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Environmental Indicators of Life Expectancy

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Gunning Fog Index: 13.74

Abstract - The study determined the global patterns of environmental indicators and life expectancy in 97 countries selected through purposive sampling. Life expectancy index is the number of years a newborn infant would live if prevailing patterns of mortality at the same time of birth were to stay the same throughout the child's life. The study used data mining with four phases: exploratory data analysis, confirmation of data for reliability, theory formulation, and theory validation. The global pattern of human development indices revealed that clustering of countries reflects similarities in environmental characteristics. Cluster 1 includes the USA and the highly developed countries in Europe, Australia and Asia. These countries have strong environmental structures. Cluster 2 includes the least developed countries in Africa and Asia with low ratings

in environmental indicators. Cluster 3 is formed by Asian developing countries and other newly industrialized countries. They have low ratings in environmental sustainability indicators. Cluster 4 includes countries in the American continent, and the southern and central parts and Asia. These countries have low environmental sustainability. The global trend of life expectancy indicates that people live longer if they live in countries with sustainable environment in terms of higher environmental health, clean and potable water, and clean and fresh air.

Keywords - International Pattern, Life Expectancy Index, Gross Domestic Product Index, Environmental Health, Water Stress, Air Pollution,

INTRODUCTION

Life expectancy is the average number of years which an individual can expect to live in a given society, normally derived from a national life table. Women consistently have a longer life expectancy than men, especially in more economically developed countries where the risks of child bearing are less than those in less developed countries. Between 1970 and 1998, world life expectancy rose from 56 to 64, from 72 to 78 in the industrialized countries, from 53 to 62 in the developing countries (Bellamy, 2000). In 2008, the current world average is 66.12. years. The lower life expectancies for less economically developed countries generally reflect high infant mortality rates.

Countries can be classified as highly developed, developing, and least developed. Highly (www.Answers.com/topic/life-expectancy) developed countries have stringent environmental laws as they adhere to international protocols in the conservation and protection of the environment. The end results are cleaner air and water and sustainable land resources.

In contrast, poorer countries in the African and Asian continents generally lag behind in terms of their environmental development. These countries exploit their natural resources with high levels of corruption, financial gains from natural resources do not translate to economic gains enjoyed by the majority of their people.

Meanwhile, the developing countries have problems in their environmental sustainability. Development is not sustainable since this is usually achieved at the expense of the environment. Weak political structures cannot sustain development. Adding to the global variations in development are the different geographic locations since some have large blocks of land, others are islands, and some are land-locked countries. Differences in language, culture and history contribute to the unique features of these countries.

The desire to live longer is a universal aspiration of every human being. The goal of every nation is for its population to live longer to enjoy the comfort and benefits of national development. The quality of life enjoyed by the citizens of the world mirrors the fruits of global development.

METHODOLOGY

The study is a descriptive analytical research considering environmental indicators identified through data mining and used as a basis for cluster analysis. Stepwise regression analysis was used to determine the significant predictors of life expectancy. The data mining process followed the procedure used by Padua (2007).

The researchers first identified environmental indicators and their corresponding sub-indicators were identified. The choice of variables was developed from an analysis of the literature on life expectancy and from the researcher's personal knowledge and inputs from preliminary interviews with other experts obtained through Delphi technique Stuter (2009) second, from a preliminary list of variables, data of the 147 countries were consolidated. Data obtained from websites were confirmed through email by the Ministries of Health, Economic Development, and Education of different countries. Some countries had missing data, thus further information was sought. However, some countries failed to provide the needed information. The researchers decided to include countries with complete sets of data. Hence, out of 147 countries, only 97 were included. Third; cluster analysis was performed for the indicators to determine the characteristics of each cluster. Fourth; theories were formulated. The new theories were validated through multiple regression analysis and stepwise regression analysis.

Measurement of Variables

Indicators	Sub-indicators	Data Source	Level of Measurement
		Life Expectancy:	
	Air Quality *(z-score)**	http://hdr.undp.org/en/statistics/data/. Retrieved on January 3, 2009	Interval
Environmental Indicators	Water Quality *(z-score)**	**Environmental Indicators:** http://sedac.ciesin.columbia.edu/es/esi/downloads.html#data. Retrieved on February 2, 2009	Interval
	Air Pollution *(z-score)**		Interval
	Water Stress *(z-score)**		Interval
	Environmental Health *(z-score)**		Interval
	Basic Human Sustenance *(z-score)**		Interval
	Greenhouse Gas Emissions *(z-score)**		Interval

Cluster Analysis. The term *cluster analysis* (first used by Tryon, 1939) cited by Blashfield (1980) encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories. A general question facing researchers in many areas of inquiry is how to *organize* observed data into meaningful structures, that is, to develop taxonomies. In other words, cluster analysis is an exploratory data analysis tool used to sort different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise (www.neurobot.bio.auth.gr/auchieues/tutorials). Cluster analysis can be used to discover structures in data without providing an explanation/interpretation.

Multiple Regression Analysis. To develop a model that would show the best and robust predictor to be included in the regression equation, the Stepwise Regression Analysis using SPSS (at α = 0.05 significance level of entering and α = 0.10 significance level of staying) was used. The variable or variables that will enter in the model contribute most to the reduction of the

variability of the dependent variables. The estimated full model regression equation takes the form:

$$\hat{Y}_i = \hat{\beta}_o + \hat{\beta}_1 X_{i1} + \hat{\beta}_2 X_{i2} + \hat{\beta}_3 X_{i3} + \ldots + \hat{\beta}_7 X_{i7}$$

where $\hat{Y}$ is the predicted value of the dependent variable and X_i's are independent variables. The β_o is a constant representing the y-intercept and the rest of β's are the estimate regression coefficients. Multiple regressions were used to estimate the parameters that would generate the model.

In the study, the indicators that were not measured in index form were log-transformed to overcome linearity, normality, and variance heterogeneity problems (McDonald, 2009).

Data Transformation. Most of the indicators were standardized in the form of z-scores. All indicators preserved the relative distances between countries' values by converting all variables to z-scores, which were obtained by subtracting the mean from the observation and dividing the result by the standard deviation of the variable. For aggregated indicators, variable components were transformed into the same unit through z-score before computing the one representing composite value. For variables in which high values corresponded to low levels of environmental indicators, the computation order was reversed by subtracting the observation from the mean and dividing the result by the standard deviation.

RESULTS AND DISCUSSION

Cluster Analysis of Countries

For purposes of comparative policy analysis, the study identified appropriate countries within a cluster for one to benchmark in terms of environmental policies for improved performance. The leading countries within the same group were looked up to for best practices in policy or technology system.

The number of clusters was identified based on the similarity levels and distances between the joined clusters. As shown in Figure 1, the values on the similarity level and distance changed abruptly, and this determined the number of clusters for the final partition. Using four (4) clusters, the similarity level within each cluster in reasonably large number and distances between the joined clusters were reasonably small, indicating that the 4 clusters were reasonably sufficient for the final partition.

Four (4) clusters were identified with the following groupings: twenty-seven (27) countries in Cluster 1, twenty-three (23) countries in Cluster 2, twenty-one (21) countries in Cluster 3, and twenty-six (26) countries in Cluster 4. Countries belonging to the same cluster were more homogenous in terms of the indicators considered than countries belonging to other clusters. Cluster 1 was mainly composed of developed European countries - Austria, Finland, France, Germany, Greece, Iceland, Italy, Portugal, Spain, Switzerland, United Kingdom; and other highly industrialized countries such as Australia, Canada, Japan, New Zealand, United States of America; and

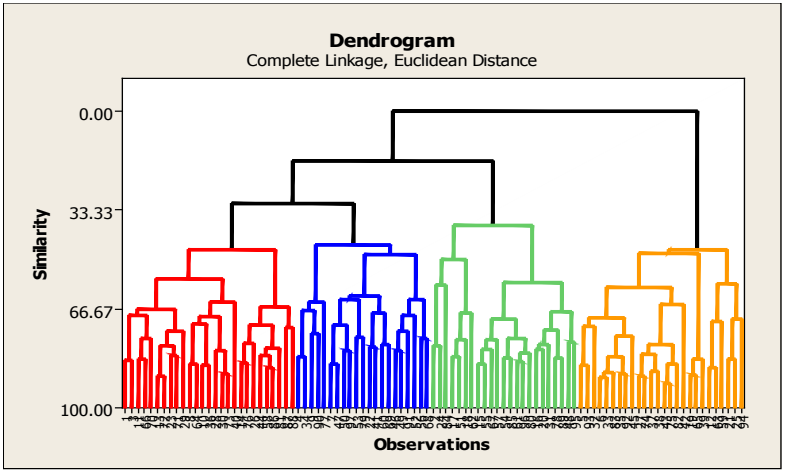

Figure 1: Dendrogram of ninety-seven (97) countries

countries with strong economies - Czech Republic and Hungary. Other few developing countries such as Botswana, Chili, Costa Rica, Mongolia, Namibia, Poland, Uruguay, and Yemen were included in Cluster 1.

Cluster 2 comprised most of the African least developed countries (LDC's), namely Angola, Burkina Faso, Burundi, Chad, Congo, Ethiopia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sierra Leone, Tanzania, Uganda, Zambia and Asian least developed countries particularly Cambodia and Myanmar. Other developing countries in Africa- Cameroon and Kenya, and in Asia; Laos and Oman and Tajikistan –belonged to the cluster.

Cluster 3 was formed mostly by Asian developing countries such as Armenia, Azerbaijan, Iran, Jordan, Kazakhstan, Lebanon, Pakistan, Saudi Arabia, United Arab Emirates, and Kyrgyzstan; newly industrialized Asian

countries such as China, Malaysia, and Turkey; and one developed country, Kuwait. Other non-Asian developing countries were in the cluster particularly Belarus, Georgia, Libya, Morocco, Russia, Ukraine, and Zimbabwe.

Table 1: Clustering of countries based on the cluster algorithm

CLUSTER 1 (27 countries) Orange	**CLUSTER 2 (23 countries) Green**	**CLUSTER 3 (21 countries) Blue**	**CLUSTER 4 (26 countries) Red**
Australia	Angola	Armenia	Albania
Austria	Burkina Faso	Azerbaijan	Argentina
Botswana	Burundi	Belarus	Bangladesh
Canada	Cambodia	China	Benin
Chile	Cameroon	Georgia	Bolivia
Costa Rica	Chad	Iran (Islamic Republic of)	Brazil
Czech Republic	Congo	Jordan	Bulgaria
Finland	Ethiopia	Kazakhstan	Colombia
France	Kenya	Kuwait	Croatia
Germany	Laos	Kyrgyzstan	Dominican Republic
Greece	Madagascar	Lebanon	Ecuador
Hungary	Malawi	Libyan Arab Jamahiriya	El Salvador
Iceland	Mali	Malaysia	Ghana
Israel	Mozambique	Morocco	Indonesia
Italy	Myanmar	Pakistan	Jamaica
Japan	Niger	Russian Federation	Mexico
Mongolia	Oman	Saudi Arabia	Nepal
Namibia	Rwanda	Turkey	Nicaragua
New Zealand	Sierra Leone	Ukraine	Panama
Poland	Tajikistan	United Arab Emirates	Paraguay
Portugal	Tanzania (United Republic)	Zimbabwe	Peru
Spain	Uganda		Philippines
Switzerland	Zambia		Romania
United Kingdom			South Africa
United States			Thailand
Uruguay			Trinidad and Tobago
Yemen			

Cluster 4 included many of the countries in the American continent such as those in the southern part: Argentina, Bolivia, Brazil, Colombia, Dominican Republic, Ecuador, Paraguay, Peru, and Trinidad & Tobago together; the central part: El Salvador, Jamaica, Nicaragua, and Panama; and one northern American country, Mexico. Southeastern European countries specifically Albania, Bulgaria, Croatia and Romania were also included in the cluster. Cluster 4 also included the newly industrialized countries like Thailand, South Africa, Philippines, Indonesia, Brazil; other developing countries such as Ghana and Nepal; and least developed countries such as Bangladesh and Benin.

Noticeably, the clusters included many geographically connected countries, suggesting that they have similar underlying environmental characteristics.

Characterization of the Cluster of Countries

Table 2: Characteristics of cluster of countries

Explanatory Variables	CLUSTER 1 (27 countries)	CLUSTER 2 (23 countries)	CLUSTER 3 (21 countries)	CLUSTER 4 (26 countries)	International Mean ± *S.E*
Life Expectancy Index	0.84	0.46	0.73	0.74	0.70 ± 0.02
Air Quality *(z-score)**	0.23	-0.43	0.41	-0.21	**
Water Quality *(z-score)**	0.51	-0.03	-0.34	-0.09	**
Fresh Water Quantity *(z-score)**	0.13	0.12	-0.59	0.30	**
Air Pollution *(z-score)**	-0.76	0.73	-0.13	0.11	**
Water Stress *(z-score)**	-0.38	0.72	-0.44	0.01	**
Environmental Health *(z-score)**	0.69	-0.95	0.08	0.29	**
Greenhouse Gas Emissions *(z-score)**	-0.12	1.06	-0.73	-0.06	**

*** Note:** Negative z-score meant that the indicator level is below the average level across countries and positive z- score above meant that the indicator level is above average. (**) double asterisk indicates that mean and

standard error was not applicable because data were composite values of different variables represented by z-score values.

Table 3: Summary of Clusters' Characteristics

CLUSTER 1 (27 countries)	**CLUSTER 2 (23 countries)**	**CLUSTER 3 (21 countries)**	**CLUSTER 4 (26 countries)**
HIGH Environmental Sustainability	LOW Environmental Sustainability	LOW Environmental Sustainability	LOW Environmental Sustainability

Countries in Cluster 1 had high life expectancy index and high environmental sustainability (high air and water quality, fresh water quantity, environmental health, and basic human sustenance and low greenhouse gas emission). In Cluster, 2 the countries were characterized by very low life expectancy index and high environmental vulnerability characterized by below average level of air and water quality, environmental health, basic human sustenance and very high level of air pollution, water stresses, and green house gas emission.

Cluster 3 represented the Muslim Asian countries with above average life expectancy index. Noticeably, Cluster 3 mostly included communist Asian countries. Some countries had large deserts; hence, they had low level of fresh water quantity that led to low water quality and high water stress because small amount of water was available for use. Air quality was low across the countries in Cluster 3 due to low ratings on air pollution and greenhouse gas emission.

Cluster 4 referred to countries with high GDP index and health expenditure and high ratings on life expectancy. They were environmentally vulnerable as they were characterized as having low air and water quality coupled with relatively high air pollution and water stress. However, they fare well in environmental health and basic human sustenance brought about by relatively high fresh water quantity. They had low greenhouse gas emission and low ratings on science and technology advancement. Cluster characteristics are summarized in Table 2.

Theory Formulation

From the cluster analysis, the following theories were formulated.

Theory 1. The highly developed European, American and Asian countries have strong economies that support their sustainability of their environmental structures.

Theory 2. The least developed countries in Africa and Asia have weak environmental structures that hinder sustained growth and development.

Theory 3. Asian developing countries have achieved higher level of development but at the expense of their environmental sustainability. Weak political structures may have brought down environmental health since it takes strong political leadership and good governance to safeguard the environment.

Theory 4. Some countries in the American continent and Asia have high development but have low environmental sustainability caused by low rate of scientific and technological advancement, which is a critical factor in improving environmental health.

Theory 5. The environmental indicators are significantly related to life expectancy in the 97 countries under study. People live longer in countries with sustainable, friendly environment.

Theory 6. The economic development of a country brings about corresponding development in the environmental aspects. Life expectancy is largely a function of economic development and some concomitant dynamics of environmental factors.

Theory Validation

This study validated the theories formulated. The data were processed using Stepwise Regression Analysis, which is an iterative regression method that determines the most influential variables among a set of variables. Prior to stepwise regression analysis, correlation test between life expectancy and other variables included in the study was performed. The variables that showed significant correlation to life expectancy were processed through Stepwise Regression Analysis.

Table 4: Summary of Stepwise Regression Variable Selection by Cluster of Countries (Transformed variables)

Clusters	Predictor Variables	Beta	Std. error	t	p-value	R^2
Cluster 1	Constant	0.461	0.138	3.334	0.003*	
	Water Stress	-0.452	0.096	-4.688	0.000*	
	Water Quality	0.484	0.111	4.351	0.000*	
Cluster 3	Constant	-0.092	0.128	-0.715	0.484	
	Water Stress	-0.426	0.188	-2.264	0.036*	

*statistically significant at 0.05 level

Table 4 shows the summative results of stepwise regression analysis by cluster. Results reveal that for rich countries (Cluster 1), water stress and water quality emerged as the significant predictors of life expectancy. On countries with environmental capacity (Cluster 3), water stress significantly predicted life expectancy. No predictor variables came out for Clusters 2 and 4.

Summary of Stepwise Regression Analysis results is shown in Table 5. Water stress, air pollution and environmental health significantly contributed to life expectancy, thus they are entered in the model. Other variables not entered in the model, however, adversely influenced life expectancy. The combination of these indicators registered an $r^2 = 0.815$. This implies that 82 % reduction of the variation in life expectancy index was already explained by the three variables. Significant t-statistics across the six significant predictors (p-value < 0.05) further affirmed the findings. Below is the generated life expectancy index.

Life Expectancy Index = -0.028 - 0.468 Water stress - 0.313 Air pollution
+0.394 Environmental Health

Table 5: Summary of Stepwise Regression Variable Selection on Life Expectancy (Transformed variables)

Explanatory Variables	**Life Expectancy Index**			
	Beta	Std. error	t	p-value
Constant	-0.028	0.046	-0.605	0.55*
Water Stress *(z-score)**	-0.468	0.092	-5.110	0.00*
Air Pollution *(z-score)**	-0.313	0.101	-3.085	0.00*
Environmental Health *(z-score)**	0.394	0.108	3.658	0.00*
R	**R^2**	**Adjusted R^2**	**S.E.**	**R^2 Change**
0.903	0.815	0.803	0.444	-0.001

* Statistically significant at 0.05 level

Every one level increase in environmental health will cause life expectancy index to increase by 0.138 points, provided that other indicators are kept constant. Other coefficients can be interpreted in the same way.

Environmental health is an aggregated value from death rate due to intestinal infectious diseases, child death rate due to respiratory diseases, and children under five mortality rates per 1,000 live births. These are indicators of the degree to which the children and adult population is affected by poor sanitation and water and air quality, which are related to environmental and health conditions. This finding validates the recent study of Schwartz et.al (2008) that reduction in particular conditions of air pollutions below US Environmental Practice Agency level would increase life expectancy. Water pollution or water stress emerges as one of the predictors of life expectancy. Water stress is the composite value from industrial organic water pollutant emission per available freshwater, fertilizer consumption and pesticide consumption per hectare of arable land, and percentage of country under severe water stress. Emissions of organic pollutants from industrial activities degrade water quality by contributing to the eutrophication of water bodies. Excessive use of fertilizers and pesticides in agricultural activities has negative impact on soil, water, humans, and wildlife. Hence, water pollution

lessens human life span. The presence of NO_2, SO_2 and VOC (volatile organic compounds) on air contributes to the changes in ambient air quality and consequently impact on human and ecosystem, thus air pollution significantly affecys human life expectancy.

Policy Formulation

Based on the validation of theories, the following policies are formulated:

1. For wealthy countries of Europe, America, Australia and Asia, they need sustainability measures and stringent implementation of laws governing water resources management.
2. For developing Muslim Arab countries, which lands are mostly deserts, the policy on critical water resource management is important for sustainable living.
3. In the developing countries in South America and Asia, greater emphasis should be given on increasing their people's life longevity. Well educated people are capacitated to make informed choices for the development of their well-being.
4. On the global level, there is a need for intensive programs to support environmental causes for the peoples of the world to enjoy the benefits of human development - higher quality of life and longer life expectancy.

CONCLUSIONS AND IMPLICATIONS

From the findings, the following conclusions and implications are drawn:

1. The international pattern of life expectancy reflects a clustering of the countries with similarities in environmental characteristics.
2. The international pattern of life expectancy reveals that people have longer lives if they live in countries with sustainable healthy environment, characterized by clean and potable water, clean and fresh air, low water and air pollution, and low greenhouse gas emission.
3. Environmental sustainability has been consistently low in the three clusters, signifying that economic gains and social development cannot be sustained if the environment is at risk. As it seems, the price of global development is the continued degradation of the environment.
4. Life expectancy is largely a function of environmental sustainability. Life expectancy in the wealthy countries of Europe, America, Australia, and Asia is basically a function of low water stress (abundant water supply).

5. Life expectancy in Asian Muslim countries and some European countries are affected by water stress. This means that scarcity of clean water adversely affects the life expectancy of people in these countries.

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The Empty Nest: Unvoiced Concerns of the Elderly

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Abstract - The study aimed at: a) presenting the profile of the elderly in terms of age, sex, living condition, family position, social support system, financial support, health-related profile, type of help received from significant others, feeling of usefulness/morale, household chores/activities, and recreation; b) discerning problems and challenges experienced by them; and c) analyzing the concerns of the elderly on pressing needs of care. The descriptive research design was used in the study in the present condition. The respondents were 150 older persons from selected urban and rural. The respondents were selected through the purposive sampling technique. The selection criteria were: a) 60 years old or above; b) Neither living alone with the family or relatives; and c) either head of household or dependent. The research tool was an interview guide/schedule formulated to answer the objectives of the study. The data were analyzed using frequencies, percentages, and rank. No test of hypothesis was done because the data are normative and qualitative

in nature. The theory on "empty nest" is concretized by the experiences of the elderly as they voiced out their concerns related to this phase of their lives. A glaring premise derived from the study is that a good number of the elderly are household heads with own sources of income. This premise contradicts the assumption that the elderly depends much on their children for their needs. It is ironic, that the majority of the elderly provides support to their own family but has constraint and economic insecurity Emotional insecurity is felt for having perceived that their children will only care when they are sick. Economic insecurity is felt for having incurred additional expense for regular medication and proper diet. The pressing health care needs of the elderly are founded on older age issues on the health care, financial assistance, providing for proper diet and nutrition, healthy environment, emotional counseling, physical therapy, and recreation.

Keywords - Elderly, Empty Nest, Pressing Needs, Problems, Challenges

INTRODUCTION

Aging is a normal process of time-related change that begins at birth and continues throughout life (Meltzer, 2007). Conceptually, aging has been associated with health depletion, physical and mental impairment, and psychosocial changes as evident in stress and depression when children start to leave homes to start their own lives.

The elderly people who are sixty years old and above now comprise the fastest growing population group in the country (Cruz 2010). Assuming that such phenomenon will continue to prevail in the future, the number of aging people in the Philippines will soar to 22 million by 2040 from 4.6 million in 2000. This imperceptible but steady shift in the country's demographic profile is being triggered by lower mortality and fertility rates.

According to Rockwille (2003), a major challenge facing society is how health and quality of life in an aged population can be maintained. Among developed countries, preventive intervention and focused activities and

programs significantly reduced disabilities and functional limitations among older people. In addition, Lewis (2005) posited that aging causes decreased mobility and deteriorating physical capacity and intellectual ability, even in the absence of any disease. The presence of physical deterioration due to old age and the interactions among several diseases often make health care provision of the elderly more complex.

One of the concerns of the healthy people and goals of the Department of Health is health care of the elderly. According to Maglaya (2003), the most commonly documented problems of older people are health and availability of health care services to sustain physical wellness. Consequently, the major problem among older people is access to appropriate health and social care.

Traditionally, elder care has been the responsibility of family members and is provided within the extended family home. The continuity of this type of elder care provided by the children and others can be disrupted when the children leave their homes to build their own family. Brier and Schaie (1997) labeled this situation as an "empty nest" wherein the parents at the old stage of their existence face the challenge and insecurities of being left at home. In reality, most elders would prefer to continue living at their own homes for reason of sentiments rather than thriving in an empty nest. Unfortunately, the majority of elderly people lose functioning ability and require additional assistance at home. An elder care facility is an option when the children lack enough time to care for the elderly. However, the adult children often face a difficult challenge in the sense that an elder care facility is rare in Mindanao.

FRAMEWORK

The study was based on Erickson's (1968) Stages of Psychosocial Development. This theory states that a human being passes through life stages from infancy to late adulthood. In every stage, an individual faces challenges and experiences changes and crises. The psychosocial crisis during this stage is characterized as ego integrity versus despair. It is in the adulthood that persons analyze their accomplishments and are able to develop integrity if they see their lives to be productive. If they feel that they have not accomplished their life goals, they become dissatisfied and develop despair, which leads to depression and hopelessness. It is also in this stage of life that issues on elderly health and care are discussed.

Moreover, Watson (1985) presented ten curative factors applicable to elder

care. These curative factors are as follow: a) practicing loving care; b) being present, sustaining, and enabling to the one being cared for; c) cultivating of one's own spiritual life; d) developing and sustaining a helping, trusting, caring relationship; e) being supportive of the expression of positive and negative feelings as a connection with a deeper spirit of self and the one being cared for; f) creative use of the of caring process; g) engaging in a genuine teaching-learning experience that attends to unity of being within other's frame of reference; h) creating a healing environment with beauty, comfort, peace, and dignity; i)consciousness of the spiritual dimension of life; and j) carrying for self and the one being cared for.

Hellstrom and Hallberg (2009) conducted a study on the perspectives of elderly people receiving home on health care and quality life. The authors emphasized the importance of the types of care needed, the reasons care are needed, and better quality of life among the elderly people living at their own homes, to support the independence and maximize the quality of their life. The study was centered on the elderly living at own homes but dependent on help from significant others. They explored in the study sex, age, living condition, civil status, number of children (if any), health condition/diseases, help from another person, and type of help received. It was found that diseases, number of complaints, restricted ability to be alone, living alone, and ages were significantly associated with low quality of life among the elderly.

The cited study encouraged the researcher to conduct a similar study in the Philippine setting. Thus, this study deals sex on number of children, living conditions (whether living alone or with significant others), family position (as household head or dependent), social support system, financial support, health-related profile, type of help received, morale (feeling of usefulness), roles in the household, and recreation. The study also explored the elderly's pressing care needs and challenges they experienced.

The Filipino elderly people are increasing in number today. One factor that explains this population trend is the increasing life expectancy due to higher standard of living and scientific advances in the medical field. Based on the projection of the National Statistic Office (NSO), the number of elderly population is seen to swell in the next three decades. From 6.1 percent in 2005, the proportion of elderly is expected to reach 13.8 percent by year 2040. More significantly, the number of elderly is seen to grow over three-folds from 5.3 million in 2005 to 19.6 million by 2040. This changing demographic phenomenon underscores the importance of creating services that respond to

their needs particularly on health, well-being and quality of life (Miles, 2009).

Traditionally, elder care is the responsibility of family members and provided within the extended family home. Increasingly in modern societies, elder care is being provided by state or charitable institutions. The reasons for this change include decreasing family size, greater life expectancy of elderly people, geographical dispersions of families, and the tendency for women to be educated and work outside the home. Although these changes have affected much European and North American countries first, it is now increasingly affecting Asian countries also (ElderCareBC.com). However, most elders would continue to live at their own homes. Unfortunately, the majority of elderly people gradually loses functioning ability, thus need additional assistance at home or need to move to an elder care facility. The adult children of these elders often face a difficult challenge in helping their parents make the right choices (Gross, 2008).

Pedro and Barba (2008) reported that the growing proportion of older persons in the Philippine population, with their potential contribution to development efforts as well as special needs for health and social services, presents an emerging demographic concern. Studies of food habits in later life among urban elderly who lived with their families, those housed in government-operated homes for the age, and older persons in private institutions and the health and nutritional status of the Filipino elderly in urban and rural settings found deficiencies in energy and protein intake among older persons. Those cared for by government social workers and care givers had lowest protein-energy intakes and highest proportion of underweight. There was a general perception of tiredness and limited social activity, network, and social support. While favorable, as the Filipino elderly generally lives in a household where there is at least one adult female.

OBJECTIVES OF THE STUDY

The study aimed at (a) presenting the profile of the elderly in terms of age, sex, living condition, family position, social support system, financial support, health-condition profile, type of help received from significant others, feeling of usefulness/morale, household chores/activities, and recreation; b) Identifying

the elderly people, and c) analyzing the elderly's concerns pressing care needs.

SIGNIFICANCE OF THE STUDY

The findings of the study will be beneficial to the following groups:

DOH, DSWD, and LGUs. The findings can be need as bases for formulation and implementation of a policy on social care for the elderly.

Elderly. The needs of other health and social care to determination of their health care needs and services will be realized to foster a better a quality of life. Concerns will help facilitate the formulation of a policy that really addresses their pressing needs.

Significant Others. Their support and care for the elderly will be enhanced through the findings will provide them with awareness of the appropriate interventions done by the Department of Health, Department of Social Welfare and pressing needs of their elderly, thereby making them more sensitive and attentive to their needs.

RESEARCH METHODOLOGY

The descriptive research design was used in the study. The respondents were 150 older persons from selected urban and rural areas in Northern Mindanao. The respondents were selected through the purposive sampling technique. The selection criteria were: a) 60 years old or above; b) living either alone or with the family or relatives; and c) either head of the household or dependent. The respondents requested the three categories of the elderly: 61 for the early category (60-69 years old); 56 for the middle category (70-79 years); and 33 for the late category (80 years old and above). The research tool was an interview guide/schedule, formulated to answer the objectives of the study. Formal communications as to the conduct of the study was sent to the different mayors. The data analyzed using frequency, percentage, and rank. No test of hypothesis was done because the data were normative and qualitative in nature.

RESULTS AND DISCUSSION

As to the respondents people, The highest percentage (40.7%) was those in the early category (60-69 year old) followed by those in the middle category (70-79 years old). The lowest percentage (22%) was those in the late category

(80 years old and above)

In terms of sex, there were more female respondents (56.7%) then male respondents (43.3%). This finding confirms the Philippine profile of the elderly characterized by feminization. Since 1980, the elderly women have outnumbered their male counterparts. This phenomenon may be due to women having longer life expectancy by five to seven years than men, thus former having a tendency to outlive them the latter (journals.upd.ph/index.php/pssr/article/viewfile).

As to number of children, the highest percentage was on people who had 4-6 children (41.3%) and the lowest percentage was on children (2 %). The average number of children was five.

The living condition of the elderly was determined in terms of living arrangement, either living on finding out if they are arrangement, either living alone or with significant others. Findings disclose that majority of the elderly (86.7%) lived with their families. Only 8.7% lived alone with a trusted helper or a relative and 4.6% with close relatives. The findings show that most of the Filipino elderly remain with their family, their adult or even married children live with them. Only very few deviated from this family norm as they live alone or with a few close relatives. It has been established that respect for the dignity of the older persons, pulling them in an exalted place in the family homes, has always been the mark of Asian societies like the Philippines (http://www.buzzle.com/articles/needs-of-the-elderly.html).

In terms of family position, the elderly, dependent on their families for support (55%) was greater in number than those who are household needs, their children may be the ones depending on them. On the other hand, those who are dependent upon their families for support are provided by their children with various types of support to meet their care needs.

Moreover, the elderly had varied social support system. The providers of social support were ranked as follow: own children (rank I), spouses (rank 2), relatives (rank 3), and others, (rank 4) such as church members, neighbors, friends, and health staff. The elderly reveled that in their old age, they feel insecure but these people left their spirit up. Many of the older persons expressed that the social aspects of elderly support are more important than the economic aspects. They connect with significant others by chatting with them to make them feel wanted, cared for, and loved. Their children let them feel that they are not alone and that they are not being ignored just because they have become old and slow. However, many elderly also commented that

their children only spend time with and care for them at the moment of illness.

Furthermore, in terms of financial support, 67 more of the elderly relied on their children or spouses (55.3%) than those who relied on themselves (44.7%). Economically this had the following as sources: savings (rank I), income (rank 2), pension as retirees (rank 3), and pension as survivors (rank 4). Those who had savings said that they really prepared for their old age. Those who had income derived it from their farms or businesses. In addition, the pensions they received either as retirees or survivors helped them meet their needs. On the other hand, those who were dependent received monthly support from their children and/or spouse. The amounts they received monthly as support was distributed as follow: P 1,000.00-3,000.00 (45.9 %), P3,001.00-4,000.00 (37.3%), P4,001.00-5,000.00 (9.6%), and P5,001.00-6,000.00 (7.2%). The finding shows the Filipinos have strong familial value. The family remains the most important provider for the elderly. The majority of the caregivers for the elderly are often members of their own family, most often a daughter or a granddaughter (Repa, 2010; Casez, 2007).

As to health and as ranked, the diagnosed diseases/illnesses since the past three years were as follow: hypertension/high blood pressure, body pains (muscles, joints/back pains), arthritis/rheumatism, diabetes, heart ailment, asthma, kidney-related ailment, skin-related ailment, liver-related diseases, and pneumonia. Twelve of them reported not having been diagnosed to have major diseases (just the common colds, coughs, and headache). The three most frequent diseases, (hypertension, body pains, and arthritis/rheumatism) indicate that as people age, their bodies undergo changes that make them more vulnerable to chronic, debilitating and disabling conditions. In fact, Carlos (2010) emphasized that the elderly tend to be at higher risk of developing disabilities and contracting diseases.

As to frequency of having medical check-up, the highest percentage of the elderly had it monthly (48%) followed by only when needed (32%). The rest had it once every two to three months (10%), weekly (6.7%) and three times a year (3.3%). Most of those who had monthly check-up had hypertension, arthritis, diabetes, and kidney-related ailments. The main reason for having a monthly check up is to monitor closely their health conditions to prevent or detect complications. Those with the most chronic diseases needed close medical supervision as in the case; hence they had weekly check-up. Those who had it only when needed were regular medication.

The health care providers sought by the elderly were as follow: physicians/

medical specialists (73.3%), alternative/folk healers (12.7%) and both medical specialists and alternative/folk healers (14 %). As revealed, the majority of the elderly had to go to physicians/medical specialists for their consultation and medication. One of the elderly disclosed that he consulted a cardiologist for his enlargement of the heart. A few resorted to alternative medicine. One specific case was a diabetic who took medicinal plant ("ampalaya") to reduce her blood sugar level.

On the preferred health care institutions, 44.7 % preferred private hospitals either primary or tertiary 30 % preferred public hospitals, 16.7 % preferred barangay health center, and 8.6 % preferred home care services. Several reasons were accounted for the choice of private hospitals, to wit: 1) advanced medical facilities and services availability of medical specialists complete provisions of health care services , and own children's choice. Those who preferred private hospitals believed that there hospitals are equipped with highly advanced medical facilities and have specialists for a specific disease. To some, they cited economic reason, for non-preference for private hospital. On the other hand, those who preferred public hospitals cited affordability and accessibility as reasons. Public hospitals were highly preferred by the elderly residing in the rural areas where provincial hospitals are just a walk away from home. The same thing holds time for preference for barangay health centers. Those who preferred home care believed that their health condition is manageable. Home care management was also preferred by the elderly whose son/daughter is a nurse or whose family members can well attend to them at home.

Moreover, most of the elderly (92 %) took prescribed medication, while only very few (8 %) took non-prescribed medication. The prescribed medications are needed to control the chronic attacks of their diagnosed diseases/ailments. For instance, one of them revealed that she rather spends as much as 3,000.00 a month for prescribed medication just to control the level of her blood pressure and sugar. She further revealed that much of her monthly pension is spent for medication. The monthly costs of medication the elderly is spending for medication is distributed as follows: P1, 000.00-1,500.00 (15.2 %), P1, 5001.00-2,000.00 (24.6 %), P2, 001.00-2,500.00 (30.4 %); P2, 501.00-3,000.00 (17 or 12.3 percent), P3, 001.00-4,000.00 (11.6 %); and P4, 001.00-5,000.00 (5.8 %). The monthly cost of medications was paid for by the elderly's own savings, pensions, and contributions from children. The monthly cost of medication is increasing each year for as they get older, their health further deteriorates and

hospital visit becomes more frequent.

Furthermore, the types of help the elderly received from significant others were as follows: 1) companionship and sense of belonging (f=103), 2) health care needs (f=100), 3) financial support (f=97) and nutrition (f=93). The findings reveal that the elderly received much socio-psychological support from family members. The elderly were also provided with the needed nutrition. The giving of financial support to parents by children is culturally noted among the Filipinos. The different types of help give the older persons solace. The elderly need a supportive family environment, without which they may experience depression (http://www.trailhealth.net/health/).

Most of the elderly felt that they are still of use in their families. Consequently, they had a high morale for being consulted for major family decisions (rank 1), the for being asked to help in the disciplining of their grandchildren (rank 2) for being still the household (rank 3), and for being able to do little things significantly (rank 4). (eg. helping grandchildren do their assignment and home study, accompanying toddlers to schools, and taking care of pre-scholars at home). Other things that the elderly managed to do included taking care of farm animals gathering of firewood, cooking rice, and manning a store. On other hand, seventeen out of 150 respondents felt becoming useless because of their physically weakness. Twenty-nine of the elderly revealed having low morale because their children would only remember them when they are sick.

Data further disclose that 84 % could still perform some household chores while 16 % revealed otherwise due to physical exhaustion and weaknesses. The majority of those who were into household chores did the washing of plates, cooking, cleaning / arranging of furniture house gardening, sewing of worn dresses, and fixing up of broken furniture. The household chores they did were not imposed upon then by their children, but is voluntary as a form of exercise.

As to recreation, more than half of the elderly (58%) did not have recreational activities. Only 42% of then had recreational activity, such as watching TV regularly (f=32), malling/window shopping (f=30), going to the beach at least once a month (f=28), drinking with buddies others but "fighter" drinks only (f=12), ballroom dancing (f=10), and playing mahjong on a weekend (f=9). Those who did not have any recreational activities cited versous as lacking interest in those activities, having no time and financial

resources for those, and just wanting to stay home and do household chores.

The second objective of the study was to discern the problems and challenges experienced by the elderly.

Ranked 1 (f = 113) was insecurity due to old age. The elderly were anxious about who would assist them in time of their sickness and helplessness. Although, the majority of them lived with their children, still they feared being neglected.

Ranked 2 (f = 108) was inadequate financial resources. Although close to one half had personal financial such as person, needed more for medication, recreation, and adjusted diet among others.

Ranked 3 (f = 97) was irritability due to a noisy environment. The elderly revealed that at their age they desire to live in a peaceful environment where they get quality rest and have a moment of spiritual meditation. This is usually true among the elderly in the urban areas. Many of them who voiced out this problem expressed their desire to live in a mountainous environment where they could breath fresh air, eat fresh fruits, and hear the chirpings of birds.

Ranked 4 (f = 93) was psychological and emotional gaps. The elderly commented that although they are living with their families, most of their children are already having their own residences. Usually, the children will visit them only if they are sick. Consequently, the elderly felt abandoned or neglected by their own children.

Ranked 5 (f = 91) was becoming physically weak. Becoming weak is inevitable as one grows older, but the elderly need time for such kind of adjustment. This is so because when they were still young, they used to be active but at their old age their mobility is restricted due to illness or weakness.

Ranked 6 (f = 87) was joining senior citizen's organization. They expressed their derive to associate with others and participate in the activities of their own circle. Some of them hope of finding companionship with other older persons with whom they can relate with.

Ranked 7 (f = 63) was adjustment to a new lifestyle as retirees. Sudden change of lifestyle, activities, and concerns can be stressful to those who have just retired.

The third objective of the study was to analyze the needs of the elderly.

Ranked 1 (f = 138) was on health care needs to include financial assistance.

The elderly revealed that their most pressing need is health care due to sickness, deteriorating physical strength and other age-related health issues. They also needed health care for recovery after stroke. The finding implies that the demand for elderly health care is increasing as they experience physical weakness due to age-related diseases/illnesses. Another reason for the dire need of health care is the increased life expectancy of the elderly due to new advances in medicine and science. Since they have greater chances of dying late in their lives, the call for elderly care continues to progress (http://pinoypen.com). Although the majority of the elderly are still living with their family with a married daughter, their other children are already living in different places because of location of work of having their own families raised in a different place. This situation leads to the decreasing number of family members who can share the responsibility of providing health care to their aging parents. Further, financial assistance is also needed by those who are recovering from stroke and those who have prescribed medication for maintenance are required regular medical check-up.

Ranked 2 (f = 112) was the need for proper diet. This is need greatly due to loss of appetite brought about by the aging process. Most of the respondents said that their diet has significantly changed. Aside from loss of appetite, their diet needs to be altered considering on food restrictions due to diagnosed diseases and medications. The elderly need to receive proper diet to prevent or manage diseases.

Ranked 3 (f = 96) was the need to live in a peaceful and stress-free environment. This psychological need of the elderly is also called harmony or serenity need. Many of them wished living in a place where they could take fresh air for good health. This specific need is emphasized in the theory of Watson (1985) that one curative factor of caring is a healing environment, an environment of beauty, for comfort, peace and dignity.

Ranked 4 (f = 94) was the need emotional for counseling. This need is brought about by the fact that they are sensitive and thus easily get hurt. If this feeling progresses over time, depression may possibly. According to Castillo (2007), emotional support by family and friends is necessary. Rehabilitation or psycho therapy can boost the elderly's emotional security.

Ranked 5 (f = 92) was on the need for physical therapy to improve mobility. Several elderly respondents complained being less mobile and less active after a stroke, or a fall. While full physical mobility may not be achieved, they can apply significant therapy or palliative treatment with the assistance of family members or other persons. Regular movement of the joints and muscles

preserve the strength of the bones. Physical therapy is considered a health care need, but for social care program, it is considered special need of the elderly.

Ranked 6 (f = 81) was the need for recreation and to socialization. Many of the elderly cited that loneliness goes with their aging loneliness is felt when everything is the family is gone either for work or for school. Although many of them still do some light household chores, these chores are not considered recreation. They expressed their need for some creations, for a hobby, and for an organization appropriate for their age.

CONCLUSION

The theory on "empty nest" is concretized by the experiences of the elderly as they voiced out their concerns related to this phase of their lives. A glaring premise derived from the study is that a good number of the elderly are household heads with own source of income. This premise contradicts the assumption that the elderly much depend on their children for their needs. It is an ironic that the majority, of the elderly reside with their own family but have emotional and economic insecurity. Emotional insecurity is felt for having perceived that their children would only care when they are sick. Economic insecurity is felt for needing incurred additional budget for regular medication and proper diet.

The pressing health care needs of the elderly are founded on old age issues, such as on health care, financial assistance, provision for proper diet or nutrition, healthy environment, emotional counseling, physical therapy, and recreation.

RECOMMENDATIONS

To address the concerns of the elderly, the following recommendations are presented:

1. The local government units and concerned government agencies should spearhead the establishment of an institution for the elderly where the old people can be provided with proper health care and live a healthy life. The institutions shall be established with the following conditions:

    1.1. That the services to be provided to the elderly shall be paid monthly by the family or relatives of the elderly.

1.2. That the admission of the elderly to the institutions shall only be done

2. The family members/children should find time to attending to their elders. They should regularly spend time with then Communicating and engaging in recreational activities. Also, they should provide them with a healthy environment.

3. Any family member or hired persons giving care to the elderly must strictly impose on the elderly the proper diet plan.

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Interactions with theChronically-ill: Discovering Care Opportunities for Holistic Health Care

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Abstract - This research is a qualitative inquiry on the caring interactions of hemodialysis nurses and End Stage Renal Disease patients. The research questions were focused on determining the caring characteristics that nurses used as they interact with the chronically-ill. A case study approach was considered appropriate by the researcher to match with the nature of the given processes. The study had been conducted in a natural setting with a total number of six hemodialysis nurse participants. Data was gathered by means of individual interviews and direct non-participant observations. The data was explored primarily within the case followed by cross case analysis incorporating thematic analysis. The data analysis generated conclusions: the existence of a unique caring relationship, the power of interpersonal teaching and the need for advocacy of end-of-life careopened doors for a better understanding of the interactions of a hemodialysis nurse and a chrnically-ill patient.

Keywords - *nurses, hemodialysis, nurse-patient interaction, chronic kidney disease*

INTRODUCTION

The prevalence rates of Chronic Kidney Disease in the Philippines today are approaching an alarming rate. Yearly, the number of Filipinos developing end-stage renal disease is at 11, 250 according to a report from the National Kidney and Transplant Institute as quoted by Romualdez in 2007. By principle, the replacement of a defective organ is the best method of restoring the lost function. Thus, transplantation of another organ surgically is highly advised by the physician once the glomerular filtration rate reaches the critical level of less than 15 ml/min. However, this intervention is quite expensive and the process is arduous. There are hospitalization bills to take care of, a multitude of medications being the number one concern of clients and their families. These obstacles can be equated with increasing number of people who will have to subject themselves for treatment under hemodialysis instead of transplantation.

In a global survey conducted (Grassman, Gioberge, Moeller & Brown, 2004), factors identified that contribute to the growing number of clients maintained on hemodialysis are the following: universal ageing of populations, multi-morbidity, higher life-expectancy of treated End-Stage Renal Disease (ESRD) patients and increasing access of a generally younger patient population to treatment in countries in which access had previously been limited. By 2001, the annual global average rate of 7% has been reported and one million patients are receiving dialysis treatment alone from all walks of lifeGrassman et al, 2004)With this, trained personnel who will be seeing to the healthcare needs of such patients are needed.

Little is known about dialysis nurses; what they do, what qualifications they have, and what focus they have with regards to nursing care. Through time, quite a number of researches have focused on describing the role of the nurse and patient care in practical setting. A limited number of studies are actually focusing on the concept of caring as a lived experience through the nurse's perspectives; specifically, even more in the perspective of dialysis nurse (Forrest, 1989). It is of great interest to patients, significant others and the entire healthcare team to learn how these nurses care for patients who are almost at the end of their lives. The nurse-patient interaction and relationship among them is quite unique given the circumstance that they are in. They are faced by the challenges of caring for clients whom they understand that they may lose at any given time.

Hemodialysis nurses are responsible in preparing the patient and the family to come into terms with the reality of the disease condition. It is imperative that the nurse be able to initiate and address end-of life issues. Rosemeyer (2008), described the need for dialysis nurses to be prepared in initiating conversations regarding death and dying. The nurse ought to recognize that introduction of the subject of dying is not synonymous to impending death but is actually providing opportunities for the patient and the family plan for the last moments of their lives. This brings about the role of nurses to commit and participate in advance care planning (Ceccarelli, 2008). Advance care planning sheds light on the nurses' duty to educate patients about the options that they have, to encourage them to consider their preferences ahead before a health crisis will arise and to advocate for the choices made.

The purpose of this study is to describe the interactions of hemodialysis nurses as they care for their patients. The uniqueness of the experience lies within the context that nurses spend an average of four to six hours in almost three to four times per week in interaction with these patients. During this time, patient interaction is focused on monitoring the client as they course through the treatment. In an article by Dinwiddie (2004), she reported having encountered a lot of nephrology nurses feeling frustrated and guilty dialyzing patients they deem beyond hope of regaining meaningful quality of life.

OBJECTIVES

The study is guided by the following objectives to shed light on the thoughts and feelings of a hemodialysis nurse: To comprehend caring in the perspective of a dialysis nurse who cares for dialysis patients; to determine the caring attitudes that nurses utilize in the care of dialysis patients; and, to capture the perspectives of the dialysis nurses on the difficult ethical issues emerging with end of life care.

By understanding further such examples of perspectives from healthcare providers, we may be able to give meaning to the experiences of these nurses. Corollary to these findings, it is also expected that nursing care will be improved and caring opportunities for a more holistic health management for the chronically-ill will be discovered.

METHODOLOGY

The researcher employed a qualitative research approach. The qualitative research approach was intended to come up with a holistic understanding of the whole which is the interaction between the nurse and the patient. Moreover, it was focused on deriving meaning from a phenomenon or social setting and not forecasting possible outcomes from the said phenomenon (Polit & Beck, 2004). It was aimed to provide an understanding of the "human" side of an issue; examples of which were the complementing and the contradicting behaviours, beliefs, opinions, emotions and relationships of the hemodialysis nurses. A multi-case study design was made use of vis a vis a single-case approach to uncover a broader scope of responses.

Multiple sources of data such as individual interviews and direct non-participant observation were utilized. This was aimed to answer the queries that emanated from the behavioural issues that were culled out. A semi-structured interview was utilized to make it possible for the researcher to clarify the queries that arose and also allowed probing of the answers supplied by the participants. An interview framework below described how the researcher utilized interview to gather the data based on the research questions. A total of six (6) hemodialysis nurses were interviewed. Each one of them have worked as a dialysis nurse for more than a year. All interviews were conducted in the University of the East Ramon Magsaysay Memorial Hospital Dialysis Clinic, where the participants regularly rotated. The interviews that were conducted were recorded with use of an audiotape as permitted by the interviewee. The researcher also utilized note taking strategies during the interviews to keep an account of the pertinent verbal and nonverbal responses, reactions gathered during the direct non-participant observation. Finally, the participants of the research were asked to review the contents of the draft prior to the case study report or dissemination of information.

The researcher employed the use of case study database (Yin, 2003). The case study database was used as measure for organizing and documenting the data collected to allow other investigators to review the evidences or data that had been collected and not merely rely on the findings that were to be presented.

To address the issue of trustworthiness of the data gathered and its analysis, the primary researcher constantly kept in touch with the participants of the research. This was a way to make sure that member-check is done. It

entailed going back to the participants to verify whether the interpretations of the findings and data was in actual accordance to what the participants had described of their experiences either in person or via phone interview.

RESULTS AND DISCUSSIONS

Thematic analysis was done to generate a coding system for the emerging themes. It was able to address intangible factors such as social norms, socioeconomic status, roles and participant's perceptions. The complex realities of the nurse-patient relationship were better understood as the researcher employed qualitative research as a method. Six (6) individual interviews were conducted. The participants were coded (N1-N6) accordingly to facilitate the coding system. Indexing was done through within case and cross-case analysis of the data. After generating themes and subthemes, data was organized according to thematic content. Relationship and associations between concepts were referred upon to condense the data as the final step which later on were tied up with literature.

Case Study N1

N1 is a female nurse, 33 years old, and has worked in the dialysis unit for 6 to 8 months. After working for a tertiary hospital, she chose to work as a dialysis nurse. When asked about her specific caring characteristics for dialysis patients, she said that the caring characteristics which she used as a nurse generalists caring for clients in the hospital were no different from the ones that she utilized in the dialysis unit: All nurses have the innate capacity to care for patients. The traits that are called upon to assume such responsibility varies in degree to which the service is required: *(The responsibilities are the same only we are more focused in the care of patients in a dialysis unit. With patients on dialysis, you can easily recognize if there is something going wrong, like if they suddenly become pale…).* But she further expounds saying: *(When their hands become numbed. They appreciate it much if nurses would take time to caress or massage them, even their feet.)*

From her initial responses, it can be presumed upon that N1 will do more than what is expected. Since her patients come on a regular basis of more than once a week, she cannot do away with establishing familiarity with her patients and the relatives as well. She repeatedly mentions this relationship throughout the interview. *(You cannot help but develop closeness with them seeing*

them almost three times in a week… then if one of the patient dies, we also pay our respects to the dead. Even if we are tire coming from work, wherever they might be, we go to their wakes). Describing her feelings on end-of life care, N1 as much as possible, did not want to see patients and families to give up so easily on the treatment. Her heart goes out to the patient who suffers. She stressed the importance of showing honest support to the needs and wants of the family and the patient *(We tell them encouraging words. It is like moral support because we cannot really do anything more. For example 'as long as you are still alive there is still hope'.)* On the subject of advanced directives, N1 also said that she has not yet been given the chance to provide advance care planning to patients.

Case Study N2

N2 is a female nurse from Renal Services Inc., and was fielded in the dialysis unit of UERMMMC. She has been a dialysis nurse for almost one year. She graduated in the year of 2005 and has held the position of staff nurse in a private hospital prior to this job. As a nurse caring for these patients, she is concerned with handling the situations to the best of her capabilities and knowledge. *(Independent nursing interventions must not be neglected most especially by the nurses who are caring for patients with specific needs. We are largely responsible for most of the nursing care for such patients.)*

Following the discussion on resolving patient concerns, she was asked how she defines caring for dialysis patients. She replied curtly with: *(Of course, we not only think about the treatment but also the patient's safety. They should always be comfortable and we should always be looking after them.)* Her caring qualities were mainly focused on the basic interactions of the nurse and the patient. The interactions were chiefly directed towards education of client and relatives with what's and what not's during treatment and home care. She was apprehensive in answering: *(They often ask about their diet. Also, the ask about the ways on how to care for their access, whether IJ[intra-jugular]or fistula… we answer all their questions. Usually those things are explained to them by their doctor. They probably just want clarification)* She elucidated that reinforcing the instructions from the physician is an important role of the nurses, most especially those working with special clients: *(It provides them with reassurance. We remind them so that they will never forget what they should do).* When asked about patients who are withdrawing from the treatment, N2 answered that the most common reason for patients to abandon the treatment is the lack of

the necessary funds. Again, she mentioned that education of patients and the family was important.

Case Study N3

N3 is a 25 year old female nurse. She is married and has been a dialysis nurse for four years now. She is now one of the two nurse managers of the unit. It was evident in her countenance during the interview that she enjoyed her work as a dialysis nurse: *(I learned to love it [being a dialysis nurse]. I experience many sort of things –different patients, different cases and I learn a lot)*

Being the nurse manager in the unit, N3 is in-charge of the daily schedule and staffing of the unit. she considers arising complications as one of the challenges that she faces on a day to day basis. Complications, albeit can be handled with ease, still pose a challenge for seasoned nurses due to the diversity of patients, their diagnoses and the reactions and responses. *"(We encounter challenges everyday… Complications such as hypotension, hypertension, like vomiting and other usual things like cramps)*As for her caring attributes, she believes that all nurses have the capacity and the heart for caring. Perseverance is an atiitude that nurses must poses according to her: *(…Most especially for troublesome access. It is all part of caring of a patient. You need be patient, you need to understand and know what is hurting them. There are times when they [patients] don't even express their concerns) S*ince patients stay in the unit for four hours per session and are considered to be long term clients, N3 mentioned the familiarity that develops between the nurse and the patient. The familiarity that she shares with the patients and relatives sometimes leads her to extend a helping hand to them in times of crisis. She is also an advocate of the patients whenever they need to communicate concerns to their attending physicians. When asked about patients who wish to withdraw from the treatment: *(Patients who are terminally-ill, they also want to rest, it is the relatives who wants otherwise. They [relatives] do not want to give up. We [nurses] consult with the doctors first …then if the relatives and patient do not want to continue then that is the time we remove the access.)*

Case Study N4

N4 is also a female nurse, 25 years old who graduated in 2006. She regards thorough assessment of patients an important component of caring. Most of the problems and challenges that she is facing were focused on optimizing

the care that she is rendering to patients. She deemed it necessary to improve herself first in order to improve her delivery of care. N4 also said that she was particular with the responses of the patients. She is sensitive to their needs and she believes in rendering individualized care for each of her patients: *(… It is better to have more choices because you will be able to deliver individualized care for the patient. Whatever the patient needs then that is what we need to provide).* N4 expressed her views on what caring should be as: *(Caring? Caring is when you are able to provide to your patients their needs whether they are able to tell it to you or not)*

And she explained further that she thinks that prudence and empathy are core traits that a dialysis nurse must possess. She shared her experience with her sister who died of chronic kidney disease as she enlightened her answer. She also thinks that her experience with her sister's condition helped her in better understanding her patients. When people have shared experiences, they are more suitable or compatible to help each other with problems due to the nature of reciprocity. More of her caring attributes were identified as she continued to recount how she would extend help for such patients. She was also particular with the social support that she can extend to patient and the family. She mentioned the importance of interacting with the family and their presence during treatment.

Case Study N5

Being a dialysis nurse is the first job that N5 had. She has been a dialysis nurse for almost a year. But even with daunting challenges, N5 remains steadfast in her role as a nurse as she provides care to all the patients in the unit. She considered assessment of patients crucial in the delivery of care for the patients in the dialysis unit.She explicated the different caring characteristics that she thinks are imperative for a dialysis nurse which included having sufficient knowledge, patience and the capacity to do more than what is expected for the patients.As with most nurses, she also developed certain closeness with her patients and their relatives with time.Patients and relatives would feel at ease sharing their experiences before the treatment, their feelings and things about life with N5. With those small talks, she gradually injects health teachings and words of encouragement.

She mentioned that more often than not, the families express their intent

to withdraw from the treatment to her before anyone else:" *(To us. Most of the times when the doctors are no yett around they tell us that they don't want to go on anymore. They call sometimes; telling us that they are not coming anymore)*

Case Study 6

N6 is a 28 years old female hemodialysis nurse. Prior to working as a dialysis nurse, she has had experiences as a staff nurse in a hospital facility for almost two years. She mentioned that she was interested in working in a special area that is why she chose to change careers. The work is, to some extent routinary but there were also challenges in the work area that she identified. These were mostly focused on the problems that patients encounter during treatment.To resolve emerging concerns as such, N6 is keen in observing what measure she can do independently before referring patients to doctors. She equated caring with putting the needs of the patient before anything else. *(First you have to be caring; there are all sorts of patients, some are nice others are grumpy. Second, you need to be patient. Spending four hours daily, you need to be alert for whatever. Above all, you need to put the patient first before the machine.)*

N6 stresses also the need to recognize the feelings and emotions of patients. This provides a better understanding of the personhood of the patients *(I think it is important to value patient's feelings, their reactions to the treatment, what they are feeling and if they are hurt. Looking back, they are really helpless and you [the nurse] are the only one they can rely on especially if relatives are not around).* On the ethical issues of withdrawal from treatment and end-of-life care, N6 first and foremost respects the decisions of the family. But she continues to encourage the family and the patient not to lose hope in the treatment.And although she is not formally trained in the provision of palliative care, to some extent she is able to broaden the scope of her nursing care beyond the nurse-patient relationship as she provided the necessary teaching to patients and families. Caring was also concentrated on the supportive role that she assumed.*(I don't know if it can be called advance care planning but for chronic patients, we talk to them. We ask them [patients & relatives] how they wish to handle the situation and how they want to prepare for the coming days.)*

Theme 1: Transcending the nurse-patient relationship

From the response of N1-N6, it was clearly evident that the relationship that they foster with the patient goes over and above the therapeutic relationship to the extent that they were considered much likely, as next of kin. But still, nurses were able to maintain professional distance. Huebner (2007) defined this as professional intimacy,

> *"…professional intimacy as intimate exchanges between nurses, patients, and family members in which the nurse must balance the patient's emotional and physical needs in a turbulent work environment."*

Huebner adds that professional intimacy, although invisible is important to patients and relatives. As described by N1, patients needed and wanted nurses who were gentle, those who were perceptive of minute details that could alleviate the little pains that they were experiencing during procedures. The relationship was elevated since, it was common knowledge and was expected that the end of every interaction was the end of the nurse patient relationship *(…our protocol only extends until the time they leave the unit)*, but due to the trust, respect and empathy that resulted from the relationship, nurses and patients were able to know one another beyond the illness and the treatment process.

Primarily, it is a positive benefit from the established relationship between the nurse and the patient that discussions on end-of-life (EOL) care and advance care planning are carried out more effectively. Given the opportunity, nurses do not immediately recognize the need to initiate EOL. Barriers like discomfort with communicating bad news and prognosis, lack of skill to assist patients and families to negotiate clear goals of care and treatment priorities, and lack of understanding of patients' rights to decline or withdraw treatment have led to frequent misunderstanding and excessive futile interventions (von Gunten, 2000).

Theme 2: Coaching

The positive responses from the patients as reported by N1 and N4 regarding patient education, can attest to the unquestionable impact that

proves communication and patient education can improve the condition of the patients remarkably.

Nurses want to give optimum care to their patients and they best believe that this could be achieved by individualized educational interventions. The diversity of patients contributes to the sustained need to individualize the care that should be rendered to them. The advantages associated with this approach as discussed by Horl in 2002 are likely to include improved patient compliance, outcomes and quality of life. In addition, Golper has also discussed that benefits not only apply to the patients but to the health care providers as well. It provides greater opportunity to delay disease progression through the management of accompanying signs and symptoms and to attenuate or halt the development of co-morbidities.

And as patients reach the pinnacle of the disease process, health education is still a means of providing palliative care. The responses of the participants clearly reflected how they continue to give care to patients even if they are already giving up on the treatment or simply going home after the procedure. Encouraging words spur from the sincere intent of the nurses to help the patient and the families as they go along the treatment process.

Theme 3: Offering of Self

As defined by Watson, caring is central to the practice of nursing and that nursing care is an integration of knowledge, skills, experience and values. The nurse is reflected as someone who is able to offer herself through the following subthemes:

Supportive and protective of the physical, social and spiritual environment of the patient

ESRD patients undergoing dialysis could require different types of social support depending on their social environment and the severity of the illness. The family provides them with the basic support that they require. Most of the time, patients are cooped up inside the dialysis units with no one to turn to but the nurses who are caring for them.

These led them to have poorer quality of life despite progressive treatment and feeling of low self- worth (Thong, 2007):

Being there for the patient

From the narrations of the nurses, it was evident that the patients appreciated it more if the caregiverswere visible to them. On the other hand, nurses also showed the desire to help out and reach out to the patients.

There is willingness; evident in the responses of the participants, to enter into the caring interactions and in doing so, enables the needs of the patients to be met. This is without regard to whether or not the patients earned the right to the efforts of the nurse. The attitude of willingness to do more than what is expected and to extend oneself without any expectations has been exemplified as well.

Theme 4: Using creative problem solving processes

Majority of the nurses brought up during the interview the need for a thorough assessment. These responses sprung from their previous experiences from whence they encountered problems during treatment. These problems were either expected or unexpected complications of the treatment or machine-related problems.

According to the nurses, careful and thorough assessment of clients before and during dialysis was a perceived vital component of caring. Cardiovascular co-morbidities accounts for more than ~50% percent of deaths in dialysis patients (Locatelli, 2004). The control of the blood pressure must be placed in top priority during the treatment. A multi-disciplinary approach in the management of the vascular access as prescribed by Bonucchi (1999) and Ackad (2005) will help reduce the difficulties encountered during treatment.

CONCLUSIONS

The following are the conclusions that have been drawn out from the study:

Unique caring relationship. There exists uniqueness in the interaction of a hemodialysis nurse and the patient. What began as an impersonal association, developed in to a helping relationship which transcends the medical intervention. The communication processes that go along with the established relationship enabled both parties to know one another not just

as an individual who is sick or a person who provides care, but as a human being. From the caring relationship, the caring characteristics that underscore the interaction became apparent. The dialysis nurses in the study were found to be sensitive of the patient as a whole. Characteristics such as patience, empathy and extending or reaching out to patients were also evident from the nurses.

Interpersonal teaching. Health education is the heart by which the changes in behaviors are rooted. Most patients with renal disease have limited knowledge about their condition. Through the provision of health education, patients as well as families are equipped to face the challenges that entail their illness and the subsequent treatment that they must undergo. Complications are also better controlled through the constant reinforcement that nurses perform. It can be concluded, therefore that the role of the nurse as an educator is imperative in the caring interactions during dialysis care.

Advocacy for EOL and advance care planning. Nurses are not ready to tackle on the role of providing EOL care to patients. In practice, nurses are able to carry out part of EOL care through the interactions and patient teachings that they conduct. The data analysis opened doors for a better understanding of the interactions of a hemodialysis nurse and a chronically-ill patient. Firstly, the interaction was defined by a unique caring relationship that enabled the nurse and the patient to know each other on a higher level. The interactions were further characterized by the caring qualities that the nurses employed to foster the relationship. Furthermore, these caring characteristics enabled the nurse and the patient to rise above the connections they have established. Secondly, through the provision of health education, patients as well as families are equipped to face the challenges that entail their illness and the subsequent treatment that they must undergo. Finally, it can be deduced from the discussions aforementioned that nurses are not ready to tackle on the role of providing EOL care to patients.

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The Caregiver's and Nurse Therapist's Experiences on Gestalt Therapy

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Abstract **-** The most often neglected member of the group who cares for the patients in the hospital is the informal family caregiver who often experiences emotional crisis. This study explored how gestalt therapy helps the caregiver and the personal experiences of the nurse therapist who did gestalt therapy. Utilizing phenomenological design, three caregivers were provided with gestalt therapy and interviewed. The caregivers and the nurse therapist related that through gestalt therapy there was a feeling of relief and awareness of the crisis being experienced developed by the participants. It is concluded that gestalt therapy enables the caregivers to go through their crisis by enabling them to develop relief from emotional crisis, awareness of their problems and to move on despite the continued presence of the crisis.

Keywords - gestalt therapy, caregiver experiences, nurse therapist

INTRODUCTION

Caregiving is a time-consuming responsibility which inflicts various limitations on the caregiver's personal life. Role conflict resulting from the competing demands of the care recipient, other family obligations, and employment responsibilities is often a major complaint of caregivers. In addition to competing roles, many caregivers must adjust to a new role. Becoming a caregiver results in a change in the former relationship between the caregiver and the care recipient (Mittelman, 2005; Blieszner & Alley, 1990). Oftentimes, role reversals take place.

Furthermore, the emotional and physical demands of the care recipient can also cause stress among caregivers. Caregivers experience more stress if the care recipient's impairment results in disruptive behavior and improper social functioning. Several studies have shown that the degree of caregiver stress increases as the care recipient's level of functional impairment becomes more severe (Lopez, Crespo, Zarit, 2007; U.S. Select Committee on Aging, 1988). Thus, caregivers whose patients are admitted in the Intensive Care Units (ICU) are subjected to more stress as a crisis manifestation since patients admitted in this area are those who are critically ill and requires more intensive management due to the critical nature of their illnesses. Caregivers indeed experience problems with the physical care demands such as lifting or moving their care recipient while others report difficulty in performing personal care tasks.

With the demands made on individuals by caregiving, they often are subjected to caregiver stress and crisis which is the emotional strain of caregiving. Studies show that caregiving takes a toll on physical and emotional health. Caregivers are more likely to suffer from depression than their peers. Limited research suggests that caregivers may also be more likely to have health problems like diabetes and heart disease than non-caregivers (Mittelman, Roth, Coon, & Haley, 2004; Wisendale & Allison, 1988). Thus, there is indeed a need to look for an intervention that will help manage the crisis of caregivers to avoid its effect on the health of caregivers. Moreover, psychosocial interventions can potentially enable the caregiver manage the emotional crisis associated with caregiving and improve their ability to provide this care. Secondly, the cost to society of caring for people with chronic illnesses may be reduced by improving family members' ability to provide

some of that care. Thirdly, interventions that contribute to maintaining the mental and physical health of family caregivers, reducing the risk of illnesses such as depression, will undoubtedly reduce the cost of their own healthcare as well.

One approach which has gained recognition in stress management is Gestalt therapy which is an experiential psychotherapy that focuses on individual's experience on the present moment, the therapist-client relationship, the environmental and social contexts in which these things take place and the self-regulating adjustments people make as a result of the overall situation. It emphasizes personal responsibility. This therapy answers the result of the studies compiled by Beekman (1991) and Mittelman (2005) that while didactic interventions can provide knowledge, supportive interventions generally have more impact on caregiver and patient emotional and psychological well-being, pilot studies suggest that psychosocial interventions for caregivers that are individualized and flexible, and provide long-term support appear to be the most efficacious. Through Gestalt therapy, stress level of the caregiver will not only be reduced but they will also be given the chance to look for solutions to their current problem situation. It is the intention of this study to explore how gestalt therapy helps the caregiver and the personal experiences of the nurse therapist who did gestalt therapy. With this study, it is hoped that adequate attention can be provided to informal caregivers who are prone to mental problems. Moreover, through this study, hospital administrators may be able to include in their health services the need to organize a group who will be able to help caregivers in stress reduction.

MATERIALS AND METHODS

This is an exploratory study which focused on the meaning of life experiences of caregivers taking care of clients who are members of their family in the Intensive Care Unit (ICU). This also explored the lived experiences of a nurse therapist providing gestalt therapy to the caregivers. A qualitative phenomenological design was utilized in this study.

A government hospital in Cebu City was the locale of the study. Furthermore, the study was done in the waiting lounge of the Intensive Care Unit (ICU) of the hospital. The ICU was considered as the specific locale in as much as it is noted that this area is one of the most stressful areas catering to critically ill patients and they only allow one family member to get inside

the ICU as the primary informal caregiver of the ICU patients. This enabled the researchers to choose which one is the primary informal caregiver of the patient.

The basic criteria considered in selecting the respondents of this study were the following: a) the caregiver should be the one providing care to the client in the ICU assisting the ICU nurses on the process; b) the patient of the respondents must have an acute case and the client was admitted no less than 24 hours and no more than two weeks prior to the actual gathering of data to eliminate the effect of chronicity of illness of a client and its effect on the caregiver; c) the caregiver must be a family member and renders voluntary service not paid by the client's family. After considering these criteria, the researchers proceed with the identification of information-rich cases.

The nurse therapist was selected based on her expertise having specialized in Psychiatric Nursing and exposed in the Psychiatric Unit utilizing Gestalt Therapy. She underwent a one-week training with a licensed psychotherapist before the actual data gathering commenced.

An interview guide was used in answering the necessary data needed for this study which was formulated based the objectives of the study. The nurse therapist's experiences and insight of the therapy utilized a diary to document and express her experiences on the therapy.

In the actual data gathering, one researcher interviewed the participants prior to the therapy. Ten to fifteen minutes after the pre-therapy interview, the paritcipant shall underwent a 30-minute Gestalt Therapy provided by the trained nurse therapist. Ten to fifteen minutes after the therapy, the interviewer proceed with the post-therapy interview to determine the participant's experiences after the therapy. One of the researchers acted as interviewer while the other one took notes which used for the transcription of the interviews. The interview recorded with the permission of the respondents. The therapy and interview continued two to three days until such time that the researchers have to stop since they have been getting the same information from the same set of participants which indicates that saturation has already been attained. The nurse therapist, she made a diary on the account of her experiences with every respondent she provided with the therapy.

Data were analyzed using narrative analysis through the identification of themes or prevailing feelings in the experiences of both the caregivers and the nurse therapist.

RESULTS AND DISCUSSIONS

The Caregivers' Experiences

The Crisis and Its Source

There were three participants who were included in the analyses. As backgrounder of these three participants, all three patients of the three caregivers were admitted due to heart problems and hypertension. The first caregiver was F.Y. whose mother was the patient, D.C. also has her mother and C.W. who was taking care of his wife.

The most common theme among the participants' testimonies, is their declaration of *the fear of losing a close family member* and the *need for comfort and assurance*.

The interview on the initial meeting with the caregivers focused on their feelings at the time they were interviewed. It was noted that most of the patients cared for by the respondents were still under close monitoring due to their unstable conditions. The common feelings experienced by the caregivers were *sadness* for what happened to their family members but most pervasive in the three is the *worry* and *fear* of what will happen to their sick family members. The fear was often due to the possibility of the patient's death. This was often manifested by crying during the interview.

F.Y.'s fear of the loss is expressed when she said,

"*Dili lang unta ikarga ug lain nga sakyanan ako mama, magdungan lang unta mi ug uli nga pareha ug sakyanan" (I hope my mother will not be placed in another vehicle, that when we go home we will ride the same vehicle and that she will not be placed in a separate vehicle*). The vehicle refers to the fact that an alive sick patient will be placed in ambulance but a dead one will be placed in a separate funeral car.

The second emphasis derived from the testimonies is the *feeling of oppression*. According to Keltner (2007) and Boyd (2002), this phase of crisis is known as disorganization in which a person becomes dependent on others and would need assistance and guidance from outside sources. The feeling of oppression becomes prevalent when this need is unmet by the people in the client's environment be it from the healthcare workers or the people related to the caregiver of the sick member.

Two of the participants, on the other hand, expressed that they are *overwhelmed* with the gravity of the responsibility of having a patient and the feeling of being *trapped* to the responsibility of taking care for the patient. It is due to these experiences that F.Y. and D.C. were *angry* with the other siblings in the family who did not help in caring for their patient. They felt that they were *abandoned* by their siblings.

The participants are in the phase of emotional exploitation by a family member through them the roles which violate their needs as individuals (Parad & Caplan, n.d.). The exploitation serves to protect the individual family members by displacing the individual anxiety and ventilating the guilt of the situation by assigning a single family member as the sole caregiver for the loved one.

Moreover, C.W. also experienced *humiliation* and *rejection* from some medical practitioners which added up to the pain and or sadness that he was experiencing. He did not feel being abandoned by his family members but his abandonment is on the medical practitioners.

The feeling of anger towards the other siblings arises from the crisis experienced due to role conflict in as much as F.Y. and D.C. also have children left at home and family responsibilities to fulfill yet they are in the hospital taking care of their sick mothers. There is a feeling of oppression because of the indifference of other siblings in providing care and support to their mother. This is a cry for help to other family members. A need to be recognized that they also have family members who need them and that they should also be given importance and support.

Third emphasis noted was the *guilt feeling that they may not have done everything for the patient.* This reflects an attempt of the caregivers to escape the problem (Keltner, Schweeke & Bostrora, 2007; Taylor, 1990) which is exemplified by the guilt feeling and blaming. The caregiver attempts to project the situation onto something in order to relieve the anxiety which is increasing during this phase.

The three participants disclosed that they are all close to the patient. F.Y and D.C. described their relationship with the patient as confidante. C.W. on the other hand stated that he loves his wife dearly more than his life. Because of this type of relationship, there is a sense of commitment to help the patient.

As stated by D.C., " *Bahala na ug wala ko'y tulog basta mabuhi lang". (I don't mind if I will not be able to sleep taking care of my mother as long as she lives.)*

F.Y. further expressed that,

"Sa una ako iyang gibantayan pagkagamay nako, karon ako na sad mo amuma niya" ("When I was still young, my mother took care of me, so it is my time now to take care of her.").

Perceived Severity of Crisis Experienced Before Therapy

The experiences and perceptions of the participants on the severity of the crisis they are experiencing may differ based on personal factors or the conditions of their patients.The three participants were unanimous in stating that the crisis they are experiencing is very severe. D.C. felt that anytime she might lose control of her feelings and temper, (" Hapit na ko maputong."); and the feeling of grave sadness; ("Grabe gyud ako kaguol nga gibati") and the severe emotional pain ("Mora'g gikumot akong kasingkasing sa kasakit sa akong gibati karon).

After the Therapy

The common themes noted from the participants after therapy are the following:

First, there was a *feeling of relief or a cleansing effect.* Having gone through the therapy for two days, there is always a sense of enlightening which the participants experienced after the therapy. This was well emphasized based on the responses made by the participants after each therapy:

"Luag ako gibati bisag naa pa kaguol gamay." (I don't feel tense anymore but I still feel a little bit of sadness); "Gaan ako paminaw" (I feel light); "Nalipay ko nga kadaghan ko natherapy kay gaan gyud ako paminaw" (I am happy that there are follow up session because I really feel light after therapy).

These emotions were felt because they said that they were able to express their feelings specially those who have no one to talk to. This is indeed true for caregivers who are constantly seen outside the ICU waiting for the nurses' call. More often than not, their co-caregivers are strangers to them and are also immersed in their respective concerns to have time to talk to each other.

Second, there is a *sharing of the burden of knowing and unknowing*. When a person keeps to himself/herself his/her problems, he/she will eventually

feel burdened and overwhelmed because they are the only ones carrying the burden of knowing the realities of the patient's needs and not knowing the possible consequences of the patient's case. When one shares their problems, there is a feeling of letting go and enables them to analyze the problem. It gives time for thinking and re-thinking and enabling them to develop the power to control their problems. This is one reason why praying is the most common resort in times of crisis because this gives one hope and divine assurance that whatever happens somebody is going to take care of them.

Third, there is *adjustment phase to the problem at hand*. Through the therapy, C.W. expressed that the activity enables him to think, consider the possibilities and started to adjust to the condition they are placed into. C.W. clearly stated that,

"Human atong ato therapy Ma'am, nakahunahuna gyud ko nga mag-unsa na man lang ako mga anak kung di ko maglig-on; nawagtang ako huna-huna nga magpakamatay na lang ko. Nakahinayhinay na ko ug dawat unsa man gani mahitabo sa ako asawa." (After our therapy Ma'am, I came to think, what will happen to my kids if I'll not keep myself strong; y thoughts of committing suicide was erased. I have slowly started to accept whatever will happen to my wife).

Gestalt therapy produces a release of tension brought about by the crisis situation in such a way that the respondents were able to increase their conscious awareness of their emotions (Yontef, 1993) which were not acknowledged since they have focused all their energy to the sick family member. Relief was also facilitated with their contact with the therapist since insight was gained on how they are seen by the therapist and how their awareness process was limited by not talking about their problem or situation. These experiences of the caregivers maybe due in part by the culture at which they were brought up that espouses altruistic surrender to bring about fulfillment of their own needs.

During the therapy, clients become aware at what they are doing, how they are doing it and how they changed themselves at the same time, learn to accept and value themselves. In this sense, the individual is able to define, develop and learn about themselves in their relationship with others (Vanburren, 2003). With this outcome of the process in gestalt therapy, the participants learn personal responsibility, thus allowing them to make plans for the future, and assimilate into their personality the experiences they had been through. By this perspective, the participants were able to develop their skills of coping that they can utilize in the present situation.

In addition, the participants who went through the gestalt therapy process were able to realistically evaluate their situations and responsibly initiate courses of action according to what the situation requires and able to satisfy their needs. These outcomes were reflected by their abilities to reorganize through making plans for their future. As in the case of F.Y., she was able to attach herself from the responsibility of becoming the sole caregiver through taking a break by going home to her family and looking forward to her responsibilities as a teacher. During the subsequent visits, the therapist and the researchers learned that she went home in order to care for her 6-month-old child. D.C., on the other hand, was expecting to receive incentive for the holiday from the national government. And C.W. has realized that no matter what happens to his wife, his life and that of his kids still go on and he has to survive for the kids' future.

The Nurse Therapist Experience

In the experience of a nurse who acted as therapist at the same time, it is noted that *self-preparation* or self-awareness is an important phase prior to the therapy. The preparation might not only involve cognitive mastery of the therapy but the emotional readiness of the therapist who goes through such a process of doing gestalt therapy. It can be gleaned from the diary of the nurse therapist that therapist also undergo a process of knowing themselves in order for them to prepare themselves to support the crisis of other people.

Night before the big day, I have difficulty falling asleep, I was wishing that time would move slowly so that I will have more time to study and read more about the therapy that I would be doing the next day. Then I realized that I have to pursue with the activity, it is either now or never. To ease the tension that I felt on this night I did music therapy by listening to mellow music and ballads by Jose Mari Chan. While listening to the music I can't help but fall into tears, even the least melodramatic tune would move me into tears. Why the tears? This I did not understand until the day that I had done the therapy and was already writing this journal.

There is also a *sense of empowerment* as the nurse therapist realize that she has to pursue with the therapy and the decision to comfort oneself through music. The nurse therapist narrated in her diary how she went through with the therapy of the three caregivers.

After I was done with the therapy and as I was writing this journal, I've realized that the tears I've shed the night before the therapy was an unconscious cleansing act since I know and have realized that I was not ready and not cut to be an emotional

person. This was an eye opener for me that various emotions and reactions as well as views can be experienced as one hurdle different and especially difficult challenges in life. Having a family member who is sick and critical is a very difficult task. Though I have experienced death in the family and taking care of an acutely ill child and family member, my usual response to these phenomena is not emotionally laden but rather intellectually motivated. I usually would explain each event using the theories and skills I have learned through my years of nursing. I have learned to detach myself even at a young age from the emotional component of every crisis and event in my life. At times I have difficulty understanding the emotional component of the crisis. I cannot even relate when one of my friends or acquaintances would cry because a family member is sick or critically ill nor be able to relate with the crisis they would undergo with this illness. I thought before that if anything can be explained by science then it can be cured. Not until I have witnessed and shared with the experiences of the subjects that I have realized science cannot explain the emotional component of the crisis nor resolve the crisis. Now I understand why some would resort to taking their own life just to find peace and solace from the burden they have experienced.

Doing the therapy enables the therapist to understand that individuals way of treating crisis is not only through intellectualization but through emotional coping. This experience has made her understand human nature better giving her the realization that as a therapist she has to place emphasis also on the psyche of the person and how this part of the whole person operates in times of crisis. Mohr (2003) explains that by sharing experiences with others, therapists are able to understand themselves as human beings better. Yet, from the diary of the nurse therapist, there is a sense of emotional burden that has to be lifted as well since the burdens of other people are passed on to her and may affect her feelings and may go through a crisis as well, thus debriefing or unloading of these feeling should also be done.

The therapist's experience with the participants gave her a chance to realize that indeed if a person learns to express his or her feelings and concerns, awareness and learning can take place. Thus, she believes that gestalt therapy is one necessary approaches to help people go through their life's crises.

CONCLUSION

Based on the experiences of the participants and the nurse therapist, it is concluded that gestalt therapy enables the caregivers to go through their crisis by enabling them to develop relief from emotional crisis, awareness of their problems and to move on despite the continued presence of the crisis.

RECOMMENDATIONS

1. A Crisis Intervention Program utilizing Gestalt Therapy should be initiated in the hospitals for caregivers of patients in critical conditions since they are most of the time left in the lobby by themselves;
2. An experimental study should be done to determine how effective Gestalt Therapy is in reducing stress.

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Health Promotion of Local Migrant Workers in a Highly Urbanized City

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Abstract - This descriptive study explores the health promotion of local migrant workers in a highly urbanized city in Southern Philippines. The respondents were the 164 workers in five of the biggest retail stores in the city. Modified questionnaires, supplemented with focus group dicussions, were the main tools employed. Permission to conduct the study was requested from the Department of Labor and Employement and the store management. Written informed consent from the study participants was also sought. Data gathered were then processed using descriptive statistics. Results show that the male and female migrant workers are barely legal, just off their teenage life, attended college, mostly single, belonged to medium-sized families, with fathers either farmers or private employees and mothers who were housewives with no gainful employment. The workers had various physical and mental health problems, as well as poor health-seeking behaviors. The findings have various implications on program planning and policy making in related private and government agencies to promote the health of local migrant workers.

Keywords - health promotion, migrant workers, health problems, health-seeking behaviors

INTRODUCTION

Cagayan de Oro City today is said to be the hottest business prospect in Mindanao. As the capital of Region 10, it has helped the region become the second most economically active in the Philippines (National Statistical Coordination Board, 2006). For this economic development, Cagayan de Oro City has become the melting pot of local migrant workers coming from both nearby and distant provinces.

An intrinsic component of development is migration as it brings about many changes in both the economic and social fronts. Migration has the potential of enhancing people's quality of life as it offers job opportunities. More often than not, earning an income is seen as a positive factor for people to be able to provide for their basic needs. However, occupational exposures to hazardous substances, processes, and working conditions increased the risk of workers to develop work-related illnesses. According to DOLE (Department of Labor and Employment, 2007), these work-related diseases are cancer, cardiovascular, nervous, renal, and chronic respiratory disorders.

Furthermore, the International Labor Organization (ILO, 2006) estimates that 2.2 million work-related deaths occur annually around the world. Significantly, work-related cancer and heart diseases account for over half of all occupational fatalities. These trends reflect, to a large extent, the experience in the Philippines with 32.2 million workers employed in the country and 8 million overseas workers.

This present plight among local migrant workers is compounded due to the dearth of data on their health status and level of empowerment. This preliminary study is, therefore, very important in bridging the knowledge gap on the characteristics and health status of migrant workers in Cagayan de Oro City.

The data of the study can be used by the Department of Labor and Employment (DOLE), Department of Health (DOH), City Health Office of Cagayan de Oro, related NGOs, and other private industries as basis in the formulation of health promotional- related policies and programs aimed at enhancing the health status of the local migrant workers in Cagayan de Oro City. The data will also be equally relevant even to the international

sector like the World Health Organization (WHO) and International Labor Organization (ILO).

FRAMEWORK

Migration trends show that there is a rural-urban flow of migrants in the Philippines (POPCOM, 2007). Migration flow is generally linked with the level of urbanization that a city has already reached (Bilsborrow, 1993). Cagayan de Oro City draws a huge number of migrants from both far and nearby rural areas. Previous studies in the Philippines attest that female migrants outnumber male migrant workers. In NCR, majority of the local migrants are young, single, female and between the ages of 15-34 (Carcallas, 1999; Gultiano and Xenos, 2005).

There is an obvious problem in the current state of occupational health in the Philippines. Survey on Occupational Safety and Health Condition in Selected Regions (2000) by the Occupational Safety and Health Center (OSHC) showed that only 42.8% of the companies surveyed have written safety and health policy, 52% have safety and health committee, 42.48% have programs for safety and health activities, 48% employ physician or nurse, 14.7% hire safety officers/engineers, and 28.76% have their supervisors trained on occupational safety and health. This survey reveals the poor safety and health promotions for workers in most manufacturing establishments.

Moreover, according to Jenning's Philippine Occupational Health and Safety situationer in 2001, the retail industry is almost totally casualised. Some conditions for that disadvantaged worker particularly the salespeople who are mostly women include having to stand all day (to be caught sitting down can lead to dismissal), seeking permission to go to the toilet resulting in a high incidence of urinary tract diseases, and undergoing a physical examination to discover abdominal-marks. Those found to have children are not employed.

Another study by OSHC (2001) looked into the health status of workers exposed to organic solvents in selected semiconductor and microelectronics industries. The results revealthat the semiconductor and microelectronics industries employ mostly young female workers. They handle organic solvents during routine work operations. To reduce operator exposure, the companies employ control measures such as local and general exhaust systems. The survey of symptoms indicates that the prevalent bodily systems affected are the central nervous system, respiratory system, and the skin.

These findings call for a need to improve the health and safety in the above-related workplaces to protect the workers.

Validating the cases of health risks to workers are the recent surveys on workers' compensation claims in the Philippines (2002), which include those in the offices of SSS (Social Security System), GSIS (Government Service Insurance System), and ECC (Employees Compensation Commission). The five leading diseases identified were cardiovascular diseases, cerebrovascular accidents, pulmonary tuberculosis, cancer, and musculoskeletal-related diseases. Laborers/maintenance workers accounted for the majority of the claimants, followed by professional/technical workers and teachers.

Thus, in 2001, in an attempt to address problems related to occupational safety and health, a National Plan on Occupational Safety and Health was implemented by a multisectoral body (Lomuntad-San Jose, 2001). According to the study, despite concerted efforts, various problems were met during the implementation process such as severe manpower and budgetary constraints, low awareness, overlapping of roles and functions of institutions involved in occupational safety and health, as well as a paucity of baseline data. Thus, alternative strategies have been proposed in the areas of enforcement, control, legislations, training and education on occupational safety and health, research and other technical services.

The Philippines has been perennially experiencing occupational-related health and safety problems despite the presence of the labor law. Presidential Decree Number 442 or commonly known as The Labor Code of the Philippines is a consolidation of labor and social laws. It is made to afford protection to labor and to promote employment and human resources development. It also ensures industrial peace based on social justice. Book four (4) of the code particularly espouses the health, safety and social welfare benefits. Chapter one of book four stipulates that every employer shall be responsible to provide first-aid treatment to his/her employees. Furthermore, it is also the duty of every employer to provide his/her employees with free medical and dental attendants (such as doctors, nurses and dentists) and facilities. A comprehensive occupational health program must also be developed and implemented for the employees. In chapter two (2), the mandatory enforcement of safety and health standards to eliminate or reduce occupational safety and health hazards in the workplace is emphasized. Stipulated as well are the employees' compensation and state insurance fund policies, medical disability and death benefits, the Philippine Medical Care Plan (MEDICARE), and appropriate and necessary adult education programs.

To facilitate changes to improve the health and safety of the workers, many researchers considered individual empowerment as an intervention. A good number of foreign studies were conducted in terms of the relationship of empowerment and health promotion. For instance, according to Wallerstein (2000) in New Mexico, the opposite of empowerment, which is powerlessness, or the lack of control over destiny, emerged as a risk factor for disease.

OBJECTIVES OF THE STUDY

The study sought to determine the background characteristics of local migrant workers in CDOC in terms of socio-economic and demographic profile and to describe the health profile of the local migrant workers.

RESEARCH METHODOLOGY

This study is exploratory and descriptive in nature. Both qualitative and quantitative approaches were utilized. The researchers included the workers in the retail industry in Cagayan de Oro City as respondents. Five (5) of the biggest retail stores in the city were targeted as research settings. The original plan was to do random sampling among the local migrant workers in these 5 stores. However, only those who were chosen by the management or human resource officer and who were willing to participate and were available for interview were included in the study. It was intended that 20 male and 20 female migrant workers in each store (total of 200 respondents) be involved. However, only 164 questionnaires were returned.

To determine the respondents' background and health proper, a modified questionnaire based on the Total Health Assessment Questionnaire by Austin (2008) was used. Questionnaire was tested for reliability which yielded a Cronbach alpha of 0.769, Indicating that the questionnaire is highly reliable. To further validate the data, a four-group discussion (FGD) on the level of empowerment was conducted.

Prior to the fieldwork, formal communications were sent to DOLE Region X Director for approval and endorsement and to the Human Resource Management Office of each retail/department store for permission to float the questionnaire to its workers.

The questionnaires with a transmittal letter where then distributed to the respondents. Coding was used to keep the confidentiality of the response. The data were analyzed using frequency, percentage, and mean. Interview

responses were also content analyzed, coded, and tabulated according to common themes.

RESULTS AND DISCUSSION

The Majority of the local migrant workers were young and single. They were aged 21-26 years old. This finding is consistent with the findings of other local studies that the Philippine migration is dominated by young and single workers (Carcallas, 1999).

A third of the respondents finished high school and more than half went to college. However, of those who went to college, only about 60 percent graduated from college. Less than five (5%) percent of the respondents reached high school and finished a vocational course. The data show that indeed Filipinos have a high level of literacy. However, these college graduates usually end up as minimum wage earners; or even below minimum. This phenomenon can be attributed to the fact that employment opportunities are scarce for the unskilled and inexperienced and for persons whose education does not match industry needs and that employment competition is stiff.

Most of the migrant workers were middle children and belonged to medium size Catholic family (of 6-8 members or 4-6 children). Large size families used to dominate in the 1950s to 1980s. Presently, however, owing to the economic decline, a small size has become the ideal family size. Since most of the respondents come from families of low economic status, they are usually expected to help the family earn after finishing secondary or tertiary education (Gultiano and Xenos, 2005; Carcallas, 1999).

As to parents' occupation, the respondents' fathers were either farmers or private company employees were working as security guards, drivers, construction workers, janitors, electricians, and factory workers. Moreover, the other third of the fathers were either deceased or with no work at all. On the other hand, their mothers were mostly housekeepers (70 %). Having a deceased or an unemployed or low earning parent in a medium to large size family is enough reason to compel a young adult work for family.

More than eighty percent (80%) of the respondents came from Mindanao. About a third, in particular, came from the nearby Bukidnon Province and one-fourth from the surrounding towns of Misamis Oriental. Still, a number came from the Visayas, while only one from Manila. The mean age of migration was 19, although a few migrated when they were still 12 – 15 years

old. Almost forty percent (40%) claimed that it was entirely their own decision to move to Cagayan de Oro City, while less than a third of the respondents were influenced by their parents.

According to the study of Quisumbing and McNiven in 2005, internal migration in the Philippines is a fundamental part of rural livelihood strategies and rural transformation, and not only to escape poor rural areas. Research undertaken by the International Food Policy Research Institute (IFPRI) and the Research Institute for the Mindanao Culture, Xavier University (RIMCU) in the mid-1980s and repeated in 2003-2004 found that *poblacions* and cities attract better educated individuals to either find a job or further their education.

The data further reveal similar themes on the common push-and-pull factors of migration. The topmost factor is obviously the economic factor, followed by educational, then social and personal factors. These data mirror in particular the country profile of the Philippines as presented in the Library of Congress (Federal of Research Division, 2006). Poverty is said to be a serious problem in the Philippines. According to the World Bank, in 2003, per capita gross national income was US$1,080, below the US$1,390 average for lower-middle-income countries. Reflecting regional disparities, in 2003 about 11 percent of Filipinos lived on less than US$1 per day and 40 percent on less than US$2 per day. The overall poverty rate declined from 33 percent (25.4 million people) in 2000 to 30.4 percent (23.5 million people) in 2003. Also, poverty is more concentrated in rural than in urban areas.

On a positive note, despite poverty in most rural areas in the country, tertiary education is still given much importance. Many of the respondents shared that they were working students while studying in college. They believe that finishing a college degree would provide them a better future and an edge in getting a good paying job.

As retail store workers, their assignments or positions vary, from cashier to sales assistant, promo girl, stock clerk, merchandiser, quality assurance checker, electrician, and packers. The average monthly income of these workers is 5,000 pesos or 192 pesos per day. As against, the minimum wage per day of 240 pesos or an approximate monthly income of 6,000 pesos. The salary ranges vary depending on the establishments. Only about ten percent (10%) of these local migrant workers received the minimum wage. The rest (90%) were paid lower than the minimum wage. This finding supports that of Ronquillo and Lorenzo in 2005 that one out of every five employed workers was underemployed or underpaid and working part-time or employed below

his/her full potential. Todaro (as cited by Carcallas, 1999) said that this rural to urban migration will continue for as long as the perceived expected urban wage is relatively higher than the rural wage.

More than half of their meager income were spent for food, lodging, transportation, and utility bills (electric, water, and mobile phone). Only about one-fourth (1/4) of the income was sent to their families. Not all, however, sent money to their families in the province. Quite a number (36 out of 164) used their income solely for their own consumption. Moreover, less than one-eight of the income was used to buy clothing, shoes, and toiletries. Some of the male migrant workers also reported having a portion of the "others" spent for night out or for dating girls. Also, a portion of the "others" was spent for leisure to prevent fatigue or boredom.

It is sad to note, but not surprising, that the smallest chunk of the salary (if there is still some left) is spent for health such as buying medicines for common illnesses and vitamins and setting aside money for emergencies.

Table 1. *Health profile of local migrant workers in Cagayan de Oro City*

Health Profile	Both Sexes		Males		Females	
	Frequency	Rank	F	Rank	F	Rank
Family History						
Hypertension	81	1	44	1	41	1
Diabetes	28	2	14	2	14	2
Heart problems	24	3	13	3	11	3
High cholesterol	6	4.5	3	4.5	3	4.5
Cancer	6	4.5	3	4.5	3	4.5
Current health complaints						
GENERAL						
Headache	111	1	59	1	52	1
Fever	103	2	55	2	48	2
Loss of sleep	51	3	30	3	21	3
Forgetfulness	27	4	11	4	16	4
Nervousness	21	5	6	5	15	5
Dizziness	7	6	3	6.5	4	6
Chills	6	7	3	6.5	3	7
Numbness	1	8	0	-	1	8
AVERAGE	20.44	1	20.88	1	20.00	2

Cont. of Table 1

PAIN IN THE-						
Back	69	1	30	1	39	1
Feet	46	2	19	3	27	2
Arms	42	3	22	2	20	3
Hands	24	4	10	4.5	14	4
Hips	22	5	10	4.5	12	5
AVERAGE	20.30	2	18.20	2	22.40	1
GASTROINTESTINAL						
Stomach pain	62	1	29	1	33	1
Diarrhea	40	2	17	2	23	2
Poor Appetite	15	3	5	4.5	10	3
Bowel changes	13	4	5	4.5	8	4
Indigestion	10	5	5	4.5	5	6
Constipation	9	6.5	5	4.5	4	7
Nausea	9	6.5	3	9	6	5
Excessive thirst	6	8	4	7.5	2	9.5
Flatulence	6	9	4	7.5	2	9.5
Vomiting	5	10	2	10	3	8
AVERAGE	8.39	3	7.18	4	9.60	3

Current health complaints	Both Sexes		Males		Females	
	Frequency	Rank	F	Rank	F	Rank
EYE, EAR, NOSE, THROAT						
Sinus problems	44	1	21	1	23	1
Bleeding gums	18	2	13	2	5	3.5
Persistent cough	15	3	11	3	4	5
Blurred vision	12	4	7	5	5	3.5
Nose bleeding	11	5	10	4	1	9
Loss of hearing	10	6	4	9	6	2
Earache	8	7	6	6	2	7
Ear discharge	7	8.5	5	7.5	2	7
Ringing in the ears	7	8.5	5	7.5	2	7
Difficulty swallowing	3	10	3	10	0	-
Hoarseness of voice	1	11	1	11	0	-
AVERAGE	6.17	4	7.81	3	4.54	5
SKIN						
Itching / rashes	27	1	13	1	14	1
Bruise easily	5	2	1	3	4	2
Changes in moles	2	3	1	3	1	3
Sores that won't heal	1	4	1	3	0	-
AVERAGE	4.37	5	4.00	5	4.75	4
GENITO-URINARY						
Painful urination	13	1	6	1	7	1
Blood in urine	2	2	0	-	2	2
AVERAGE	3.75	6	3.00	6	4.50	6

CARDIOVASCULAR						
Varicose veins			2	4.5	11	1
High blood pressure	13	1	5	1	4	2
Irregular/ rapid	9	2	4	2.5	3	3
heartbeat	7	3	4	2.5	1	4.5
Chest pain	5	4	2	4.5	1	4.5
Low blood pressure	3	5				
AVERAGE	3.41	7	2.83	7	4.00	7

As to the health profile of the local migrant workers, Table 1 reveals that hypertension and diabetes were two of the most common heredo-familial diseases among the respondents. Such case is also true to whole Filipino citizenry. As of 2002 (country profile), hypertension and diabetes are indeed two of the leading causes of morbidity. Cardiovascular diseases, specifically, account for more than 25 percent of all deaths. One out of five adult Filipinos is hypertensive and not even aware of the condition while 90 percent of the country's population has one or more of the risk factors that contributes to high blood pressure (Philippine Society of Hypertension, 2008).

Hypertension refers to an intermittent or sustained elevation in the blood pressure. It is a major cause of stroke, cardiac disease, and renal failure. Detecting and treating it before complications develop greatly improves the patient's prognosis. Scientists have not been able to identify a single cause for hypertension. Certain risk factors, however, appear to increase the likelihood of hypertension. Nonmodifiable risk factors- those that cannot be changed- include a family history of hypertension, age, ethnicity, and diabetes mellitus. Modifiable risk factors- those that can be changed- include blood sugar levels, physical activity levels, smoking, and salt and alcohol intake. Smoking cessation, reduced salt and caffeine and alcohol intake; weight reduction, improved meal planning, increased physical activity, and managing stress can all help to decrease blood pressure (Medical-Surgical Nursing, 2008).

Diabetes mellitus, on the other hand, is a group of metabolic diseases in which defects in insulin secretion or action result in high blood sugar level (hyperglycemia). As reported 4.1% of Filipinos have diabetes mellitus. At the current estimate of the population, this means 2.5 million Filipinos with diabetes, with an equal number to the undiagnosed. It is a serious disease that can cause complications such as blindness, kidney failure, heart attacks, and strokes. Aside from physiological defects (type 1 diabetes), heredity is responsible for up to 90% of cases of type 2 diabetes. Obesity is also a major

contributing factor. A newer finding is likewise the link between diabetes and a condition called metabolic syndrome, sometimes called syndrome X.

According to the American Heart Association and the National Heart, Lung and Blood Institute, metabolic syndrome is diagnosed when at least three (3) of the following criteria are met: elevated waist circumference (abdominal obesity), triglyceride level of 150 mg/dl or higher, high-density lipoprotein (HDL or "good cholesterol") lower than 50 mg/dl for women, blood pressure level of 130/85 mmHg or higher, and fasting blood sugar of 100 mg/dl or higher (Williams and Hopper, 2007). Any one who fits this profile should be monitored closely for the onset of type 2 diabetes and heart disease. They should be counseled on the importance of a diet low in saturated fats and cholesterol, weight loss, physical activity, and control of blood pressure. With good education and self-care, people with diabetes can prevent or delay these complications and lead full, productive lives. A major role of the company nurse is helping these migrant workers learn to care for themselves.

In terms of current health complaints for the past 12 months, topmost were the headache, fever, and loss of sleep. Causes may vary that include everyday physical and mental stress and infection. Ranked record was complaint of muscular pain on the back, feet, and arms. Muscular pains are common among workers during much physical labor.

Third in rank were the gastrointestinal-related problems, which commonly consisted of stomach pain and diarrhea. The causes of these may vary from eating to habits, type of foods eaten, and food hygiene (food preparation). During the interview, many respondents reported that they usually eating foods in cafeteria, sari-sari stores, eateries, or street foods because the foods are cheap.

Fourth were, particularly sinus problems to include rhinitis or common colds and acute or chronic sinusitis. These conditions involve the inflammation of the nasal mucous membranes or inflammation of one or more sinuses due to bacterial or viral infections, or as a reaction to allergens such as pollen, dust, molds, or some foods. Both the physical home and working environments and the health status of the employee may contribute to the occurrence of sinus problems.

Next were the skin-related complaints, such as itching and/or rashes, and genito-urinary tract (painful urination). Female respondents reported that they usually delay urination until break time and that their water intake is limited when they are at work. Lastly, a few of the female-respondents complained of having varicose veins, particularly on the lower extremities.

Varicose veins are described as elongated, tortuous, dilated veins. The exact cause is unknown but the condition tends to be familial. Any factor that may contribute to increasing hydrostatic pressure within the leg, such as prolonged standing, pregnancy and obesity, may promote venous dilation. Most of these respondents stand for 4-8 hours a day as part of the job.

Though the above data reflect the health conditions of the respondents, there are limitations as to the accuracy and completeness of the data because of the manner they were gathered. Health status can best be examined through actual physical assessment and not by mere perception of the person on the signs and symptoms felt or experienced.

There seems to be a common pattern of both family health history and health complaints for both sexes. However, more females opened up their health problems than males did. Other health problems noted that (not shown in the table) are specific to women were extreme menstrual pain (18), bleeding between periods (2), breast lump (2), hot flashes, (1) and vaginal discharge (1).

The World Health Organization defines health as a "state of complete physical, mental and social wellness, not merely the absence of disease or infirmity." People in a state of emotional, physical, and social well-being fulfill life responsibilities, function effectively in daily life, and are satisfied with their interpersonal relationships and themselves. Thus, an equally significant indicator of a person's health status is their mental health. According to Videbeck (2002), no single, universal definition of mental health exists, but one can infer a person's mental health from his or her behavior.

Table 2 presents the mental health of the respondents. With highest frequency among the indicators was perceiving stress as a major problem, followed by having trouble sleeping. Mental health, as described in Medical-Surgical Nursing (2007), is the ability to be flexible, be successful, form close relationships, make appropriate judgments, solve problems, cope with daily stress, and have a positive sense of self. It is natural for emotions to ebb and flow from day-to-day in response to the degree of stress that is experienced. People who remain mentally healthy are able to keep their stress in perspective. Others are not able to do so as shown in the table. A number of the respondents cried frequently because of varying problems, panicked when stressed, thought of hurting self, and even attempted suicide. Over time, they may develop physical or emotional illnesses as a result of the constant stress in their life, these respondents eventually affecting their overall health and putting a strain on their work.

Table 2. *Mental health profile migrant workers in Cagayan de Oro City*

Mental Health	Both Sexes		Males		Females	
	Frequency	Rank	F	Rank	F	Rank
Stress is a major problem	66	1	23	1	43	1
Have trouble sleeping	48	2	17	2	31	2
Cries frequently	28	3	6	4	22	3
Panics when stressed	23	4	7	3	16	4
Have seriously thought about hurting self	14	5	3	6	11	5
Have been to a counselor	11	6	5	5	6	6
Have attempted suicide	7	7	2	7	5	7

It is, therefore, imperative that these respondents be taught about effective stress management. Coping is the way one adapts psychologically, physically, and behaviorally to a stressor. Individuals have different methods of coping or dealing with their stressors. The company nurse can be a vital source of information on the healthy choices for dealing with stressors. The process of effective coping is sometimes called adaptation. Allowing the person to practice new coping techniques will give him or her confidence to adapt and will decrease the stress that can accompany change.

The data convey that there is a common trend on the ranking of the indicators for both sexes. However, obviously more women (almost double in numbers) than men shared that they were constantly beset with such conditions.

Another indicator of health status is a person's health-seeking behavior. Health-seeking behaviors as defined in Kozier (2004) are the actions people take to understand their health state, maintain an optimal state of health, prevent illness and injury, reach their maximum physical and mental potential, as well as health practices during illness. Behaviors such as eating wisely, exercising, paying attention to signs of illness, following treatment advice from appropriate health agency and experts, avoiding known health hazards such as smoking are examples. Under health-seeking behaviors are health screenings/check-ups, medical consultations, healthy lifestyle, and health planning.

Table 3. *Health-seeking behavior of local migrant workers in Cagayan de Oro City*

Health Screenings & Practices when ill	Both Sexes (n=164)		Males (n=88)		Females (n=76)	
	F	%	F	%	F	%
VACCINATIONS						
Tetanus	9	5.5	6	6.8	3	3.9
Flu	6	3.7	5	5.7	1	1.3
CHECK UPS						
Blood pressure	34	20.7	22	25	12	15.8
Cholesterol level	1	0.6	1	1.2	0	-
Skin examination	2	1.2	1	1.2	1	1.3
Pap smear(women)/prostate exam (men)	4	2.4	1	1.2	3	3.9
PRACTICES WHEN SICK						
Done self-care/ self-treatment	79	48.2	36	41	43	56.6
Visited doctor's clinic for consultations	17	10.4	14	16	3	3.9
Treatment with alternative medicines	12	7.3	10	11.4	2	2.6
Gone to hospital for treatment	5	3.0	4	4.6	1	1.3
Hospital confinement during illness	3	1.8	3	3.4	0	-

Tables 3 to 5 reveal the health-seeking behaviors of the respondents. Data on health screenings are very alarming since only a small number of the respondents subjected themselves for health examinations and vaccinations. Promoting health and wellness always starts with prevention, which levels are primary, secondary, and tertiary prevention.

Primary prevention includes generalized health promotion and specific protection against disease. It precedes disease or dysfunction and is applied to generally healthy individuals. Examples of primary prevention activities are health education about accident and poisoning prevention, standards of nutrition and growth and development for each stage of life, exercise requirements, stress management, protection against occupational hazards, immunizations, risk assessments for specific disease, family planning services and marriage counseling, environmental sanitation and provision of adequate housing, recreation, and safe work conditions.

Moreover, secondary prevention involves early detection of disease, prompt intervention, and health maintenance for individuals experiencing health problems, and prevention of complications and disabilities. Examples are regular medical and dental check-ups and self-examination for breast and

testicular cancer. Finally, tertiary prevention begins after an illness, when a defect or disability is fixed, stabilized, or irreversible. Its focus is to help rehabilitate individuals and restore them to an optimum level of functioning within the constraints of the disability.

Both primary and secondary levels of prevention are applicable to or may be adapted in any workplace setting. The company physician in partnership with the company nurse must come up with a health promotion and disease prevention program among its employees. Bringing health promotional and disease prevention activities will make health care accessible and affordable to the workers, particularly those receiving only minimum or below minimum wages. More often than not, the cost of health care is a barrier to its utilization.

More males had better health-seeking behavior than the females. However, during the FGD, men revealed that they are not familiar with prostate exam. Among females, few submitted themselves for pap smear because of its cost (between 300 – 400 pesos). Most respondents disclosed that health-related expenses, such as medical consultations and immunizations, are not their priority. In terms of practices during illness, females are more likely to do self-care or self-treatment than males. Conversely, more males consulted medical doctors when ill, used alternative medications as treatment, and went to a hospital for treatment or for confinement compared to their female counterparts.

According to Kozier (2004), an individual's standard of living (reflecting occupation, income, and education) is related to health, morbidity, and mortality. Hygiene, food habits, and the propensity to seek health care advice and follow health regimens vary among high-income and low-income groups. For example, preventing illness may not be as important as generating and maintaining an income among the poor. Even when prevention is a priority, the poor may not be able to afford regular medical examinations, housing, or nutritious food that promote health.

Moreover, low-income families often define health in terms of work; if people can work, they are healthy. They also do not have regular preventive medical check-ups because they cannot afford them. It is more important for them to work than to lose a day's pay visiting a physician. Reliance on public health services and inability to afford health care insurance limit both the low-income person's access to health care and the type of care available.

Another variable considered to contribute to the health status of people is their lifestyle. Lifestyles are personal habits of the individual that may affect health. Specific indicators include smoking, alcohol consumption, eating

habits, and physical activity or exercise.

The data reveal a positive result. Less than 15% of the respondents smoked, averaging of 1-3 sticks per day for about 1-3 years already. Also, about 20% of the respondents drank occassionally. Smoking is implicated in lung cancer, emphysema, and cardiovascular diseases, while alcohol is physically and mentally debilitating. Thus, smoking and drinking must be emphasized in health talks for employees.

In terms of eating habits, most respondents ate about 1-3 servings of vegetables and fruits daily. Only a few frequently ate "fast" foods. About 40% drank coffee everyday, while others drank tea (30%) and/ or cola (15%) daily. Inappropriate eating and being overweight are likewise closely related to the incidence of heart disease, diabetes and hypertension.

Table 4. *Lifestyle or health-related behaviors among local migrant workers in Cagayan de Oro City*

Lifestyle/Health- related behaviors	Both Sexes (n=164)		Males (n=88)		Females (n=76)	
	F	%	F	%	F	%
Smoking habit:						
• Never smoked	105		50		55	
• Used to smoke	36		19		17	
• Still smoke	23		19		4	
	164		88		76	
Number of cigarettes per day						
• 1 – 3 sticks	18	64.0	16	56.8	2	72.4
• 4 – 6 sticks	4	22.0	4	21.6	-	22.4
• 7 – 10 sticks	1	14.0	1	21.6	-	5.2
		100		100		100
Number of years of smoking						
• 1 – 3 years	13		12		1	
• 4 – 6 years	7		6		1	
• 7 – 10 years	4		4		-	
Number of alcoholic drinks in a week						
• 1 – 3 glasses	30		23		7	
• 4 – 6 glasses	1		1		-	

Cont. of Table 4

Number of fruits/ vegetables serving/day						
• 1 – 3 servings	78		46		32	
• 4 – 6 servings	11	47.6	7		4	42.1
TOTAL	89	6.7	53	52.3	36	5.3
Frequency of eating in a fast food		54.3		8.0		47.4
• 1 – 3/week (always)	11		6	60.3	5	
• 2/month (frequently)	16	6.7	2		14	6.6
• Once a month (sometimes)	33	9.8	27	6.8	6	18.4
• 6/ year (seldom)	5	20.1	0	2.3	5	7.9
TOTAL	65	3.1	35	30.7	30	6.6
Caffeine drinks (multiple responses)		39.7		0		39.5
• coffee	60		34	38.8	26	
• cola	49		30		19	
• tea	16		11		5	
Number of times engage in moderate-intensity physical activity in a week						
• 3 – 6/ week (always)	6		6		-	
• Once a week (frequently)	19		19		-	
• 2 – 3/ month (sometimes)	34		24		10	
• Once a month (seldom)	3		2		1	
TOTAL	62		51		11	

In terms of physical activity, only 40% exercised. Of the 40%, only a few exercised 3-6 times a week. Most of them exercised once or twice a month only. Exercises are ideally done regularly, about 30 minutes to an hour, 3 to 4 times a week, involving isotonic, isometric, and aerobic exercises. Among its proven benefits are increased sense of well-being, improved self-concept, ability to cope with stress, improved energy level and work performance, improved quality of sleep, improved cardiovascular and respiratory status, firmed muscle tone, increased strength and endurance, increased balance and coordination, and decreased serum triglyceride and cholesterol levels.

Program for lifestyle and behavior change, which enhances the quality of life and extends lifespan, requires the participation of the individual. Worksite wellness programs, in particular, may include accident prevention for a machine operator or electrician, back-saver program for an individual involved in heavy lifting, screening for high blood pressure or blood sugar, and health enhancement programs such as physical fitness and relaxation techniques.

Table 5. *Health planning among local mograntworkers in Cagayan de Oro City*

Health planning	Both Sexes (n=164)		Males (n=88)		Females (n=76)	
	Frequency	Rank	F	%	F	%
Changes done during the past 12 months to enhance health:						
• Increased physical activity	58	1	39	44.3	19	25
• Lost weight	55	2	26	29.6	29	38.2
• Reduced alcohol use	41	3	29	33	12	16
• Reduced fat intake	30	4	20	22.7	10	13.2
• Coped better with stress	26	5	11	12.5	15	19.7
• Quit or cut down smoking	17	6	14	16	3	3.9
Planned to do in the next 6 months to keep healthy or improve health:						
• To increase physical activity	91	1	51	58	40	52.6
• To reduce fat intake	40	2	21	24	19	25
• To reduce alcohol use	32	3.5	22	25	10	13.2
• To cope better with stress	32	3.5	17	19.3	15	19.7
• To lose weight	31	5	18	20.5	13	17.1
• To quit or cut down smoking	20	6	17	19.3	3	3.9

Aside from family health history, health complaints, health-seeking behavior and lifestyle, the respondents were also asked about the activities they had for the past 12 months to enhance health and the activities they planned to do for the next 6 months to keep healthy or to improve health. Table 5 shows the data on health planning. Ranked first was exercise followed by weight loss and reduction of alcohol in take. Ranked lowest were reducing fat intake, coping better with stress, and quitting smoking. The data indicate that they do know how to promote health. However, details of the cited activities were not known in the study.

As to their plans for the next 6 months, still first in rank was increased physical activities or exercise, followed by reduction of fat and alcohol intake. What they planned indicates how they value health. Health promotion plan has to be developed according to the needs, desires and priorities of the individuals. Data reveal that males had more and better plan for health than the females activities to keep healthy and are also planning activities to enhance health.

Health promotion programs always start with assessing and diagnosing the health needs, desires, and priorities of the individuals involved and

followed by the planning the activities or interventions to achieve the goals of the individuals, the frequency and duration of the activities, and the method of evaluation.

The role of the company nurse or the health team is to guide the employees in the planning and to facilitate the implementation of the plan. The health personnel must act as a resource person(s) rather than as adviser(s) or counselor(s). It is important to emphasize the small steps to behavioral change, to review the goals and plans, and to make sure they are realistic, measurable, and acceptable to the employee.

Pender (1987), as cited in Kozier (2004), outlines several steps in the process of health promotion planning, which must be carried out jointly by the health personnel and the employee: 1) identify health care goals–the employee selects 2 to 3 top-priority goals or areas for improvement; 2) identify possible behavior changes–determine what specific behavior changes are needed to bring about the desired outcome; 3) assign priorities to behavior changes- behavior must be acceptable to the individual if it is to be adopted and integrated; 4) make a commitment to change behavior- increasingly, a formal, written behavioral contract is being used to motivate the client to follow through the selected actions; 5) identify effective reinforcements and rewards; 6) determine barriers to change; and 7) develop a schedule for implementing the behavior change. Another essential aspect of planning is identifying support resources available to the client. The resources may that of the community or the establishment or the company, such as a gym

CONCLUSIONS

In the light of the above findings, the following conclusions are drawn:

Local workers migrate to the highly urbanized city for lack of job opportunities in the province, for their desire to go to school while working, to help financially their families, and for sheer adventure or experience.

The migrant workers have varied health problems as evidenced by their health complaints such as headache, fever, and loss of sleep, bleeding gums, persistent cough, itching and rashes, and painful urination. These symptoms are the body's responses to life and work stresses.

Thrust into the world of work and away from the security of their families and have to face life and work alone, the migrant workers are vulnerable to

symptoms of mental health problems. Sleep problems, crying, and panic are indicators of inability to manage stress to the extent that, out of desperation, they tend to hurt on themselves and attempt suicide.

Health-seeking behaviors are mostly on self-care when they get sick and rarely on visiting a doctor since they cannot pay health services. At most, they only avail of blood pressure check-up and vaccinations.

The migrant workers generally live a healthy lifestyle with a majority being non-smokers, occasional drinkers, vegetable eaters, coffee drinkers, and active physically.

The migrant workers' health plan is indicative of their health consciousness.

RECOMMENDATIONS

Based on the implications cited above, the following are recommended:

The Commission on Higher Education (CHED), Department of Labor and Employment (DOLE), and Higher Education Institutions (HEIs) should open avenues for completion of college education to college level employees. Finishing a college degree will increase their chances of finding better and stables job.

The Department of Labor and Employment and other related agencies should strictly monitor the implementation of the minimum wage law. The Department of Labor and Employment and establishment must consider policy changes that promote health among the rank-and-file local migrant workers. Health programs must be institutionalized and must consider the health needs of the workers.

For further studies, additional variables may be included such as the ethnicity of the employee/migrant workers as this may influence their attitude towards health, empowerment and work.

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Lived Experiences with Arthritis among Older People

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Abstract - Arthritis is one of the many disabling diseases in the Philippines today. Its effects on the older person are paramount in terms of productivity and quality of life. This study identified the experiences of older people with arthritis in Cagayan de Oro City. A descriptive method was used. The study was conducted at the office of Senior Citizen's Organization, Cagayan de Oro City. The respondents were members of OSCA (Office of Senior Citizen Affairs) who are affected by arthritis. An interview schedule was used in the gathering of data. Majority of older people are still living under the debilitative and disabling effects of arthritis despite the advancement of medical management. Without proper medical management of arthritis, quality life for older people with arthritis shall remain to be attained. Effective ways must be done to deliver education, knowledge and understanding of arthritis to the older individuals.

Keywords - lived experiences, arthritis, older people

INTRODUCTION

The years of medical and nursing advancement changed the faces of different disorders affecting older people. With the discovery of new drugs and the application of preventive measures, the problems brought about by the signs and symptoms of these diseases have been remarkably reduced. However, there are still a lot of people who suffer from the effects of these diseases, not only physically but also psychosocially. Among these disorders, arthritis could be considered one of the most debilitating conditions affecting mostly the older people in the Philippines, not to mention other groups in their early age. The disabling effects of arthritis may be manifested in an individual's personal, social and employment activities (Porth, 2002).

Arthritis is now increasing in terms of prevalence affecting people in their 60's. There are over a hundred types of arthritis (Smeltzer, 2008). However, the three most common types are rheumatoid arthritis (RA), osteoarthritis (OA) and gouty arthritis (GA). These three common types of arthritis are the focus of this study because of their increased prevalence in the Philippines. Most of the older Filipino people are now commonly suffering from these debilitative conditions. Age groups under the cohort of baby boomers are most likely candidates for arthritic disorders in this decade (http://livinginthephilippines.com).

Arthritis is increasing significantly, affecting every race but there are differences in the prevalence and distributions in different populations and countries. About one (1) percent of world's population is affected by arthritis (http://www.informanthealthcare.com). And it is estimated that around 350 million people have arthritis worldwide (http://www.medicinenet.com). Majority of affected individuals are women; children are also victims of this disorder.

In the Philippines, arthritis is also increasing every year, particularly affecting older individuals who do not seek medical attention since they do not have enough resources for the treatment. For some, the hindrances of treatment are their cultural beliefs (Ringsven, 1997). These different cultural beliefs are sometimes the hindrance to preventive and treatment management. Some minority groups in a given community have unique practices in the treatment of arthritis. Cultural diversity also contributes to the widespread increased of arthritis cases (Tan, 2003). Treatments are neglected because older people think that arthritis is part of the aging process. This is further discussed

in the theoretical framework of the study. According to the Philippine Rheumatoid Association, the number of arthritis sufferers and those with soft tissue rheumatism is now climbing at 2.6 million Filipinos and increasing in number yearly (http:showbizandlifestyle.inquirer.net).

The researcher considered this study because of his interest in musculoskeletal and immunological problems particularly arthritis. Based on the researcher's observation in the community today, there are individuals who take risk of just ignoring their symptoms of arthritis because they consider it as part of the aging process. And soon majority of Cagayanons will suffer from the effects of this disorder if no preventive intervention will be followed. Many older persons are now suffering from the negative impact of arthritis in this generation. In the community where the researcher was exposed as a clinical instructor in Community Health Nursing, a lot of aging populations are showing manifestations of arthritis. These older individuals are not only complaining of the joint pain (arthralgia) brought about by the disorder but also having problems with immobility and deformity due to joint deterioration. The patient's knowledge and understanding of the disease are important to decrease the discomfort and disabling effects of arthritis. The researcher believed that older persons have the right to enjoy their remaining years as healthy individuals with minimal physical, emotional, and spiritual discomforts in life.

The researcher conducted this study to further understand the perceived behavior of older people pertaining to the causes, signs and symptoms, disabling effects, treatments, treatment responses, family and individual coping and how this perceived behavior affects their well-being as senior citizens. Health care providers play an important role in the management of arthritis by helping older people with arthritis their quality of life, free from discomfort, and remain productive in society.

FRAMEWORK

This study is anchored on the health belief theory contending that concepts about health that an individual believes are true. Such beliefs may or may not be based or in line with facts (Kozier, 2008).

This theory has six important elements. *Perceived Threat* has two types such as perceived susceptibility (one's subjective perception of contracting the disease) and perceived severity (feeling of seriousness in contracting the disease or leaving the disease untreated). *Perceived Benefits* connote believed

effectiveness designed to reduce the threat of illness. *Perceived Barriers* are possible negative consequences that might result from taking health actions (physical, psychological and financial demands). *Cues to Action*, refers to physical symptoms of health condition that motivate older people to take action. *Other Variables* refer to the demographics, psychosocial, and structural variables that affect individual perception and influence health-related behavior. Lastly, *Self-Efficacy* refers to the belief of individual about the disease and its treatment is successfully done, thus producing the desired effects-reduction of symptoms (http://www.familyhealthinternational.com).

This theory tries to explain how individuals respond to disease psychologically and how they cope based on their behaviors. In line with arthritis, older individuals have different attitudes and beliefs in the prevention and treatment of this disorder. This attitudes and beliefs are manifested, for instance, in the "pasmo" system. People tend to believe that arthritis is caused mainly by habitual washing of extremities (hands and feet) after long periods of tiring and strenuous physical activities.

The disabling effects of arthritis may be manifested in an individual's personal, social, and employment activities. To help persons with arthritis, health care providers must have a working knowledge of the specific disease and an understanding of the underlying pathologic processes. Basic education is fundamental in rectifying misconceptions.

OBJECTIVES OF THE STUDY

This study sought to find to the following objectives: (1) To describe the profile of the respondents in terms of age, gender, weight, previous occupation, socio-economic status, income, income source, educational attainment and support system; (2) to describe the experiences of the respondents in terms of types of arthritis, symptoms, causative factors and diagnostic/laboratory examinations done; (3) to determine the respondents' management and prevention practices in terms of coping, medications, lifestyle modification and its effects, other alternative treatments and preventive modalities; and, (4) to determine the prognoses of the respondents.

MATERIALS AND METHODS

This study used the descriptive design as the study summarized the status as phenomena of interest as they existed.

The study was conducted in the office of the Senior Citizen's Organization, Cagayan de Oro City. The respondents were members of OSCA (Office of Senior Citizen Affairs) who were affected by arthritis.

The study was conducted among the 34 members of the Office of Senior Citizen Affairs in Cagayan de Oro City. The OSCA is a regulatory body of different organizations of older people having the advocacy of uplifting the protection, promotion of health, and prevention of diseases among older people. The respondents were selected based on the following criteria: male or female who have signs and symptoms of arthritis (either medically diagnosed or undiagnosed), 60 years old and above, resident of Cagayan de Oro City, and willing to participate in the study.

An interview schedule was used to obtain information on the respondents' profile, their experiences with arthritis to include, management and prevention of arthritis, their prognosis and interview tool was tested for clarity to ensure the accuracy of data. The tool was translated into the local dialect for the respondents to understand the information asked for.

Permission to conduct the study was obtained from the Dean of the Graduate School of Liceo de Cagayan. Also, the comment of the office-in-charge of the OSCA to conduct the study among its members was sought.

The researcher and research assistants then distributed the instrument to the respondents who were given directions on how to accomplish it. An interview with the respondents then followed. The gathered data were analyzed using descriptive and inferential statistics.

RESULTS AND DISCUSSION

Table 1 shows the profile of the respondents. As to age, majority of the respondents were young old (60-70 years) old), while 29% were middle old and five percent were old/old.

The result implies that, majority of the respondents affected by arthritis are usually young old (60-70 year old). Commonly, onset of arthritis is seen at the age of 60 years old. Young old people are still actively involved in various activities; hence they are more at risk of developing arthritis. Those who were middle old (71-80 year old) might have suffered from the disease since their early 60's. Of invert percentage in the age group were the old old (81 years and above). This finding implies that the life expectancy among Filipinos is not that high.

As to marital status, 71% of the elderly were married, that majority of older people with arthritis. Implying has support system. On the other hand, widows accounted for 24% and single for 6% of the sample size.

The occupations of the respondents before retiring were highly distributed to the different government and non-government institutions. The occupations of highest number were government employee and housekeepers. Others were blue color jobs. The data further reveal that the majority of respondents had income below minimum wage. Their previous income could be related to the severity of arthritis. Low income could mean poor diet, lack of medical consultation, non-compliance with medication, and less monitoring of the disease.

Furthermore, in terms of weight, most of them (70%) were overweight, taking into account their average height of 5'2". The finding suggests a correlation between overweight and arthritis.

As to educational attainment 35% finished college while 26% obtained elementary education only. The rest of the respondents were unable to finish college (11%) and high school (11%). These data reveal that majority did not have college education, a factor that could have an impact on the understanding of the disease process and its treatment.

In terms of socio-economic status, 50% of the respondents had below average life status, while other 44% had average and only 6% above average. Financially impoverished, they could hardly sustain their medication and some would not even bother to go to the doctor for check-up.

As to received monthly income and source of income, 62% of respondents received below P3, 500.00 mostly sourced from pension, while 32% earned P3, 500.00 to P10, 000.00. Only 14% got financial support from their children. The data suggest that most of the respondents are self-reliant. However, the money they receive monthly is only enough for their daily expenses, not enough to cover medication and medical consultation.

In terms of support system, 97% of the respondents had their own families for support while only 3% received support from an organization. Filipinos are indeed very family oriented, providing the aged the needed support.

Table 1. Profile of older people with arthritis

Age	**Frequency**	**Percentage**
60-70 years old	22	65
71-80 years old	10	29
81 years old above	2	6
Overall	**34**	**100.00**
Gender	**Frequency**	**Percentage**
Male	14	41
Female	20	59
Overall	**34**	**100.00**
Marital Status	**Frequency**	**Percentage**
Single	2	6
Married	24	71
Widow	8	24
Overall	**34**	**100.00**
Previous Occupation	**Frequency**	**Percentage**
Self employed	2	6
Businessman	2	6
Electrician	1	3
Teacher	3	9
Government Employee	6	18
Carpenter	2	6
Laundry Woman	1	2
Mechanic	1	3
Housekeeper	4	12
Vendor	2	6
Barangay Health Worker	2	6
Helper	2	6
Factory Worker	2	6
Ship Captain	1	3
Salesman	1	3
Driver	2	6

Continuation of Table 1

Overall	**34**	**100.00**
Weight	**Frequency**	**Percentage**
50 lbs. below	2	6
51-60 kg.	10	29
71-80 kg.	21	62
81 kg above	1	3
Overall	**34**	**100.00**
Educational Attainment	**Frequency**	**Percentage**
Elementary level	0	0
Elementary Graduate	9	26
High School level	4	12
High School Graduate	5	15
College level	4	12
College Graduate	12	35
Overall	**34**	**100.00**
Socio Economic Status	**Frequency**	**Percentage**
Below average	17	50
Average	15	44
Above average	2	6
Overall	**34**	**100.00**
Source of Income	**Frequency**	**Percentage**
Pension	17	50
Self-employed	11	32
Children	5	15
Others	1	3
Overall	**34**	**100.00**
Income	**Frequency**	**Percentage**
3,500.00 below	21	62
3,501.00 to 10,000.00	11	32
10,001.00 above	2	6
Overall	**34**	**100.00**

Continuation of Table 1

Support System	Frequency	Percentage
Family	33	97
Friends	0	0
Senior Citizen Organization	1	3
Overall	**34**	**100.00**

Table 2, shows that the highest type of arthritis the respondents had was rheumatoid arthritis, followed by osteoarthritis (29%) and gouty arthritis (11%). However, a few others were not able to identify their type of arthritis and had two types of arthritis at the same time. The data imply that a significant number of people, most of whom are women, are affected by rheumatoid arthritis. Rheumatoid arthritis is five times higher in women than in men (Smeltzer, 2008). Osteoarthritis is generally common among the overweight/obese. Weight is found to be the usual causal factor of osteoarthritis. Gouty arthritis affected only a very few but it is considered to be the most debilitating type of arthritis. Majority of the respondents believed that arthritis is caused by the food they consumed. Acknowledging the cause of the disease decreases the risk of having the disease.

Table 2. Older people with types of arthritis

Types of arthritis	Frequency	Percentage
Rheumatoid Arthritis	15	44
Osteoarthritis	10	30
Gouty Arthritis	4	12
Don't know/not sure	3	9
Others	2	6
Overall	**34**	**100.00**

In terms of signs and symptoms, Table 3, shows that pain was the most common symptom. Pain is caused by joint inflammation, degradation of membrane, and destruction of ball and socket of the joints. The second most common symptom was numbness, which is caused by the decrease sensation of the peripheral nerve that might be related to the decrease conduction of electrical nerve impulses in the joint area. Deformity was also identified. Deformity is considered to be chronic; this is usually the late sign

of rheumatoid arthritis. Uncommon symptoms included tophi, swelling, podagra, and redness, which are cardinal signs of gouty arthritis. Fever was not a usual symptom.

Table 3. Older people with Arthritis signs and symptoms

Signs/Symptoms	Frequency	Percentage
pain	34	100
Swelling	4	12
Numbness	26	76
Redness	1	3
podagra (swelling of the big toe)	3	9
tophi (formation of nodules in between joint)	5	15
Immobility	2	6
Deformity	6	18
Fever	0	0

In relation to the frequency of signs and symptoms, Table 4, shows that 67% of the respondents experienced the arthritis every week while 20% experienced the symptoms daily. Less than ten percent had the symptoms once a month or few times a year. The debilitative effects of arthritis were evident among the majority of the respondents, affecting their day-to-day activities and their psychosocial functioning.

Table 4. Older people with arthritis in terms of frequency of signs and symptoms

Frequency of S/Sx	Frequency	Percentage
Always (everyday)	7	20
Often (every week)	23	68
Sometimes (every month)	3	9
Seldom (few times a year)	1	3
Overall	34	100.00

As to severity of discomfort, Table 5 reveals that 44% experienced moderate pain whole 29% experienced severe pain. As cited by Black (2005), experiencing chronic pain for a longer period of time can sometimes increase tolerance to pain. Only 3% had very severe pain while 24% had mild pain. The severity of discomfort may necessitate medical attention or alternative treatment to alleviate the pain. The data imply that despite the advent of medical management, majority of people with arthritis are still suffering from moderate to severe pain. This problem should be thoroughly addressed in the management of arthritis.

Table 5. Older people with arthritis
in terms of Severity of Pain

Severity of pain	**Frequency**	**Percentage**
10 (very severe)	1	3
7-9 (severe)	10	29
4-6 (moderate)	15	44
1-3 (mild)	8	24
Overall	34	100.00

Table 6, shows that 67% of the respondents believed that arthritis is a problem caused by "pasmo", which is a layman's term for muscular fatigue merely caused by muscle strain/muscular overwork. Arthritis is believed to be caused mainly by habitual washing of extremities (hands and feet) after long period of tiring and strenuous physical activities. Though "pasmo" is not accepted in medical practices and has no medical basis at all, it is still considered to be the main cause of arthritis among Cagayanons.

Moreover, 59% of the respondents believed that aging is also one reason for having arthritis. According to them, it is normal to have arthritis when the person ages. In short, arthritis is considered a normal part of aging. Furthermore, the data show that 41% believed that arthritis is caused by the food they eat. Consumption of food high in fats and internal organs can lead to arthritis. However, 20% believed that it is hereditary or genetic in nature; that is, it runs in the family, hence can be avoided. Less than 10% believed that arthritis is caused by obesity and sedentary lifestyle. According to health belief theory, p*erceived threat* has bigger impact on the treatment of arthritis.

When an individual has knowledge on how he would have the disease, he would be serious about avoiding the possibility of contracting the disease. If majority of the respondents believe that consumption of certain food groups can cause arthritis, then they will avoid those foods to lessen symptoms or avoid or manage arthritis.

Perceived benefits of an individual could help reduce the risk of acquiring arthritis. Some respondents think that arthritis is merely a problem due to overwork or "over fatigue". However, beliefs find no medical support. Thus, by reducing workload, they thought they could avoid arthritis. Hence, older people should be educated on this matter to correct their misconceptions. The researcher totally should also be considered as combination and part of the management of arthritis.

Table 6. Experiences of older people with arthritis in terms of causative factors

Causative factors	Frequency	Percentage
aging (degenerative in nature)	20	59
bad diet (unhealthy food)	14	41
hereditary/genetic	7	20
Obesity	1	3
"pasmo'	23	68
kidney problem	0	0
secondary factor (diseases)	0	0
sedentary lifestyle (minimal activity with less time to do physical exercises)	3	9
Trauma	0	0

As regards, diagnostic examination underwent by the respondents, in Table 7, shows that almost 80% did not seek any diagnostic examinations. Less than 20% of the respondents had blood exams, X-ray and arthrocenthesis. These data reveal that most of the respondents were unmindful of their condition, a behavior that could be due to financial inability to pay for those medical exams.

Table 7. Experiences of older people with arthritis in terms of diagnostic and laboratory examinations

Diagnostic/laboratory exams	Frequency	Percentage
Never been to a Doctor for check-up	27	79
Blood exams (ANA, C reactive protein, anti CCP)	5	15
X-ray	4	12
Arthrocenthesis	1	3
Arthroscopy	0	0

Coping with physical and psychosocial effects is a challenge for someone who has arthritis. As shown in Table 8, when revealed asked about their way of coping with the disease, 38% just resting and enjoy doing other activities to ignore the discomforts like pain. However such coping will not cause the pain to subside. Others just ignored the discomforts (29%) or simply accepted and bore (20%) the discomforts. All of the respondents were active members of the Office of the Senior Citizen Affairs, which somehow had helped them cope with their disease. Support system is important for an individual who is suffering from arthritis.

Table 8. Experiences of older people with arthritis in terms of coping

Coping	Frequency	Percentage
"Pahulay/lingaw-lingaw"	13	38
Ignore	10	29
Acceptance	7	20
Use of Cane	3	9
OSCA activities	34	100

As revealed in Table 9, many of the respondents used alternative medication like herbal to alleviate their discomfort, accounting for about 47% of respondents. This finding suggests the respondents, dependence on alternative or herbal medication like luy-a, sambong, tuba-tuba, rather than on medical management. The respondents experienced relief after taking alternative treatment. Under the health belief theory, people tend to adapt

behaviors that produce the desired effects. Moreover, 32% of the respondents used drugs like None Steroidal Anti-inflammatory Drugs (NSAID) to decrease the symptoms and alleviate pain. These drugs are mostly over-the-counter drugs taken without prescription at all. Self-medication is a dangerous practice among older individuals. Prescribed medication is important to lessen the possible side-effects that could add up to the problems. Other drugs like colchicines, allopurinol and probenecid are prescribed drugs but were not taken by the respondent. These drugs are also intended for gouty arthritis, which affected only a very few of the respondents.

Table 9. Experiences of older people with arthritis in terms of medications

Medications	Frequency	Percentage
NSAIDS	11	32
Cortecosteroids	0	0
COX 2 inhibitor	0	0
Allopurinol	0	0
Colchicine	0	0
Probenecid	0	0
Herbal	16	47
Others:	7	20

Lifestyle modification is important in the management of arthritis. Table 10 shows the different modifications that the respondents perceived to be helpful. Regular exercise was perceived by 79% of the respondents to be a good option to prevent arthritis attack or relapse of symptoms. There are still individuals with arthritis who don't exercise. Physical activity is important to lessen symptoms of arthritis (Smeltzer, 2008). On the other hand 59% of the respondents identified the importance of healthy diet. Based on the earlier data, food is considered as one of the many causes of arthritis. Thus, the respondents would avoid food that for them could cause arthritis. Like in the case of gout, this is exacerbated by the consumption of food high in purine, such as the internal organs of animals and nuts. Moreover, 32% of the respondents made use of relaxation techniques while only one was into stress modification, implying that only few of the respondents believe that relaxation and stress modification techniques affect exacerbation of arthritic

symptoms.

About 67% claimed that they improved in their daily functioning after following a healthy lifestyle. More than half of the respondents (53%) had lesser symptoms while 32% did not notice any improvement of their condition. Lifestyle change should be made a lifetime effort.

Table 10. Experiences of older people with arthritis in terms of lifestyle change and its effects

Lifestyle Change	Frequency	Percentage
Healthy Diet	20	59
Regular Exercises	27	79
Stress modification	1	3
Relaxation techniques	11	32
Effects of Lifestyle Change	**Frequency**	**Percentage**
Improvement of ADL	23	68
Less symptoms attack	18	53
None	11	32

Table 11 shows the different alternative and treatment modalities resorted by the respondents. As shown, 88% took time to rest the affected part to alleviate the discomforts of arthritis, while 41% massage the affected area, which is a good alternative to lessen pain (Kozier, 2007). Less than 30% of the respondents used warm compress and elevated the affected area. Further, 11% applied herbal liniments to the affected area. The data show that almost half of the respondents used alternative modalities while a greater number of them just took a rest to improve the condition.

Table 11. Experiences of older people with arthritis in terms of alternative treatment and preventive modalities

Alternative Treatment/ Preventive Modalities	Frequency	Percentage
Warm compress	10	29
Rest	30	88
Immobilization of the area affected	1	3

Continuation of Table 11

Deep breathing exercises	0	0
Massage/rub affected area	14	41
Elevation of affected area	8	24
Herbal medications	4	12
Others	1	3

As to the source of information on the alternative modalities, in Table 12, shows that 41% of respondents were informed by their health provider (doctors, midwives, and nurses) in the health center. Forty – one percent of the respondents learned about them from the multimedia, while less than 23% from family, relatives and friends. As revealed, only a few of the respondents went to see a doctor for consultation.

Table 12. Experiences of older people with arthritis in terms of source of information for treatment

Source of information for treatment	**Frequency**	**Percentage**
Health care provider	14	41
Family or relatives	8	24
Friends	7	20
Multimedia (TV, Radio, Newspaper, Magazine, Brochures, Internet)	14	41
Traditional healers (tandok, hilot, psychic surgery)	0	0

Table 13 shows the different indicators on the experiences of older people with arthritis in terms of prognosis. The indicator "Good", means the absence of signs and symptoms for longer period of time on improvement of the quality of life. The second indicator is "fair"; means decreasing frequency and severity of signs and symptoms, but they are still evident. The indicator is "poor" improvement at all or the condition is worsening.

As revealed, 73% of the respondents had fair prognosis. That is, they experienced minimal reduction of signs/symptoms. As shown in Table 2, majority of the respondents suffered from severe pain. On the other hand, 14% of the respondents never noted any improvement of their condition while 12% had good prognosis. The findings could be linked with the fact that

majority of them did not have medical check-up at all. Instead, they relied on their cultured beliefs. If adherence to such beliefs persists, arthritis will remain a health problem among the people in Cagayan de Oro City.

Table 13. Experiences of older people with arthritis in terms of prognosis

Indicators	Frequency	Percentage
Good (absence of S/Sx)	4	12
Fair (decreased frequency and Severity of symptoms)	25	74
Poor (no improvement of S/Sx)	5	15
Overall	**34**	**100**

CONCLUSIONS

The elderly in Cagayan de Oro City are beset by pain or discomfort brought about by the three common types of arthritis. More women than men at their young to old stage are affected by the disease. Rheumatoid arthritis is the most common type in both sexes. The disabling effects of arthritis are not properly addressed by the elderly because of the belief that arthritis is a normal part of aging and because of lack of financial resource to pay for health care services. Most of them manage their illness through self-medication and the use of herbal plants and non-prescribed drugs. Finally, majority of them have fair prognosis due to a lack of effective means of managing the disease.

RECOMMENDATIONS

Based on the findings and the conclusions, the following recommendations are advanced:

1. The City Health Office and OSCA should formulate specific programs for the members with arthritis.
2. The OSCA should hold lecture on arthritis for its members. The lecture should include topics on causal factors, risks, types of joint damage, medical treatments, alternative treatments, and preventive management.

3. OSCA members who have attended seminars treatment should help disseminate the information to their fellows.
4. OSCA should hold free clinic, weekly to provide the elderly free diagnostic service.
5. The City Health Office should hold monthly activities for the elderly with arthritis and free consultation program.
6. Nursing schools should intensify their extension program to help the government in its effort to provide assistance to the elderly with arthritis.
7. Researchers should consider of doing similar study that look into other areas, like the debilitating effects of arthritis in relation to physical and psychosocial functioning of the affected.

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Correlates of Depression among Institutionalized Elderly Clients

An Institutional Research Project Presented to Cebu Normal University Research Council

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Abstract - The elderly population are considered vulnerable to stress of different kinds. One common stereotype of growing older is that there is a high chance of becoming depressed. The relationship between age, sex, educational attainment, marital status, self-esteem, social support and level of depression among elderly client admitted in Home for the Aged in selected facilities in Cebu was investigated in this study. Furthermore, the variables that greatly predicted geriatric depression was also determined. Based on the reviewed literature and studies it was hypothesized that there is a significant relationship between age, sex, educational attainment, marital status, self-esteem, social support and level of depression among institutionalized elderly clients. Utilizing a descriptive-correlational design with simple correlational methods and multiple regression analysis, data were gathered from thirty-seven (37) respondents in two geriatric facilities in Cebu. A researcher-administered questionnaire was utilized containing the demographic data, Self-esteem Scale adapted

from Rosenberg (1986), Berlin Social Support Scale adopted from Schwarzer and Schulz (2000) and Geriatric Depression Scale (Brink and Yesavage, 1982). Findings revealed that majority of the respondents who are institutionalized are female, single and has acquired elementary level in terms of education with a mean age of 76. Moreover, respondents had moderate self-esteem, adequate social support and a depression level of moderate to severe. Only social support showed a significant correlation with depression with a coefficient of determination of 0.19. It is concluded that although social support is a necessary element for the prevention of depression among institutionalized geriatric clients there are still other factors to consider as possible predictors of depression among these type of clients.

INTRODUCTION

Aging is a phenomenon that everyone has to go through in life. The elderly population are considered vulnerable to stress of different kinds. One common stereotype of growing older is that there is a high chance of becoming depressed. This stereotype has fostered the exploration of depression as a natural aspect of aging and how depression and age are related. During the past decade, there have been significant research findings concerning depression in the aging and the aged. Psychologists are aiming to find answers to numerous of questions concerning depression in the aging which is such a major public health concern. New research findings have suggested that depression in late life occurs in the context of numerous social, physical, and related disability problems (Meyers & Young, 1997).

Depression in elderly is an important but often unrecognized public health problem. Numerous studies have examined depression in the general community, but studies of depression in the elderly have generally been small and limited.

Moreover, depression greatly diminishes a person's quality of life, personal joy and productivity. Frail elderly persons, the residents in assisted living facilities, too often experience depression. Their declining health and functioning, multiple life changes and diminished personal resources are

factors predisposing the frail elderly to depression. Depression is a medical condition, which affects the whole person; body, mind and spirit. Societal stigma and misunderstandings continually affect detection, treatment and prevention of depression. Depression can be managed and treated so that the person's quality of life, personal joy and productivity can return.

According to Eldercare Online (2000), depression is more than sadness and low mood, more than a "low feeling" one experiences now and then but goes away when taking a walk or having coffee with a friend. It is the darkest of moods, an empty feeling, many things and people are no longer interesting, aches and pains that keep coming back and go on and on for weeks, months or years. Depression is a whole body disorder that affects the way one thinks, the way one feels, both physically and emotionally. It isn't normal to feel depressed all the time when one gets older, in fact, most older people feel satisfied with their lives.

A widespread belief is noted that depression is a natural consequence of aging but according to Meyers & Young (1997) it is not. Although depression in elderly might be difficult to determine because it is masked by physical condition, dementia among others, yet, there is indeed a need to determine its existence among the elderly since they need care appropriate to their developmental needs.

Depression affects the quality of life for the elderly in other ways. It can substantially increase the likelihood of death from physical illnesses, increase impairment from a medical disorder and impede its improvement, while psychological treatment frequently improves the treatment success rate for a variety of medical conditions. Untreated depression can interfere with a patient's ability to follow the necessary treatment regimen or to participate in a rehabilitation program. Moreover, healthcare costs of elderly people with significant symptoms of depression are roughly 50% higher than those of non-depressed seniors. Depression basically affect the total functioning of a person (NMIH, 2005).

Elderly patients who are placed in institutions of care are prone to depression since they are mostly away from their families or do not have families at all. They are left to the care of strangers whom they gradually learn to accept as their daily social groups and sometimes they consider as their family. There are factors that one should investigate as to what factors contribute to the development of depression among the elderly clients being institutionalized. In doing so, caregivers will be able to provide anticipatory

care to these clients who can possibly develop depression.

There is therefore a need to determine the factors that predict the occurrence of depression among elderly clients in geriatric institutions in Cebu City, thus this study was undertaken.

REVIEW OF RELATED LITERATURE

Literature presents the common predictors of depression among elderly. This has been eventually studied for purposes of preventing the occurrence of depression among likely candidates based on the factors that can predispose one to develop.

In the study of Husaini (1997), depressive symptomatology and correlates of depression were compared in 600 white and 600 black elderly people over a period of 18 months. In general, factors associated with depression were found to be similar for both groups. They included prior depression, social and medical stressors, poor ego and social networks that were small, with which contact was infrequent, and from which emotional support was lacking. This study focus on the social and psychological factors that influence the development of depression.

Ostbye , Kristjansson, Hill, Newman, Brouwer and McDowell (2005) initiated a Canadian Study of Health and Aging (CSHA) which includes a large and national representation of both the cognitively intact and the cognitively impaired elderly. The current analyses of 2,341 participants from the CSHA who completed a clinical rating scale for depression have two objectives: 1) to determine the prevalence of minor and major depression and 2) to examine the importance of several risk factors. The prevalences of major and minor depression were 2.6 percent and 4.0 percent, respectively, and were higher for females, specifically those in institutions, those who reported that their health problems limited activities, and those with chronic health conditions. Women were more likely to exhibit depression (OR = 3.5; 95% CI: 1.4-8.8) than men, and those with dementia more likely to exhibit depression than those without (OR = 2.4; 95% CI: 0.9-3.1). The study concluded that depression is a significant mental health problem among elderly Canadians, particularly among women and those with physical limitations. It is recommended that more attention should be paid to the detection and treatment of depression in the elderly, particularly among those most at risk.

Another study examined the predictors for depression, anxiety and

psychotic symptoms in a population of very elderly persons. A total of 894 persons with a mean age of 84.5 years were examined twice using a 3-year interval. Physicians performed a structured psychiatric interview and persons with current disorder or symptom were excluded. The findings revealed hat persons who had history of psychosis, were affected with dementia and had an insufficient social network had an increased frequency of psychotic symptoms. A history of depression or anxiety increased the frequency of having anxiety and depression. An insufficient social network was associated with anxiety. Anxiety, depression and psychotic symptoms in the very elderly seem to be linked to a lifetime psychological vulnerability, since all were related to a previous psychiatric history. Additionally, psychotic symptoms seemed to emerge due to structural brain damage, as seen in dementia.

As gleaned from the enumerated studies, social support is a common variable often associated with depression.

Evidence of depression as influenced by aging was also identified. Roberts et al (1997) examined whether growing old increases the risk for depression. To investigate the effect of aging on rates of depression accurately, the authors collected two forms of data from community residents 50 years old and older. The panel study contained 12 variables that ranged in categories of biological and social factors (i.e., age, gender, education, marital status, financial strain, chronic medical conditions, functional impairment, cognitive problems, life events, neighborhood problems, social isolation, and social support). These factors measured the depression of the subjects by using the DSM-IV diagnostic criteria for major depressive episodes (Roberts et al., 1997). There was no significant age related effects on depression found. The results show that "gender, chronic health conditions, problems with activities of daily living, cognitive problems, neighborhood problems, and social isolation were predictors of depression" . Thus, Roberts et al. concluded that what seem to be age-related effects on depression are only attributable to physical health problems, social factors, and related disability problems.

Another research finding on the influence of aging on depression was studied by Hughes et al. (1993). The authors' hypothesis was whether age makes a difference in the effects of physical health and social support on the outcome of a major depressive episode. Two groups of subjects were studied: 67 patients who were less than 60 years old and 46 patients who were 60 years old or older. They administered a face-to-face interview and

then a follow-up interview over the telephone after 6 months. The interviews were studied with findings data on their patients physical health and social support influences. The results of this research showed a similarity of the two age groups. The authors found out that the mean illness index score of the older patients was slightly higher and their mean impaired subjective social support score was slightly lower than the younger patient. Thus, the findings show that the illness index (physical health) and impaired subjective support (social support) measures were significant predictors of depressive symptoms in the elderly.

Studies on the elderly and depression have brought forth new and substantial information. This research has found a number of factors that influence depression throughout the aging process. These factors are no longer found to be age-related as in past research. The related literatures presented, demonstrate that depression in late life occurs in the context of numerous social support issues, stressful life events, and physical problems.

OBJECTIVES OF THE STUDY

The study sought to find the correlates of depressions among institutionalized elderly clients. In particular, it aimed to determine the relationship between age, sex, educational attainment, marital status, self-esteem, social support and level of depression among elderly client admitted in Home for the Aged in selected facilities in Cebu.

Hypotheses

Based on the reviewed literatures and studies it was hypothesized that there is a significant relationship between age, sex, educational attainment, marital status, self-esteem, social support and level of depression among institutionalized elderly clients.

MATERIALS AND METHODS

Research Design

A descriptive-correlational design was used in the study utilizing simple correlational methods and multiple regression analysis. Multiple independent variables (age, sex, educational attainment, marital status, self-esteem and social support) was correlated with one dependent variable (geriatric depression).

Research Locale

There are currently three geriatric institutions in Cebu. Based on the number of clients catered in these respective institutions, Hospicio de San Jose in Barili, Cebu and Durano Foundation in Danao, Cebu were taken as locale of the study since they have the most number of clients admitted. Moreover, these two facilities have provided full support to the implementation of this study. Both facilities are managed by non-government organizations.

Research Instrument

A researcher-administered questionnaire was utilized in the study consisting of the following parts: Part I includes personal data such as age , highest educational attainment, marital status of the respondent; Part II contains the Self-esteem Scale, Part III contains the Berlin Social Support Scale and Part IV has the Geriatric Depression Scale.

The Self-esteem Scale was adopted from Rosenberg (1986) which consists of a ten-item Likert Scale with items to be answered in four-point scale. This test reportedly has high reliability: test-retest correlation ranged from 0.82 to 0.88 and Cronbach's alpha ranged from 0.77 to 0.88 (Blacovich & Tomaka, 1993 as cited by Palompon, 2004). The scoring system for this instrument are as follows:

Items 1,2,4,6,7	Strongly agree=3; agree=2; disagree=1 and strongly disagree = 0
Items 3,5,8,9,10	Strongly agree=0; agree=1; disagree=2 and strongly disagree = 3

Social support was measured using Berlin Social Support Scale (BSSS) adopted from Schwarzer and Schulz (2000, userpage.fu-berlin.de/~health/soc_e.htm - 29k). This instrument has a four-point scale with the following choices: 4 – strongly agree, 3- somewhat agree, 2-somewhat disagree and 1-strongly disagree. Social support is categorized into Highly Adequate (25 – 32), Moderately adequate (15 – 24), Adequate (9 – 16), Not adequate (1- 8).

The Geriatric Depression Scale, on the other hand, was adopted from Brink and Yesavage (1982) who freely allowed interested researchers to use the instrument. This has no reported reliability and validity tests but was reported to have been utilized in several researches. This consists of 15 items with Yes or No choices. The following answers are noted to indicate depression: 1) No;

2) Yes; 3) Yes; 4) Yes; 5) No; 6) Yes; 7) No; 8) Yes; 9) Yes; 10) Yes; 11) No; 12) Yes; 13) No; 14) Yes and 15) Yes. Scoring was interpreted as : No depression (0-4), Mild Depression (5-9) and Very Depressed (10-15).

Research Sample

Universal sampling was utilized in the study in as much as only limited number of elderly clients were admitted at Hospicio de San Jose (Barili) and Durano Foundation (Danao) at the time collection of data was undertaken . Originally, only geriatric clients within the age range of 60-70 was identified but it was noted that most of the clients in the two institutions were of higher ages above 70 so the age range was set at 60 to above 90 as long as the respondents was admitted in either of the two home for the aged institutions; able to talk and well-oriented to time , person and place. Table 1 shows the sampling distribution for the two locale. Majority of the respondents were from Hospicio de San Jose because it has a bigger coverage compared to Durano Foundation.

Table 1. Distribution of Research Samples

Locale/Facility	Frequency	Percentage
Hospicio de San Jose	23	62.2%
Durano Foundation	14	37.8%
Total	37	100%

Data Gathering Procedure

The institutionalized elderly clients were the basic unit of analysis in this study. The following steps was undertaken to ensure a comprehensive data gathering procedure:

A. Construction of Instruments

The questionnaire used in this study is a composite of measures adopted from previous studies and from the internet. This is a researcher-administered questionnaire and translation of the entries into Cebuano version was done to provide uniform interpretation of the items in the questionnaire.

B. Data Gathering

Permission to conduct the study was obtained from the administrators of the two facilities for elderly. Prior to the actual data gathering, the respondent were explained of the purpose of the study and his/her permission was obtained. The two researchers personally interviewed the respondents using the questionnaire in Cebuano Version as their guide. Repetition of the items to be asked was done but information was limited to what was stated in the questionnaire. The data gathering lasted for two weeks in each facility.

Processing of Data

The data was statistically analyzed using Statistical Package for Social Science (SPSS) software utilizing its evaluative copy.

In the correlation between categorical variables (sex, marital status, educational attainment and level of depression) a Chi-square was utilized and extent of correlation was verified through the use of Cramer's V or Contingency Coefficient depending on the contingency table arrangement.

In determining correlations between depression (treated as ratio variable) and self-esteem, age and social support (interval), Pearson's r was utilized.

Variables with significant correlations were entered into the regression analysis with the criteria of $F \leq 0.05$ to enter and $F \geq .10$ to remove prediction toward depression as dependent variable.

All correlations were interpreted as significant at 0.05 level of significance.

RESULTS AND DISCUSSION

After processing the data, the following results were obtained based on the statement of the problem formulated.

Profile of the Respondents

Table 2 shows the demographic profile of the respondents such as sex, marital status and educational qualification which serve also as independent variables of the study.

Table 2. Profile of the Respondents

Profile		Frequency	Percentage (%)
Sex:	Male	9	24.8
	Female	28	75.7
	Total	37	100
Marital Status:	Single	14	37.8
	Married	10	27.0
	Widow/widower	12	32.4
	Separated	1	2.7
	Total	37	100
Educational Qualification:			
	Elementary Level	17	45.9
	Elementary Graduate	2	5.4
	HS Level	9	24.3
	HS Graduate	1	2.7
	College Level	3	8.1
	College Graduate	4	1.1
	Master's Graduate	1	2.7
	Total	37	100

Data presents that majority of the respondents who are institutionalized are female, single and has acquired elementary level in terms of education. This profile implies that single women who do not have immediate family of their own since they have not married, who are probably left behind by other siblings and have not acquired stable jobs due to inadequate educational qualifications are the ones who are institutionalized in geriatric facilities. Furthermore, most of those who are institutionalized are those who do not have their spouses such as the widower/widow. This profile also implies the significance of the role of family members or immediate kin who are instrumental in the care of old family members at the home setting.

The mean age of the respondents is 76 which indicates that most of them are on the late stage of retirement. According to Duvall, at this stage, geriatric clients are expected to be enjoying time for themselves and reaping the fruits of their long years of working. Yet, it is observed that majority of the clients are not receiving any retirement benefits, the comforts of living with a family since most of them have not even finished elementary education.

Respondents' Self-esteem

Table 3 shows the self-esteem of geriatric respondents as categorized into high, moderate and low self-esteem.

Table 3. Respondents' Self-esteem

Level of Self-esteem	Frequency	Percentage (%)
Moderate	35	94.6
Low	2	5.4
Total	37	100

The self-esteem measurement revealed that majority of the respondents have moderate self-esteem. None of them reported high self-esteem which implies that the respondents have certain degree of insecurity in unidentified aspects. Meyers & Young and Eldercare Online support this result that elderly clients experience a sense of being low in their self due to possible indications of depression. As per interview, respondents who revealed a moderate level of self-esteem attributed this to the support provided by the institution's caregiver and other volunteers who visit them and take care of them.

This result implies that these clients need family members or other people who can boost their self-esteem and avoid possible development of depression. Moreover, this also implies that geriatric institutions should provide recreational and occupational therapies for the clients so that they will be able to maintain a sense of focus and importance of themselves.

Respondents' Social Support

Social support was measured using Berlin Social Support Scale (BSSS). Table 4 shows the social support of the respondents.

Table 4. Respondents' Social Support

Level of Social Support	Frequency	Percentage (%)
Highly Adequate	1	2.7
Moderately Adequate	11	29.7
Adequate	17	45.9
Not Adequate	8	21.6
Total	37	100

Most of the respondents reported adequate social support and minority have highly adequate support. This is expected in these clients since most of them do not have family members with them and they are left in the elderly institution. Some of them have relatives who visit them but not as often as they would want them to be there. Moreover, most of the respondents are single thus, support from others is seldom expected. As some respondents have disclosed, the presence of volunteer workers and students in their institution help them to feel a sense of support and belongingness. Hughes et al. support this finding in that social support is low among elderly clients in geriatric institution. Due to their length of stay in the institution, some family members seem to ignore or forget the existence of an elderly parent or relative usually attributed to lack of time or finances needed to visit the institutionalized family member.

Respondents' Level of Depression

The Geriatric Depression Scale measured the level of depression of the respondents. Table 5 presents the level of depression of the respondents.

Table 5. Respondents' Level of Depression

Level of Depression	Frequency	Percentage (%)
No depression	11	29.7
Mild Depression	13	35.1
Severe Depression	13	35.1
Total	37	100

The data revealed that majority of the respondents have either mild depression or severe depression. This result lend support to the study made by Ostbye , Kristjansson, Hill, Newman, Brouwer and McDowell that elderly clients have experienced certain level of depression. The strong inclination of these clients to develop depression can be attributed to their deteriorating self-esteem and the inadequacy of the social support they derived from their family members. The constant loneliness and longing to be with their family members play a factor in the development of depression among these clients.

Correlations Between Age, Sex, Marital Status, Educational Attainment, Self-esteem, Social Support and Depression

The level of depression of geriatric clients is correlated with certain variables to determine their degree of influence over the possible occurrence of depression among respondents. Table 6 presents the correlation coefficients.

Table 6. Correlations between Independent and Depressions

Correlates of Depression	**Correlation Values**	**Level of Significance**
Age	r = .14	.41
Civil Status	$X^2 = 10.76$	.09
Sex	$X^2 = 3.11$	.21
Educational Attainment	$X^2 = 15.59$	.21
Self-esteem	r= -.04	.98
Social Support	r= .42	.00

From among the independent variables that were correlated with level of depression, social support shows a significant correlation at p=.00, r=.42. With this result, the alternative hypothesis that there is a significant relationship between social support and depression is accepted while the other alternative hypotheses were rejected. This implies that social support has a significant influence on the level of depression among geriatric clients. This results is in consonance with several studies which cited that social support is an integral variable that influence the development of depression among elderly clients

(Ostbye, et al., 2005; Roberts, 1997; Hughes, et al., 1993). This findings implies that social support is an important factor in the prevention of depression among elderly clients. This factor enables them to feel that they are valued and cared by other people despite their condition which they sometimes perceived as becoming a burden to others.

To determine which variables predict depression, the independent variables were entered into the stepwise regression analysis model. Only social support was entered with R=.43 and a coefficient of determination at .19 which means that social support predicts depression among elderly at nineteen percent (19%) only. This implies that geriatric clients have higher tendencies to develop depression with the absence of social support system. This further implies that support system among elderly clients play a great role in maintaining their sense of well-being although other factors may contribute to depression such as physical health among others. It is therefore necessary for caregivers to provide more time and understanding to these clients so as to help lessen if not diminish their depression states.

CONCLUSION

Based on the findings obtained, social support is a necessary element in the upliftment of the well-being of an individual most specially for elderly clients who are institutionalized. It is further concluded that institutionalized geriatric clients have higher tendencies to develop depression specially those who lack support from the caregivers and family members.

RECOMMENDATION

From the conclusions made, the following recommendations are presented:

a. Families of patients in geriatric institutions should be involved in the care of the clients;
b. Geriatric institutions should provide recreational activities that will help channel negative emotions of clients through positive means;
c. Caregivers should be trained to provide empathy, sensitivity and understanding to geriatric clients.
d. A government-financed geriatric facility should be established in Cebu to cater to the growing number of geriatric clients. Furthermore,

the Department of Health and Department of Social Welfare and Development should intensify their programs for geriatric health and social welfare including those who are institutionalized.

e. Further study should be done through a comparison of the development of depression between institutionalized an non-institutionalized elderly clients.

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Modern and Indigenous Combined: Enriching Health Knowledge among the Bagobo

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Abstract - Using interviews and community discussions, this paper sought to determine the health practices of the Bagobo in the Malagos watershed, particularly the confluence between the modern and indigenous. This paper discusses why despite the high-level of acceptance of modern health practices introduced by health workers, the Bagobo have not ended traditional ways of making themselves healthy. Instead, they have combined the traditional and modern practices to enrich their health knowledge. The decision to fuse the two is a consequence of what facilities and materials are available to them in the area. The Bagobo have fully embraced modern ways in some aspects of their life-cycle such as maternal and child care, however their indigenous ways particularly circumcision, child-delivery, and the use of medicinal plants still prevail.

Keywords - Bagobo, health practices, indigenous knowledge, Malagos watershed

INTRODUCTION

In the Philippines, medical beliefs and practices among indigenous communities persist because they answer instrumental and moral imperatives of the society and are found empirically effective. This is not to say that such beliefs and practices are effective from the standpoint of western medicine, or that they always bring about the desired results. According to Mutin (**** in Young 2005), "empirical effectiveness of these practices has important ontological consequences, since it enables sickness episodes to confirm ideas about the real world." This paper documents the traditional and modern health practices of an indigenous people, the Bagobo, of Malagos watershed. Special attention is given to the confluence between these two knowledge systems on health. Analysis rests upon the enduring indigenous health practices in the context of modernity.

The Malagos Watershed is located within the foot slopes of Mount Apo Natural Park particularly in Calinan. It is a 235-hectare aquifer declared a protected water resource area (Davao City Water Code 2001) anchored on Presidential Code 1067 or the Philippine Water Code of 1976. Calinan to Dacudao, Calinan to Malagos, and Sirawan in Toril District are declared protected water resources under the Implementing Rules and Regulations of the Davao City Water Code of 2001 (Braga, 2008).

Predominantly, the place is populated by the Bagobo who accounts for 81 percent of the ethnolinguistic groups in Region XI's 493,643 ethnic population (NCIP 2005). In the Davao region, latest statistics from NCIP's official website reveals a total population of 292,153 Bagobo mostly living in the hinterlands of Mount Apo.

Trip to the Philippines' highest peak

The Bagobo are proud people with proto-Malayan features. A strong social structure has enabled the group to blend well with the main body politic while retaining their indigenous customs, beliefs, and values. While many are in economically depressed circumstances, a great number have attained a considerable degree of self-sufficiency. Most of the Bagobo have suffered dislocation from the loss of their ancestral lands and the effects of modern day insurgency (NCIP 2008). Also according to NCIP, the Bagobo is further classified into subgroups, the Tagabawa found in the provinces of Davao del

Sur and North Cotabato, the Guiangan/Clata of Davao City, and the Ubo of Davao del Sur and Davao City. Ubo is a Manobo sub-group found between the more isolated mountains of Southwest Cotabato in the area called Datal Tabayong and farther down Davao del Sur.

The Bagobo are swidden farmers. They plant upland rice, root crops, and vegetables for subsistence. Sometimes they forage the nearby forests for wild game.

Drilling of free flowing wells in water resource areas is prohibited, including massive land activities that could affect the utilization and protection of water resources. Sanitary landfill, cemetery and underground oil storage tanks are also not allowed in identified water resource areas. No person is also allowed to engage in the business of drilling or operating wells, whether test wells or production wells, without first registering as well driller or operator with the Council.

Participant-observation was used in this study, specifically Participatory Rural Appraisal (PRA) method together with interviews both using structured questionnaire and key informants. Data were triangulated using focus-group discussion. This form of investigation enabled the Bagobo to share and analyze their indigenous health practices, vis-à-vis modern concepts. Primary data and information gathered were analyzed qualitatively and quantitatively. Secondary data were taken from the local government unit concerned.

Maintaining wellness, combining modern and indigenous knowledge

In maintaining a healthy living, the Bagobo people have to deal with common illnesses which include fever, cough, colds, diarrhea, chickenpox, amoeba, pneumonia, measles and skin-boil (matagtiki). (see figure 1 below) Discussions reveal that fever, cough and flu are prevalent all year-round but peak during the rainy season, June to August. Allergies and other skin diseases are very common during the same period when most of the forest trees and plants bear flowers; diarrhea in August and September—when fruits have gone ripe; and diarrhea in December when there are lots of food prepared for the yuletide season.

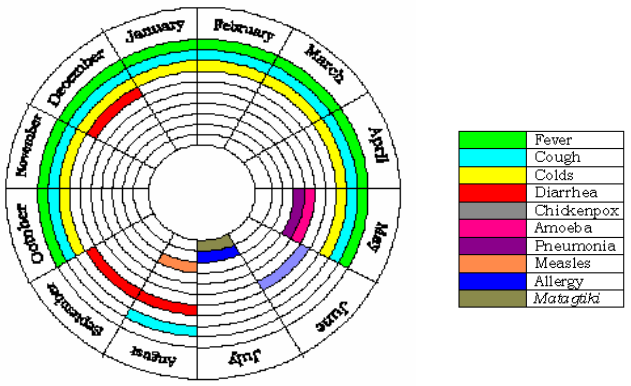

Figure 1. Year-round Seasonal Calendar of Common Illnesses of the Bagobos in Malagos Watershed Area

Other than these common ailments, the Bagobo have to deal with other health concerns specifically those surrounding the life-cycle. In this regard, interviews point out the influence of external sources of health knowledge, primarily brought about by the creation of the health center in the community.

The Health Center has succeeded in enticing the Bagobo to use artificial family planning methods. Interview reveals that more respondents use artificial family planning methods than natural methods. (see table 1) Discussions also reveal that the Bagobo privilege medicines provided by the health center before they use herbal medicines sourced out from nearby forests. Separate discussions also confirmed the use of indigenous knowledge in controlling childbirth by utilizing herbal plants. Elderly Bagobo are the sources of this knowledge. Presently, it is unusual for them to utilize these plants because most of them avail of the artificial contraceptive materials given free by the community health center.

Table 1. Distribution of respondents by family planning method

Planning Method	Frequency	Percentage	Frequency	Percentage
Natural	31	39		
Rhythm			24	77.78
Calendar			2	7.41

Withdrawal			5	14.81
Total			31	100
Artificial	49	61		
Pills			30	60.98
IUD			5	9.76
Depo			6	12.20
Condom			0	0.00
Ligation			7	14.63
"Herbal"			1	2.44
Total			49	100
Total	80	100		

The situation in child delivery is different with more *bagobo* women giving birth at home assisted by comadrona or paramedics. (see Table 2) Discussions point out that these women prefer the paramedics based on these reasons: hospital is quite far from their community; hospital fees are beyond their reach; and the advice of elders on child delivery at home with an attending comadrona is still preferred. This jibes with the research finding of the World Health Organization's Reproductive Health and Research which says that there are only 59.8 percent of skilled birth attendants in the Philippines. The great gap in the number is filled by traditional birth attendants. (2006)

Table 2. Distribution of respondents by child delivery practices

Child Delivery Practices	Frequency	Percentage
Hospital with an attending doctor	19	23.19
Lying-in clinic with an attending midwife	12	14.49
House with an attending comadrona	50	62.32
Total	80	100

Infant feeding practices are dominated by breastfeeding mainly because most of them cannot afford the commercially sold infant milk. (see table 3) Discussions reveal that this information is an aggregate of past child feeding practices of families who now have grown up children and of those families who are currently practicing any of these child feeding practices with their

children. The Bagobo mothers prefer breastfeeding not for its health benefits but simply because it is the most economic way of feeding their infants.

Table 3. Distribution of respondents according to infant feeding method

Infant Feeding Method	Frequency	Percentage
Breastfeeding	54	68.12
Mixed	21	26.09
Commercial	5	5.80
Total	80	100

A combination of indigenous and modern practices is very evident in the Bagobo's maternal and child care. (see table 4) While they seek professional medical attention during their pregnancy, the Bagobo mothers still practice some traditional ways which include: seeing a comadrona to check the health of their unborn; allowing the comadronas to "position" their babies in a "proper place" by massaging their tumescent womb. They do this particularly when the baby is detected to come out *suhi* (breech birth); and they also believe that the comadronas are excellent in identifying the gender of their babies in the womb which the latter does by simply sizing up the mother's womb, looking in her eyes and skin complexion.

Discussions point out that the Bagobo husbands prepare protection materials against *aswang* (blood sucker) during the last trimester of pregnancy of their wives. They hang several pomelo or calamansi branches around the house especially at the room where the expectant mother sleeps or stays. They believe that with these protection materials, the evil can be kept away.

Table 4. Status of health practices of the Bagobo in Malagos watershed area in terms of maternal and child care

No.	Indicators	Mean	Description
1	Doing regular prenatal check up with the health professional	4.32	Highly Practiced
2	Ensuring clinically safe labor and delivery	4.00	Highly Practiced
3	Proper caring of new born baby	4.25	Highly Practiced
4	Management of common diseases of infants	3.42	Practiced

5	Proper feeding and weaning of infants	4.41	Highly Practiced
Overall Mean		4.08	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

The Bagobo of Malagos believe that they practice good nutrition. (see table 5) Discussions point out that they eat rice or corn and vegetables regularly, and their typical meal includes only one viand. Fruits are usually not included in their regular meals, because they only eat these when they are in season. Also, members of the family, regardless of age (except infants), drink coffee every morning before they start their daily activities. They believe that as long as they are able to eat and relieve themselves from hunger, they have enough nutrition.

Table 5: Status of health Practices of the Bagobo in Malagos watershed area in terms of nutrition

No.	Indicators	Mean	Description
1	Keeping a balance diet.	3.32	Practiced
2	Taking vitamins and other food supplements.	2.33	Fairly Practiced
3	Eating three (3) meals a day	4.46	Highly Practiced
4	Doing regular exercise at least twice a week for at least 30 minutes.	2.97	Practiced
5	Getting right amount of time to sleep or rest.	4.57	Very Highly Practiced
Overall Mean		3.53	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

Although they still cling to some traditional practices, the Bagobo highly practice personal hygiene. (see table 6). The researcher observed that the Bagobo in the area are well-groomed; they look and smell good. During the FGD, it was confirmed that majority of the elders practiced taking a bath

every day. Children too are bathed regularly to keep them away from disease-causing germs and viruses.

Table 6. Status of health practices of the Bagobo in Malagos watershed area in terms of personal hygiene

No.	Indicators	Mean	Description
1	Maintenance of toothbrush of every member of the family	4.03	Highly Practiced
2	Taking a bath everyday to keep one's body clean	4.44	Highly Practiced
3	Hand washing before and after every meal and every after use of toilet	4.33	Highly Practiced
4	Tooth brushing at least twice a day	3.09	Practiced
5	Ear cleaning and nail cutting regularly or as often as necessary	3.32	Practiced
	Overall Mean	3.53	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

While some of the Bagobo women embrace modern ways of making themselves healthy, these ways are, however, fairly practiced. (see table 7) Discussions show that during early times the Bagobo women used cloth lining *(pasador)* during menstruation but are now using sanitary napkins during heavy menstrual flow. Also, the participants confirm that some of them take a bath even when they have menstruation. They believe that is highly hygienic and can keep them clean and fresh.

Table 7. Status of health practices of the Bagobo in Malagos watershed area in terms of promotion of women's health

No.	Indicators	Mean	Description
1	Maintaining proper hygiene during menstruation	3.77	Highly Practiced
2	Annual pap smear	2.00	Fairly Practiced
3	Using vaginal wash	2.04	Fairly Practiced

4	Undergoing mammogram examination	1.65	Fairly Practiced
5	Choosing an appropriate and effective family method	2.23	Fairly Practiced
	Overall Mean	2.34	Fairly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

The Bagobo also use modern ways of disease management by undergoing basic medical checkup, following the prescribed vaccination/immunization doses, proper management of chronic and infectious diseases, taking of medicines prescribed by doctors, and giving palliative care to ailing family member. (see table 8). Discussions confirm that they are not ignorant about primary health care and/or home remedies. When a member of the family shows signs and symptoms of an illness, they are always able to generate the cure through medicinal herbal plants and oils used. They also acknowledged the use of modern medicine or over-the-counter drugs available in the market especially when they are not satisfied with the use of herbals.

Disease management among the Bagobo follows three main fields of medical behavior: the popular sector; the folk sector; and, the professional sector. When symptoms of illness is still at the early stage, the patient or other family members consult the advice of other members of the community especially the opinions of the elders regarding the disease. The elders are expected to be knowledgeable in finding the cure for certain illnesses because of their long experiences in managing diseases. When curing procedures at the popular sector do not meet the needs of the patients, the patient or his/her extended family may opt to seek the intervention of folk healers for cure. The Bagobo in Malagos watershed area believe in the effectiveness of modern health care system but they opt to seek doctors only when their medical concerns are extremely serious. They said that the main deterrence for seeking proper medical checkup is still the high cost of professional medical service.

Bagobo who participated in the FGDs generally agreed that most of them succumb to traditional folk healers or *babaylan* in the community even if the signs and symptoms of a disease get worst. They also confirmed that the services and free medicines handed by medical missions and free clinics in the barangay center are still not enough to serve their needs for proper

medical and health service. Presently, the Malagos Watershed area has only 1 Barangay Health Worker.

Table 8. Status of health practices of the Bagobo in Malagos watershed area in terms of disease management

No.	Indicators	Mean	Description
1	Undergoing basic medical check up regularly	2.94	Practiced
2	Following the prescribed vaccination/ immunization doses	4.01	Highly Practiced
3	Proper management of chronic and infectious diseases	3.54	Highly Practiced
4	Proper handling and taking of medicines prescribed by the doctors	3.93	Highly Practiced
5	Giving palliative care to ailing family member	3.96	Highly Practiced
	Overall Mean	3.68	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

The Bagobo still cling to the traditional way of circumcising their children. In this case, the *pakang* method is widely used. (see table 9) This rite of passage is done usually by letting the boy sit astride a banana log into which a wooden plug is inserted as an "anvil." The traditional rite is only a super-incision or dorsal slit, removing no tissue (but with variations).

Discussions reveal that only 2 experienced grown-up men in the area perform this traditional circumcision practice. These elder men chew up guava leaves and spew out the juice into the wounded area of the penis. Mothers take care of their boys at home. They use the concoction made from heavily boiled guava and *gabon* leaves as antiseptic wash. The FGD participants also confirmed the strong held belief of this community practice that prohibits girls to peek at a wounded penis or it can cause the organ to look like a *kamatis* (severe swelling resembling a tomato), an infection. They also believe that the newly circumcised boys should not walk over *iti sa manok* (chicken manure) as

this can prolong the healing process.

Table 9. Distribution of respondents according to circumcision practices

Circumcision Practices	Frequency	Percentage
Hospital with an attending doctor	15	25.00
Lying-in clinic with an attending midwife/nurse	8	13.33
Traditional *pakang*	37	61.67
Total	60	100

Despite the presence of a health center in their area, different medicinal plants are used by the Bagobo to counter minor pains, itchiness, burns and other common bodily ailments and the ways to prepare and apply them. (see table 10) Discussions confirm the reliability and effectiveness of these common herbal plants in curing minor diseases. These herbal plants are made known to them not exclusively within the bounds of their community but even through knowledge sharing with the mainstream Christian communities nearby. These plants grow abundantly either in the forest or right in their backyard gardens.

The information regarding the efficacy of a particular herbal plant usually emanates from testimonies of elders who have tried and proven the herbal plant's "therapeutic" wonders. They are very influential in the extent of use of these herbal plants. In should be noted though that the curative effects of these herbs were tested on a trial-and-error basis. The knowledge and skills on the curative application of any given herbal medicine has been handed down from generation to generation. (DOH, 2008)

The comadrona-participants in the FGD confirmed that most of these herbal plants especially *gabon,* guava, *hilbas, ispada-ispada,* and *domokkot* are planted in their backyards to ensure enough supply for use in attending child delivery and administering traditional post-partum care.

Table 10. Medicinal herbal plants used by the Bagobo

in Malagos watershed area

Herbal Plant	Target Disease	Preparation/Method of Use
Mayana (Coleus Scutellarioides)	Cough	Extract the juice of the leaves then drink a spoonful at least 2x a day
Lagundi (Vitex Negundo L.)	Cough	Drink a decoction of leaves liberally
Tawa-tawa (Euphorbia Hirta Linn)	Cough, Fever & Dengue	Drink a decoction of the plant liberally
Kila-kila	Stomach ache	Drink a decoction of leaves liberally
Anonang (Anana Reticulata Linn)	"bughat" & cough	Drink a decoction of barks liberally
Kugon	Fever	Drink a decoction of bulb liberally
Ispada-ispada	Wounds	Pill the outer layer of leaves and apply to the wounded part
Pagana flower	Appetizer	Drink a decoction of flower liberally
Panyawan (Tinospora Rumphii Boerl)	Itches	Steam or set directly on fire the panyawan leaves and crushed outer layer of the vine then apply to the affected area
Gotocola (Centalla Asiatica)	High blood	Drink a decoction of leaves liberally
Guava leaves (Psidium Guajava)	Wounds	Wash the wounded area with the heavily boiled concoction of leaves
Avocado leaves (Persea Americana Mill)	Diarrhea	Drink a decoction of the leaves liberally
Domokkot	Wounds	Obtain the leaves extract and apply to the wounded part
Banaba (Lagerstroenii Speciosa)	Kidney trouble	Drink a decoction of leaves liberally
Hilbas (Meutha Arvensis Linn)	Fever	Drink a decoction of leaves liberally
Aswetes (Bixa Orella Linn)	Muscle strain	Cover the affected area with leaves
Tuba-tuba (Intropha Cureas)	Stomachache & arthritis	Cover the affected area with leaves
Bagon	Skin allergies	Wash the affected area with boiled leaves and roots
Dulaw (Curcuma Xanthorrhiza Naves)	Snake bite	Obtain the extract of dulaw and apply to the bitten part

Gabon (Synsepalum Dulcificum)	Wounds	Wash the wounded area with the heavily boiled concoction of the leaves
	Fever & other body pains	Drink or bath a decoction of the leaves liberally
Peppermint (Mintha Piperita)	Colds and other respiratory ailments	Use the leaves as inhaler by placing them on top of a hot water

Aside from using herbal plants to counter minor health problems, the Bagobo people also use medicinal herbal oils and other oil-based mixtures to cure certain minor ailments. (see table 11)

Discussions conform to the Bagobo's heavy use of these coconut oil-based medicinal herbal mixtures. According to them, these mixtures are generally applied topically to the affected areas. Commonly, the *babaylan* (medicine man) prepares these mixtures during Holy Week or during high noon of Good Friday. This practice adheres to the traditional Filipino superstitious belief in *anting-anting* (talisman). The FGD interactions also reveal that the elders are highly regarded as experts in this field due to their vast experience in home remedies.

Table 11. Herbal oils and other oil-based mixtures used by the Bagobo in the Malagos watershed area

Herbal Oils	Target Disease	Method of Use
Pure Coconut Oil	Body pains and muscle strains	Massage to the affected area
Buyo (Piper Betle L.) leaves with pure coconut oil	Body pains and muscle strains	Massage to the affected area
Kinagis nga Madre Cacao (Gliricidia Sepium) plus pure coconut oil	Skin allergies	Apply to the affected area
Dulaw (Curcuma Xanthorrhiza Naves) with pure coconut oil	Body pains and muscle strains	Massage to the body
Pangilog with pure coconut oil	Body pains and muscle strains	Massage to the body
Herbabuena (Mentha Cordifolia Opiz) with coconut oil	Body pains and muscle strains	Massage to the body
Pure coconut oil with "36 roots from the forest"	Body pains and muscle strains	Massage to the body

Continuation of Table 11

Tubli (Derris Elliptica Benth) plus coconut oil	Stomach ache	Boil the plant and mix with the coconut oil then massage to the abdomen area

The Bagobo also cling to alternative treatment aside from the ones they get from health centers and hospitals. (see table 12) Based on the results of random interviews as well as from the FGDs, the Bagobo in the area have realized the importance of preserving their natural or folk healing practices. They are threatened by the gradual extinction of these worthwhile and time-treasured heirlooms of their forebears. They have also realized that these traditional healing practices are loosely adhered to by most of the younger generations nowadays due to their fast adaptation to modern medical breakthroughs and discoveries.

Table 12. Status of health practices of the Bagobo in Malagos watershed area in terms of use of natural or alternative treatment

No.	Indicators	Mean	Description
1	Use of herbal medicines to counter minor pains, itches, burns and bruises	3.94	Highly Practiced
2	Use of locally processed medicinal mixtures made from coconut oil, alum, roots, and barks	3.52	Highly Practiced
3	Seeking the help of hilot or albularyo in times of pain or and discomfort as symptoms of an illness	4.10	Highly Practiced
4	Chewing beetle nut (mama) to fight tooth decay and gingivitis	3.42	Practiced
5	Meditating in the middle of the forest to free oneself from suffering or illness	3.30	Practiced
Overall Mean		3.66	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

The Bagobo people are also concerned with promoting the mental health of their people. (see table 13) This is evident in their effort to maintain the

peace and order of their area. Discussions reveal that there is no reported case of severe psychological disorder in their area. They purport that they do not expect anybody in their community to be psychologically ill because everybody looks after the total welfare of anyone. They know each other very well and they treat each other with respect and dignity.

Discussions further point out that despite their poverty they are a happy people During Sundays all of them close their houses and go to church usually from 8:00 AM to 12:00 noon. On Sunday afternoons, most of them return to their houses to rest. But most of the men gather themselves around the *purok* (community center) to play basketball or share freshly gathered tuba (coconut wine) and/or *impeng* (a local name for a popular brand name of a brandy). Also, no single case of heinous crime ever happened in Malagos Watershed. There may be instances of petty quarrels and stealing of fighting cocks, but these conflicts were amicably settled in the tribal council of elders.

Table 13. Status of health practices of the Bagobo in Malagos watershed area in terms of promotion of mental health

No.	Indicators	Mean	Description
1	Bringing out and talking freely about any sleeping or eating disorder experienced by a family member	3.99	Highly Practiced
2	Minding closely family members to keep away from prohibited drugs	4.33	Highly Practiced
3	Keeping their house away from abuse or violence	4.32	Highly Practiced
4	Counseling any family member who is depressed and anxious	4.19	Highly Practiced
5	Promoting mental health through maintaining a positive disposition and living a happy life	4.45	Highly Practiced
	Overall Mean	4.26	Highly Practiced

Legend:4.50 – 5.00 Very Highly Practiced; 3.50 – 4.49 Highly Practiced; 2.50 – 3.49 Practiced; 1.50 – 2.49 Fairly Practiced; 1.00 – 1.49 Not Practiced

CONCLUSIONS

Modern health practices introduced by health workers in the Bagobo community have not ended their traditional ways of making themselves healthy. Instead, they have combined the traditional and modern practices to enrich their health knowledge. The decision to fuse the two is a consequence of what facilities and materials are available to them in the area. The creation of a health center and its success in promoting modern health practices is evident in the use by the Bagobo of various artificial family planning methods to keep their family size small. Although their women give birth at home attended by a comadrona, they still undergo the recommended maternal care provided by the health center. They seek the service of a comadrona because she is more affordable, easy access compared to the nearest hospital, and they feel more secure having known her personally.

The community also practices good nutrition, personal hygiene, proper maternal and child care, proper disease management, promotion of mental health, and practice promotion of women's health. On the other hand, their being traditional is evident in having their boys circumcised through the traditional *pakang* method (using knife). The training of local *manununli* (folk performing circumcision) continues until now. They also use indigenous medicinal plants to cure common ailments often mixed with coconut oil. The abundance of medicinal plants found in the nearby forests has facilitated the continuing use of traditional medicine.

The Bagobo are now aware that germs could make them sick. It does not diminish their beliefs, however, on supernatural spirits which could also make them sick more than giving them droughts, floods and other forms of miseries and joy, as well. The continuing influence of folk healers in the Bagobo community attests to this.

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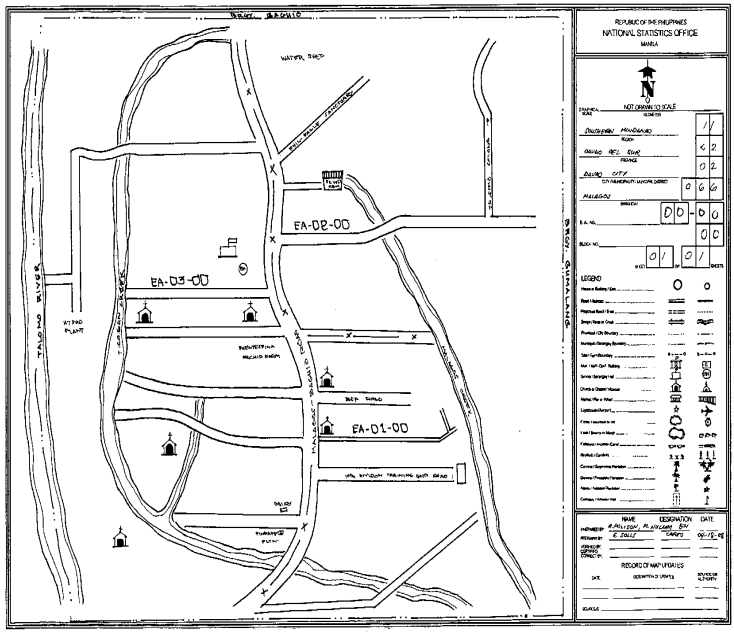
Map of Barangay Malagos



Traditional Ecological Knowledge System in Mitigating the Effects of Dengue and Malaria Outbreak

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Abstract **-** This paper presents the traditional ecological knowledge system (TEKS) of the Matigsalug tribe in mitigating the effects of dengue and malaria in the hinterlands of Marilog District, Davao City, Philippines. Dengue fever and malaria are prevalent in the area during the rainy season. The Matigsalug people are otherwise known as "river people" as they have been occupying the banks of the Davao River. Participants in the study were the tribe's herbalists, healers (*Babaylan*), elders, and tribal leaders (*Datu* or male chieftain and Bai or female chieftain). This inquiry finds that the Matigsalug tribe people heavily practice TEKS in managing natural disasters especially the dreadful dengue and malaria fever. The tribal community sees the essential role of ecological balance in reducing the risks and mitigating the effects of proliferation of disease-carrying mosquitoes. They commonly use homemade lemongrass preparations in lotion and smoke forms to deter mosquitoes. They command their children to stop catching and playing with spiders and frogs. They view the role of

these organisms very important in keeping the spread of mosquitoes at bay. The tribe's people conduct community cleaning of river bank and backyard at regular intervals during the rainy season.

Keywords - herbalists, dengue, malaria, lemongrass, Matigsalog, traditional ecological knowledge

INTRODUCTION

Traditional ecological knowledge or TEK is a collective term of indigenous peoples' practices, systems and beliefs in the entire community, and not belonging to any single individual within the community. It is basically transferred through cultural exchange modes like oral traditions and rituals through elders and community traditional healers. It is often transmitted to and adopted by select few people within a community.

The knowledge that indigenous peoples have in relation to the environment has come to be referred to as 'Traditional Ecological Knowledge' (TEK). At national and international levels, TEK is currently a recognized term in the move towards increased environmental sustainability. However, its precise meaning, role and application remain elusive at both policy and operational levels. The last decade has seen quite an interest in TEK and it has now emerged as a field of study, complete with theory, research approaches, models and potential applications (McGregor, 2000).

Despite the interest in TEK by environmental managers, policymakers, academics, consultants, environmentalists and indigenous communities themselves, the meaning of TEK remains both elusive and controversial. There is no commonly accepted view of the term. This matter is examined in more detail in recent texts (e.g. Battiste and Henderson 2000; McGregor 2000, 1994; Procter 1999).

The Matigsalugs before and now, live along the side of River Salug that runs from Arakan-Cotabato, Bukidnon and Davao mountain areas. The tribe was once part of the big Obo-Manobo tribe of Davao-Bukidnon. It got its name only during the 1970s when they begin to call themselves as river people. *Matig* means *from* while *Salug* means *River Salug*. Today, the tribe is very proud to use its indigenous knowledge systems in their everyday activities. They

have strong sense of oneness in preserving their culture despite the influx of modern technology and knowledge.

One of the most serious problems confronting the Matigsalug community in Marilog District today, aside from extreme poverty, is the onslaught of dreadful diseases like dengue and malaria. In a press conference, Health Secretary Enrique Ona said 183 of the 645 suspected cases have tested positive for malaria in Barangay Gumitan in the area. One has died from the mosquito-borne infectious disease, he said.

Since then, anti-malarial drugs and medicines have been sent to the area such as boxes of coartem and quinine ampoules. Ona urged the public to employ mosquito-repellent products as well as invest in mosquito nets in order to avoid the disease. Marilog District is about 60 kilometers from Davao City and is "essentially" filled with forest trees, which are common breeding grounds for malaria-carrying mosquitoes (Laxa and Zaldivar, 2010).

Malaria is spread by the Anopheles mosquito. Unlike dengue, malaria is not predominantly found in urban areas. Malaria and dengue are usually not found in the same locations. Both also share some similar symptoms such as fever, joint pains, occasional nausea, and a couple of others, but the characteristic symptoms of each disease represent the biggest difference. With its classic rash, the symptoms of dengue fever do not resemble malaria in the slightest. Instead of a rash, malaria is most commonly recognized by its cycles of sudden chills, shaking, and fever (Ibid).

Mayor Duterte in her State of the City Address (2010) declared that the city government has significantly controlled the number of dengue cases with heightened awareness of the people and the involvement of the barangay officials to institute measures to combat dengue. She said that the barangays shall always endeavor to continually conduct the daily "4 PM Clean-up Drive", with the emphasis that it must be developed into a habit. Malaria incidence is brought under control by the Tropical Diseases Team and other border operations in Barangays Malabog, Malamba, Salapawan, Gumitan, and Tapak.

Despite the massive campaign of the Davao City Government and the Department of Health for people to adopt the safe strategies and schemes of fighting these mosquito-borne diseases, the Matigsalugs still practice their traditional ways of mitigating the dreadful effects of the diseases.

OBJECTIVE

This study aims to describe the extent of dengue and malaria outbreak in Marilog District, Davao City. Alongside with this inquiry, the paper also examines the traditional ecological knowledge systems (TEKS) of the tribe Matigsalugs in mitigating the effects of mosquito-borne diseases.

LITERATURE REVIEW

Traditional ecological knowledge (TEK) refers specifically to all types of *knowledge about the environment* derived from the experience and traditions of a particular group of people. TEK is, nonetheless, a problematic descriptor of that knowledge. By using the term "traditional," one risks implying a static or archaic form of knowledge that is inherently non-adaptive, whereas the acute observations and sophisticated knowledge that some aboriginal people have of their environment are both evolving and current (Usher, 2000).

Increasingly, the published scientific literature and the convening of conferences and workshops reflect the growing awareness that there is a legitimate field of environmental expertise known as traditional ecological knowledge. For about a half century anthropologists and some animal and plant taxonomists (e.g., Mayr et al. 1953:5) have recognized the accuracy with which various non-western peoples have identified different species; indeed, such "folk-taxonomies" include more than just those food or medicinal species having obvious practical utility. The comprehensiveness of the taxonomic system suggests that the extent of traditional knowledge may be quite profound, and that, indeed, taxonomy is important (as in the biological sciences) as the basis for building extensive systems of knowing about nature (Freeman, 1999).

Dengue

Dengue fever (DF), the most important arboviral disease affecting humans, is an increasingly significant cause of morbidity and mortality in tropical and subtropical regions around the world. Over half of the global human population lives in areas of risk, and more than 100 countries are experiencing DF and/or dengue hemorrhagic fever (DHF) epidemics in the early 21st century (Guha-Sapir and Schimmer, 2005). Each year, there

are an estimated 50 to 100 million new dengue infections globally (Gubler, 1998a, 2004), of which 500,000 are DHF, and 25,000 are fatal (Gubler, 1998a; Guzman and Kouri, 2002; Guha-Sapir and Schimmer, 2005), although marked underreporting results in the notification of far fewer cases (Gubler, 1998b). The disease is endemic in the Americas, southeast Asia region (SEAR), western Pacific region (WPR), Africa, and the eastern Mediterranean, with the major disease burden falling into the first three regions (Guzman and Kouri, 2002; Renganathan et al., 2003).

During outbreaks, emergency vector control measures can also include broad application of insecticides as space sprays using portable or truck-mounted machines or even aircraft. However, the mosquito-killing effect is transient, variable in its effectiveness because the aerosol droplets may not penetrate indoors to microhabitats where adult mosquitoes are sequestered, and the procedure is costly and operationally difficult. Regular monitoring of the vectors' susceptibility to widely used insecticides is necessary to ensure the appropriate choice of chemicals. Active monitoring and surveillance of the natural mosquito population should accompany control efforts to determine program effectiveness (WHO, 2010).

Malaria

According to WHO (2011), malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells. Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. In many parts of the world, the parasites have developed resistance to a number of malaria medicines.

MATERIALS AND METHODS

The technology of participation was used in this study specifically the Participatory Rural Appraisal (PRA) method. This approach enabled the Matigsalug to share, enhance, and analyze their traditional ecological knowledge systems and practices. This meant learning from them directly on the site; flexible use of methods; offsetting biases by being unimposing, and facilitating investigation, analysis, presentation, and learning from the

Matigsalug themselves, so that they present and own the outcomes and also learn; and lastly, sharing of information and ideas between them and the researcher, and among other stakeholders. Proceedings of this inquiry were referred to the community representatives (majority were Matigsalug women/ wives and Babaylans) in the subsequent data gathering methods.

Data triangulation method was employed to validate the use of these PRA sequences. It included a mix of structured interview questionnaire, focus group discussion, direct observation, and data validation through key informants' interview. For many researchers, data triangulation is used largely to describe multiple data collection technologies designed to measure a single concept or construct (Berg, 1993).

Primary data and information gathered were analyzed qualitatively and quantitatively. Secondary data were taken from the local government unit concerned to supplement primary data.

Data Gathering Procedures

In this study, several data gathering procedures have been undertaken such as but not limited to the following:

Survey Questionnaire – This pertains to seeking direct responses from the respondents through the use of structured questions. An orderly and carefully prepared questionnaire was done to gather valid data.

Key Informant Interview (KII) – This is carried out with interview guides that list topics and issues to be discussed in an individual session (Kumar, 1996). In this study, this was used to validate the data gathered through the survey questionnaire.

The criteria for selection of key informants were as follows: Knowledge of and experience on the topic/concern under investigation; bonafide residents with direct concern on health in the community; trustworthiness and credibility and; willingness to participate

Focus Group Discussion (FGD) – This was done to discuss specifically the special topics/concerns that came out from the survey and reinforce the key informants' interview results in a buzz or group session. The focus group

members were carefully selected based on the criteria as follows: Groups may be heterogeneous or homogenous in composition; groups are able to participate in group discussion; group members have knowledge on the subject of discussion; and they have similar background or knowledge.

Direct Observation – This technique was used within days or weeks. The purpose of this technique was to observe the traditional ecological knowledge systems and practices of the people in the community relating to mitigating the dreadful effects dengue and malaria.

RESULTS AND DISCUSSIONS

Table 1 shows the number of dengue and malaria cases in the area understudy over the last 5 years. As shown, dengue and malaria were most prevalent in the barangays of Marilog District in 2010 with 33 and 183 morbidity cases respectively. Morbidity case in dengue was also high in 2007, 2005 and 2009 with 20, 14, and 13 cases respectively.

Table 1: Number of dengue and malaria cases in Marilog District, Davao City

Year	Dengue		Malaria	
	Morbidity	Mortality	Morbidity	Mortality
2005	14	1	0	0
2006	0	0	2	2
2007	20	0	1	0
2008	5	0	15	1
2009	13	0	62	0
2010	33	0	183	1

Source: City Health Office, Davao City (2010)

Medicinal Herbal Plants Used

Table 2 shows the different medicinal herbal plants used by the Matigsalugs in Marilog District to deter dengue and malaria-carrying mosquitoes. The

FGD participants confirmed the reliability and effectiveness of these common herbal plants they use to cure dengue and malaria diseases. These plants grow abundantly either in the forest or right in their backyard gardens.

The information regarding the efficacy of a particular herbal plant usually emanates from testimonies of elders who have tried and proven the herbal plant's "therapeutic" wonders. The elders therefore are very influential in the current extent of use of the Matigsalugs of these herbal plants. The curative effects of the herbs were tested by traditional healers on their patient on a try-and-error basis. The knowledge and skills on the curative application of any given herbal medicine has been handed down from generation to generation (DOH, 2008). The Babaylan-participants to the FGD confirmed that most of these herbal plants especially *lagundi*, *hilbas*, and *mayana* are planted in their backyards to ensure enough supply for use whenever the need arises. Most of them they said, share these plants to other members of the tribe.

During the in-depth interview with the Matigsalug mothers, they said that they are fond of planting these medicinal plants in their gardens as these also serve as ornamentals with their different bright colors. They said their elders always recommend making their gardens and surroundings colorful and beautiful to keep away bad spirits, pestilence and pests in the farm.

Table 2. Medicinal herbal plants used by the Matigsalugs in Marilog district to cure dengue and malaria

Herbal Plant	Preparation/Method of Use
Mayana *(Coleus scutellarioides)*	Extract the juice of the leaves then drink a spoonful at least twice a day until cured
Lagundi *(Vitex negundo L.)*	Drink a decoction of leaves liberally until cured
Tawa-tawa *(Euphorbia hirta linn)*	Drink a decoction of the plant liberally until cured
Anonang *(Anana reticulata linn)*	Drink a decoction of barks liberally until cured
Kugon	Drink a decoction of bulb liberally until cured
Hilbas *(Meutha arvensis linn)*	Drink a decoction of leaves liberally until cured
Gabon *(Synsepalum dulcificum)*	Drink or bath a decoction of the leaves liberally until cured

Medicinal Oils and other Oil-Based Mixtures

Table 3 shows the various medicinal herbal oils and other oil-based mixtures used by Matigsalugs in Marilog District, Davao City to cure certain minor ailments.

The FGD participants confirmed the heavy use of Matigsalugs in Marilog District of these coconut oil-based medicinal herbal mixtures. They narrated that these mixtures are generally applied topically to the affected areas. Commonly, the *babaylan* (folk medicine man or woman) prepares these mixtures during Holy Week or during high noon of Good Friday. This practice adheres to the traditional Filipino superstitious belief in *anting-anting* (talisman). The FGD interactions revealed that elders are highly regarded by younger generations as experts in this field due to their vast experience in home remedies.

Table 3. Herbal oils and other oil-based mixtures used by the Matigsalugs in Marilog District, Davao City

Herbal Oils	Method of Use
Lemongrass with Pure Coconut Oil	Apply liberally to the exposed body parts (including hair/head) in the morning and evening
Madre de Cacao *(Gliricidia sepium)* plus pure coconut oil	Apply liberally to the exposed body parts in the morning and evening
Pure coconut oil with "*36 roots from the forest*"	Apply liberally to the exposed body parts in the morning and evening (for children only)
Tubli *(Derris elliptica benth)* plus coconut oil	Boil the plant and mix with the coconut oil then apply to the abdomen area

Combined Modern and TEK Practices

The tribal Matigasalug communities in Marilog District also take heed of the campaign of the Davao City Government's "4 o'clock Clean Up" Drive. Under the program is the massive conduct of community cleaning especially in the residential areas. Mothers and children sweep their grounds; plant

ornamental and medicinal plants (usually lemongrass) while the gentlemen cut grasses and clean their community canals. However, this practice is only very common in areas near the community's center.

Most of the Matigsalugs in Marilog live in highly remote and heavily dispersed locations. They live in the hinterlands along creeks and rivulets. According to the FGD participants, most if not all, of dengue and malaria morbidity cases come from the area. They account this fact to the absence of community cleaning which they say is not being done in far-flung areas. In these areas they say, people burn leaves and branches of trees during early morning and late afternoon. The burning of leaves almost always includes fresh and matured leaves of lemongrass to keep mosquitoes at bay away from their houses and children.

Most of the Matigsalug mothers gather lemongrass leaves in the morning. They set aside the portion of these leaves for every scheduled burning. During daytime, most of them clean their houses' floor only. Some FGD participants narrated that they even use lemongrass as broom, polisher and floor wax. In an actual demonstration of one of the FGD participants, it was verified how the leaves are gathered and bundled to resemble a broom and a polisher and how these are being used as aid for house cleaning. When a bundle of lemongrass is pounded and scrubbed to the floor, a waxy secretion from the leaves made the floor shiny. The house smelled like citronella oil is sprayed to repel mosquitoes.

In the same FGD session, it was known that mothers clean only their floors especially during dengue and malaria outbreak because they keep their mosquito nets hanged night and day ready for use by their youngsters for siesta and nightly sleep. They said that the major reason why they do not clean their ceiling and/or scaffold is that they want to keep in the meantime the spiders' web. They highly believed that the webs can best manage mosquitoes. They said that more webs mean more security from mosquito bites. The Matigsalug mothers also command their kids not to play with or kill frogs as these they know eat mosquitoes voraciously. They said that increasing frog's population in their surroundings could decrease their chance of being bitten by mosquitoes.

CONCLUSION

Based on the foregoing findings, the following conclusions are drawn:

For the last five years, dengue and malaria are most prevalent in Marilog District, Davaop City in 2010. Morbidity case in dengue was also high in 2007, 2005 and 2009.

The Matigsalug's traditional ecological knowledge system in mitigating the effects of mosquito-borne diseases is rich and prevalent. They widely use indigenous medicinal or herbal plants to cure dengue and malaria and other diseases with similar signs and symptoms. They primarily use tawa-tawa (*Euphorbia hirta linn*) and lemongrass (*Andropogon citratus DC Stapf*). Commonly, they use lemongrass preparation in lotion (with coconut oil), floor wax and smoke forms.

The tribal community actively supports the "4 o'clock Clean Up" drive headed by the Davao City Government by conducting community cleaning. This practice is found effective only in the community center wherein most houses are located.

RECOMMENDATIONS

Based on the foregoing conclusions, the following recommendations are made:

The Matigsalugs widely used their indigenous medicinal plants or herbal plants in the area. It is best if these medicinal plants be researched further to check their medicinal properties. But for those that are already endorsed by the Department of Health (like *tawa-tawa*), it is best if these are propagated more in the backyards. The DOH experts on traditional medicine can be invited to conduct trainings in the community to teach the Matigsalugs how to maximize the use of these herbal plants. The ways to propagate, prepare the materials, and dispense or use can be best shared by the DOH experts. Further, a group of Matigsalug mothers can be tapped to take the lead in exploring the ways to prepare medicinal and organic soaps, antiseptics, ointments, liniments/oils, etc. on a larger scale for income generation.

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Eosinophilia and Incidence of Soil-Transmitted Helmintic Infections of Secondary Students of an Indigenous School

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Abstract - The incidence of STHI and its relation to eosinophilia were examined in 74 students of a secondary school for the IP in Bukidnon, Northern Mindanao, Philippines. After obtaining necessary permission and consent, blood and stool samples were collected and examined. Kato-Katz method was used to determine and quantify helminths. Differential WBC count identified the manifestation of eosinophilia. Incidence of blood eosinophilia among the participants was 58% (43/74) with 12.2% mean eosinophil WBC count. Percentage of eosinophil among infected and non-infected varied significantly ($p< 0.05$), except for Trichuris infection. Cumulative morbidity of STHI is 37.8% (28/74) with mean ova count of 1266 EPGF. Females have significantly higher parasite load than males ($t = 2.663$; $p = 0.015$). Single and co-infections occurred among

the participants. Occurrence of single infection was 14.7% (11/74) for *Ancylostoma duodenale*, 14.7% (11/74) for *Ascaris lumbricoides*, 1.4% (1/74) for *Trichuris trichura*, 6.8% (5/74) for co-infections. Light infection occurred in 35.1% (26/74) of the participants while 2.7% (2/74) suffered moderate infection. There was a moderate association ($r = 0.328$; $p = 0.004$) between eosinophilia and parasitism. Because STHI aggravate health, IP groups must be ensured of access to health services and health education. Regular implementation of effective helminthic-disease management and prevention programs is crucial to eliminate the prevalence and persistence of STHI in the area.

Keywords - Eosinophilia, Soil-Transmitted Helminthic Infections, Intestinal Parasitism, Helminthiasis, Indigenous People, Bukidnon

INTRODUCTION

The indigenous people (IP) of the Philippines comprise a substantial portion of the population in the country. So far, it is known that the majority (61%) of the estimated 12-15 million IP are in Mindanao, a third (33%) is in Luzon and a few (6%) are in the Visayan Islands (NCIP, 1998). Very few literatures are available on the health status of this group including soil-transmitted helminthic infections (STHI).

STHI is one of the neglected tropical diseases affecting more than 1 billion people in the tropic and sub-tropic areas world-wide (Crompton and Peters, 2010). de Silva *et al* (2003) estimated that 514 million people in Southeast Asia are afflicted by a single or mixed STHI. In the Philippines, STHI are still prevalent in many areas (Brooker, 2002). It is identified as one of the leading causes of morbidity in the Automonous Region of Muslim Mindanao (DOH ARMM, 2003) and in Davao Region (Lacuesta *et al*., 2010).

Eosinophilia, as a marker of Th2 cell response, can be used to assess helminthic infections (Janeway *et al*., 2005). Several studies have indicated the association of eosinophilia and helminth-infection. According to Roberts and Janovy (2009), an increase in circulating eosinophils is often associated with

diseases caused by allergies and helminths. In the tropics, asymptomatic individuals manifest eosinophilia owing to subclinical helminthic infections, which is common in rural area (Fleming and de Silva, 2004). According to Ranque (1998) and Anane (2006), parasitic infestation should be suspected as the cause in patients with hypereosinophilia. Eosinophils attack and destroy helminths (Capron, 1991).

Many studies indicated positive correlations of eosinophilia and helminthic infections. Travellers returning from developing countries showed increasing possibility of helminthic infections with the extent of eosinophilia (Schulte *et al*., 2002). In United Kingdom, eosinophilia is used to investigate helminth infection among migrants and travellers coming from the tropics (Checkley *et al*., 2010). Among pediatric refugees in the United States, eosinophilia is predictive of helminthic infections (Dawson-Hahn *et al*., 2010). The cause of persistent eosinophilia among Indo-Chinese refugees in the United States was pinned to intestinal parasitism (Nutman *et al*., 1987). Furthermore, among the HIV^+ population in Honduras, eosinophilia was traced to intestinal helminthiasis (Kaminsky *et al.,* 2004).

The secondary school in this current study caters exclusively the educational needs of the IP in Mindanao (pers. comm.). It provides a complete 4-year curriculum granted full recognition by the government. It is a remote institution of learning (7^O 46.4 N, 125^O 12.28 E) inaccessible to most motorized vehicles. A 20-25-km hike through rough terrain of mountains and rivers from site takes you to the nearest urbane community.

Students have limited access to medical services and health care delivery is deficient. Helminthic-disease prevention and management programs are underprovided since the outset of the school in 2003 (pers. comm.) Poor sanitation, insufficient toilet facilities and meagre personal hygiene abound in the area. These factors, among others, impact the exposure of IP students to STHI. A particular study among school children in indigenous communities in Davao del Norte revealed higher incidence of STHI compared to non-IP (Belisario *et al*., 2010).

The management and prevention of these infections are important particularly in certain areas in Mindanao where these diseases are one of the leading causes of morbidity (DOH ARMM, 2003; Lacuesta, *et al*., 2010). The current study describes the relationship of eosinophilia and the incidence of intestinal helminthic infections among the secondary students of a school for the IP.

OBJECTIVES OF THE STUDY

This research is done to accomplish the following goals: Describe the haematological characteristic in terms of WBC count and haematocrit of the indigenous high school students; determine the STHI amongst the participants and examine the relationship between eosinophilia and STHI.

HYPOTHESIS OF THE STUDY

The following hypotheses serve as a guide post in the conduct of the study:

H_1: Parasitic infection is present amongst the indigenous students.
H_2: There is positive correlation between eosinophilia and STHI.

MATERIALS AND METHODS

Locale and Subject of the Study

This study was conducted in a remote secondary school for the IP of Mindanao (7^O 46.4 N, 125^O 12.28 E). It has 220 students from various indigenous communities in Mindanao. Only those participants with complete stool and blood specimens were including in the study. Permission from the school supervisor or principal and informed consent from the students were obtained prior to the conduct of the research.

Physical Assessment and Interfering Factor

The physical appearance of the participants was assessed to determine any sign that would relate to eosinophilia and helminthic infections and as well as any factor that might interfere within. The following were considered: abdominal distension, skin coloration, skin swelling and nodulation, chronic skin diseases, ulcerations, wounds, vomiting and bloody diarrhoea, body mass index, stressful conditions like burns and overworked and medication taken.

Hematological Procedures

Standard haematological techniques were utilized using the Manual of

Laboratory and Diagnostic Tests of Fischbach and Dunning (2004). Procedures include blood specimen collection, haematocrit and differential white blood cell counts. The differential WBC count is determined as the percentages of the different types of white blood cells. The incidence of eosinophilia was determined if the counts of blood eosinophilia is above the normal value. In this study, eosinophilia is defined as having eosinophil counts higher than 5% of total WBC.

Screening for Helminth Infections

The Kato-Katz technique was used in screening helminthic infections (Endriss *et al*., 2005). This technique identifies and quantifies helminth eggs in fresh stool. Ova count is expressed as egg per g faeces (EPGF). Species of helminths present were identified based on the diagnostic morphology of the eggs. Degree of helminth infection follows the proposed gradation by the WHO (Endriss *etal.,* 2005). Blood and stool samples were examined by a registered medical technologist.

Statistical Treatment

Descriptive (means and standard deviations) and inferential statistics (T-test, ANOVA and correlation) were used in the analysis data.

RESULTS AND DISCUSSION

Out of 220 students, 74 (33.6%) qualified as participants. The mean age of the participants was 16.9 year (range, 13-28 years). The ratio of male students to female participants was 1:2.5 (21/53). Fifty eight percent (43/74) of the participants had blood eosinophilia with mean eosinophil count of 12.2% (range, 6%-23%). Mean eosinophil count of participants without eosinophilia is 1.9% (range 0-5%) which was significantly lower (t = 14.048; p = 0.000) than those with eosinophilia. Sex had no association among those with eosinophilia. (t = 0.099; p = 0.922).

Mean of haematocrit among infected (41.6) and non-infected participants (42.0) were not significantly different (t = -0.488; p = 0.628). There is association between sex and haematocrit. According to Fox (2009), males have higher haematocrit than females and this study showed that males (44.3) differ

significantly (t = -3.999; p = 0.000) with females (40.9). Cumulatively, 10.8% (8/74) of the participants had below normal haematocrit. In males, 28.9% (6/21) have low haematocrit while only 3.8% (2/53) in females. Only 1 participant with STHI had below normal haematocrit. All participants had normal body mass index.

Of the 43 participants with blood eosinophilia, 65% (28/43) had diagnosed STHI. Cumulative mean ova count was 1266 EPGF (range, 24 – 8328). The mean ova count of both males was 249 EPGF and that of females was 1672 EPGF which is significantly higher than the male (t = 2.663; p = 0.015). Thirty and 5% (15/43) of the participants with eosinophilia were negative of STHI. STHI morbidity among the participants is 37.8% (28/74) which is relatively lower than the school children (39.0%) of IP communities in Davao del Norte, Southern Mindanao, Philippines ((Belisario *et al*., 2010).

Three species of nematodes, namely: *Ascaris lumbricoides*, hookworms, and *Trichuris trichura*, were responsible for the STHI in the area (Table 1). These species were also responsible for the worldwide morbidity of STHI (de Silva *et al*., 2003) as well as in Southeast Asian countries like Indonesia, East Timor, and the Philippines (Brooker, 2002). Both single and mixed STHI were observed among the participants. *Ascaris* and hookworm infections were prevalent. Both nematode species affected 14.7% (11/74) of the participants. *Trichuris* infection is rare (1.4%; 1/74) although it was observed in cases of multi-helminthiasis.

Table 1. Distribution of STHI among the 74 participants.

Nematode Species	Number of Patients (%)
Ascaris lumbricoides	11 (14.7)
Hookworm	11 (14.7)
Trichuris trichura	1 (1.4)
Co-infection *	5 (6.8)

*presence of 2 or 3 of the observed nematode species

Infections among the participants range from light to moderate. Cumulatively, 35.1% (26/74) had light and 2.7% (2/74) had moderate STHI. Amongst those infected with *Ascaris,* 82% (9/11) suffer light infection and 18% (2/11) have moderate infection. Ninety and 1% (10/11) of those diagnosed with hookworms suffer moderate infection. Light grade infections occurred in participants with *Trichuris* and mixed STHI. In Southeast Asia, ascaris

is the most prevalent cause of morbidity of STHI, followed by *Trichuris* and hookworms (de Silva *et al*., 2003). All eosinophil counts of participants with STHI, except *Trichuris* infection, differed significantly with those non-infected (Table 2). Mean eosinophil count of participants with single infection (12.6%) is not significantly lower ($p = 0.353$) than those co-infected (15.8%).

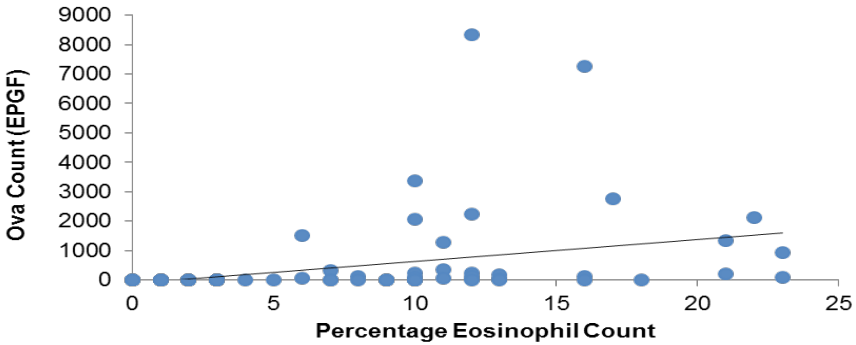
Table 2. Relationship of eosinophilia among participants with STHI and those non-infected.

Nematode Species	Mean Eosinophil Percentage		
	Infected	Non-infected	p value
Ascaris lumbricoides	10.0	4.7	0.000
Hookworm	15.1	4.7	0.000
Trichuris trichura	13.0	4.7	0.070
Co-infections	15.8	4.7	0.019

Correlation between percentage eosinophil counts and incidence of STHI was observed (Figure 1). Percentage of eosinophil count and incidence of STHI is positively correlated with STHI ($n = 74$; Pearson's $r = 0.328$; $p = 0.004$) indicating that there was an increasing incidence of STHI with increasing percentage of eosinophil count. According to Cohen (1988), a coefficient of 0.328 shows moderate correlation. Simple line regression of data from 74 participants predicted the incidence of STHI from percentage of eosinophil count (slope = 0.328: $r^2 = .0108$, $t_{72} = 2.95$; $Y = 1.29 + 0.25X$; $p = 0.004$). For every 1% increase in eosinophil count the chance of having STHI increases by 0.328. The increasing percentage of eosinophil count explains 1.08% of the chances of having STHI.

Figure 1. Scatter plot showing correlation between percentage eosinophil and STHI. Bar indicates line of correlation.

Of the 220 students enrolled in the school, only 74 submitted both blood and stool samples for examination. All students underwent blood screening



but only 34% (74/220) handed-in faecal samples. Handling stool is a taboo and ignominious in IP culture (pers. comm.).

In the course of established helminth-related infection, the helper T-cell $CD4^+$ response of the body stimulates the overproduction of eosinophil, via cytokines, resulting to eosinophilia (Janeway *et al*., 2005). The explanation for the presence of blood eosinophilia among the participants without a confirmed intestinal helminth infection remains uncertain although allergic reactions are likely explanation for this (Fleming and de Silva, 2004). Indeed, a similar observation was reported by the study of Schulte *etal.* (2002). In the absence of stool examination, occurrence of high eosinophil counts implicates helminthic infection. Participants with STHI suffered light and moderate infections. Patients with subclinical helminthic-infection do not show specific clinical symptoms until it is largely severe (Fleming and de Silva, 2004).

Several factors might have contributed to the presence of parasitism in the area. Lack of facilities for proper human waste disposal, poor hygiene and environmental sanitary practices are some of the predisposing factors on the prevalence of STHI in the area. Such factors increased the exposure of IP to STHI. In fact, increasing incidence of child mortality in Northern Mindanao, Philippines was associated with the absence of sanitary toilets (Lacuesta *et al*., 2010).

The negative effects of STHI morbidity could not be disregarded. Hookworms are implicated with iron-deficiency anemia (Crompton, 2000). *Trichuris* infections cause chronic dysentery, cognitive deficits, stunted growth and developmental loss (Stephenson *et al*., 2000). Further, *Ascaris* infection poses nutritional loss like decrease food intake, reduce nutrient absorption and loss of appetite, as well as weakening cognitive processing (O'lorcain and

Holland, 2000). Such impact of STHI on health demands great effort in management and prevention.

Cultural practices relating to personal and food hygiene, including defecation practices also contributed to the prevalence of STHI. Maintaining sanitary toilet is a taboo to the IP communities and stool disposal could just be anywhere. Parasite eggs are passed from infected patient to the soil and in areas lacking toilet facility, water and soil around are being contaminated. Environmental sanitation and personal hygiene are trivial in IP communities (pers. obs. and comm.). Poor hygiene is linked to higher prevalence of STHI (Richard-Lenoble *et al.*, 2010). A study on hygiene and maternal-child health care on a certain IP community in Valencia City, Bukidnon, Northern Mindanao showed inverse relationship (Ramos, 2008). Hygiene and sanitation are practical methods for long-term control of STHI.

CONCLUSION

The results of this study imply that STHI is prevailing in the area. Eosinophilia and STHI have moderate positive correlation. Furthermore, high eosinophil count can predict incidence of STHI.

RECOMMENDATIONS

Cognizant of the prevalence and morbidity of STHI in the community, the following intervention programs are stipulated to manage and prevent STHI in the area:

1) Conduct a health lecture on parasitism to inform the students of the causes, transmission and prevention of STHI.
2) Educate IP students about the importance of hygiene and environmental sanitation in improving community health.
3) Display posters on areas frequently visited by students, like sinks and toilets, on proper hand washing to limit or reduce, if not stop, the oral-faecal transmission of parasites.
4) Initial anti-helminthic treatment in the community.

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The Environmental Sanitation, Hygienic Practices and the Prevalence of Intestinal Parasitism among Schoolchildren

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Valencia City, Bukidnon, Philippines

Parasitism has afflicted Filipinos despite community health-promotion programs. The Philippines has suffered high prevalence of intestinal helminths (Kim et al., 2003; Reyala et al., 2000). Data in 1908 to 1970 showed that 86% of the Filipinos in various Philippine islands had one or more intestinal parasites (Alave, 2008). The prevalence rates have been taking a toll on the physical, social, and economic life of several Filipino communities, particularly among children, and have caused hundreds of deaths (Alave, 2008).

It is already known that environmental sanitation and hygienic practices have been associated with the incidence of intestinal parasitism (Cuevas et al., 2007; Jombo, Egah, & Akosu, 2007; Suriptiastuti, 2006). Improved water supply and the use of toilet facilities have contributed to the reduction of parasitism (Arfaa, 1977; Jordan, 1982) and contamination of other parasite species (Habicht, 1988; Lima a Costa, 1987; Mason, 1986). However, one study revealed that the installation of boreholes, without laundry or shower facilities, failed to reduce people's reliance on high-risk marshes and ponds as source of water supply and bathing (Kholy, 1989).

Researches show that schoolchildren are victims of intestinal parasites. For example, the intestinal helminth infection rate was considerably high among the schoolchildren in Roxas city in Mindoro, Philippines (Kim et al., 2003), among 64 examinees in Legaspi city, Philippines (Lee, Ahn, & Yong, 2000), among children living near garbage dumpsites in Metro Manila, Philippines (Baldo et al., 2004). In addition, play habits make schoolchildren especially vulnerable to soil-transmitted helminths (Savioli, 2006). As energetic schoolchildren socialize, play, and explore the world with peers, they often neglect the need to observe personal hygiene (Pillitteri, 2007).

In 2006 and 2008, several surveys revealed that parasitism afflicted the populace of Valencia City, Bukidnon, Southern Philippines. In 2006, schistosomiasis was the leading cause of morbidity with 2,914 cases out of 34, 328 diseases. In 2008, schistosomiasis accounted for 5% of the total causes of morbidity, and it ranked 9th in the list (Valencia City Health Office, 2010). Among the 31 districts of Valencia City, a community has been consistently on the top rank of the list because in 2006 80% of its population had schistosomiasis, 39% in 2008, and 21% in 2010 (Valencia City Health Office, 2010). Although 72% of its population use sanitary toilets and 84% practice satisfactory garbage disposal, schistosomiasis is still prevalent in this community. Ninety-five percent (95.5%) and 15% of the residents only have access to Levels 1 and 2 water supply, respectively. A spring is the principal source of water (Valencia

City Health Office, 2010).

In 2010, the local government health unit in cooperation with the teachers in this community conducted two de-worming activities for the schoolchildren. One happened in May and the other in August. In 2011, the de-worming process schedule will be in May. Of the 203 schoolchildren, 201 (99%) took Mebendazole/Albendazole and Praziquantel, and two (1%) did not. Since previous data in this community showed only higher incidence of schistosomiasis, this study focused on the intestinal parasitism among its schoolchildren. This current study described the prevalence of intestinal parasitism three weeks after the deworming process in August 2010.

The objectives were to (1) describe the prevalence of intestinal parasitism, environmental sanitation, and hygienic practices of the schoolchildren and the community's residents after the de-worming process, (2) explain possible relationships between the environmental sanitation, hygienic practices, and incidence of intestinal parasitism, (4) determine whether environmental sanitation and hygienic practices differ among those infected and not infected with parasites, (3) describe the physical conditions of the infected children and its potential association with intestinal parasitism, (4) describe the perceptions of the children's parents as regards the infection of their children. This study hypothesized potential associations between environmental sanitation, hygienic processes, and incidence of intestinal parasitism. Environmental sanitation and hygienic practices would probably show differences between those who were and were not infected with intestinal parasites or other parasites.

MATERIALS AND METHODS

The study employed mixed methods in obtaining data. Quantitative were data through questionnaires that used the likert scales. Using the constructivist perspective, the qualitative data were gathered through semi-structured interviews from the parents of the infected schoolchildren. There were collected from 203 (6 to 12 years old) schoolchildren officially enrolled at a public school of this community, Valencity City.

Four medical technologists of the Bukidnon Provincial Health Office (PHO) conducted the fecalysis for the 203 schoolchildren. Microscope slides were prepared, and the technologists scored for the presence of parasitic eggs and determined the number of children infected with intestinal parasites and

other parasites.

The Environmental Sanitation Questionnaire (ESQ) was a 4-likert scale instrument, which sought to examine the responders' frequency of practice of the key environmental sanitation domains. The ESQ was a researcher-constructed, 68-item tool that comprised questions relevant to water supply and water sanitation (WHO, 2010), garbage (Roldan & Crespo, 2003; Insel & Roth, 2002) and excreta disposal (Disease Control Priorities Project, 2010), pet ownership (Roldan & Crespo, 2003), and pest control (Sicat, 2009). The questionnaire was subjected to content validation before administration. The community health workers used the questionnaire to evaluate the environmental sanitation of the homes of the schoolchildren.

The Hygienic Practices Questionnaire was a 109-item tool which comprised questions that examined the frequency of the schoolchildren's hygienic practices on these core areas: hand washing (Mayo Clinic Staff, 2010), foot and nail care (Berman et al., 2008; Woolf, Shane, & Kenna, 2010), use of clean water in cleaning and bathing (Seameo Innotech, 2010), ideal feeding habits (Jaffari, 2009), quality food (Ellis, 2007; Wadlaw & Smith, 2007) and water storage protocol (Provident Living, 2010). The questionnaire was also subjected to content validation before its administration. This was used to determine the schoolchildren's frequency of their hygienic practices.

Both the hygienic practices and environmental sanitation instruments applied the 4-likert scale measurement. The ratings were 1.00-1.24 (*never*), 1.25-2.49 (*rarely*), 2.50-3.24 (*frequently*), 3.25-4.00 (*all the time*). The sanitation of water source used the scale 1.00-3.99 (*poor*), 4.00-6.99 (*fair*), 7.00-9.99 (*good*), 10.00-13.00 (*very good*). The evaluators (community health workers), through a checklist describing13 ideal water source characteristics, were asked to rate the quality of the households' water source. Any water source that complies with the 13 characteristics received higher ratings.

The researchers secured approval from the city Mayor of Valencia, the community's officials (captain, midwife, and councilors), Valencia city health office, and the community's school principal. Before the scheduled stool examination, the researchers and the individual schoolteacher, in consonance with the PHO medical technologists, oriented the schoolchildren to submit fresh stools on a scheduled date. On the scheduled date of examination (Friday), only 133 schoolchildren complied with the agreement to submit stool samples on the school campus. The researchers took the remaining 70 stool samples to PHO for analysis within 3 to 4 days after first examination.

Before the respective analyses, the medical technologists ensured that the 133 and 70 stool samples did not come from animal manures.

Four of the researchers who were 4th year and graduating senior nurses performed physical examination on the infected schoolchildren immediately after the results were released. Data obtained during the examination were the children's gender, age, and BMI. They also assessed whether the children showed pallor and suffered coughs, weakness, abdominal pain, and loss of appetite. The researchers also visited the schoolchildren's respective households and inspected their environmental sanitation and hygienic practices. Parents of these infected children were also interviewed as regards their perceptions and feelings on the health conditions of their children.

Data from the questionnaires were analyzed using the SPSS Version 15 and the results were expressed as $M \pm SD$. Prevalence of intestinal and other parasites found were reported using frequency counts. Tests for normality of the quantitative variables under study were conducted using the Kolmogorov-Smirnov test. The distributions of all the variables did not characterize normality. Hence, Mann-Whitney's test was utilized to analyze whether the hygienic practices and the environmental sanitation measures would show differences among those infected with their respective parasites. Logistic regression was used to determine the potential relationships between environmental sanitation and hygienic practices of those who were and were not infected with the parasites. The qualitative data resulting from the interviews with the parents were coded, analyzed, and presented in themes

RESULTS

Thirteen (6.4%) of the 203 pupils had intestinal parasites, and hookworms, and pinworms (*Trichiuris trichiura)* were the most prevalent (see Table 1). Among the 13 schoolchildren, no double infestations were observed.

Results of the senior nurses' physical assessments of the 13 infected children showed that most of them had cough and colds (92.3%) and manifested pallor (92.3%) (see Table 2). Eight of them had abdominal pain (61.54%); nine suffered body weakness (69.23%); and five had experienced loss of appetite (38.46%). Four of the 13 had BMI's below the normal range (30.77%) based on the Philippine BMI standards.

Table 1 *Frequency and Percentage Distribution of the Schoolchildren's Parasites (n = 203)*

Intestinal Parasites	*f*	%
Hookworm	5	2.50
Trichiuris trichiura	4	1.93
Ascaris lumbricoides	1	0.50
Tapeworm	1	0.50
Schistosoma	2	0.98
Total number with parasitic infection	13	6.40
No parasite ova observed	190	93.59
Overall	203	100.00

Results showed that the respondents' environmental sanitation and hygienic practices did not significantly predict whether or not the schoolchildren would be infected by parasites

[x^2 (df = 12, n = 203) = 11.514, p = 0.485]. Also, no differences were found in the environmental sanitation and hygienic practices between those schoolchildren who were and were not infected with parasites. This condition could be the consequence of the deworming procedure that the local government unit conducted three weeks prior to this study. Only the schoolchildren coded c2 and c13 (see Table 2) did not undergo the deworming process. Hence, the health condition of these schoolchildren (13 and 190) has not been that different.

Table 2 *BMI Profile and Clinical Manifestations of Schoolchildren Infected With Parasites (n = 13)*

Patient	Parasites	Gender	Age (yr)	BMI (kg/m^2)	Scale	Pallor	Cough/ Colds	Abdominal Pain	Weakness	Loss of appetite
C1	Hookworm	F	9	14.44	Normal	Yes	Yes	No	Yes	Yes
C2	Hookworm	F	8	12.92	Below normal	Yes	Yes	No	Yes	No
C3	Tapeworm	F	6	13.24	Below normal	No	Yes	Yes	Yes	Yes
C4	Ascaris	F	8	14.87	Normal	Yes	Yes	Yes	Yes	No
C5	Hookworm	F	5	16.29	Normal	Yes	Yes	No	Yes	No
C6	Hookworm	M	6	16.74	Normal	Yes	Yes	No	Yes	No
C7	*Trichiuris*	F	7	14.71	Normal	Yes	Yes	Yes	No	Yes
C8	*Trichiuris*	M	11	16.68	Normal	Yes	Yes	Yes	No	No
C9	*Trichiuris*	F	8	13.89	Normal	Yes	Yes	Yes	No	Yes
C10	*Schistosoma*	M	12	17.00	Normal	Yes	No	Yes	Yes	No
C11	*Schistosoma*	M	11	17.57	Normal	Yes	Yes	No	No	No
C12	Hookworm	F	12	15.09	Below normal	Yes	Yes	Yes	Yes	No
C13	*Trichiuris*	F	11	14.79	Below normal	Yes	Yes	Yes	Yes	Yes
Mean				15.25						
%					30.77	92.30	92.30	61.54	69.23	38.46

Note: BMI (Body mass index), C (Child)

Table 3. *Mean Rating of the Infected Children's Hygienic Practices and Environmental Sanitation Based on the Researchers Evaluation (n = 13)*

		Hygienic Practices					Environmental Sanitation						
Children	Parasites Observed	HWP	FNC	FH	WS	FS	UW	AWS	ED	GD	PO	PC	SWS
C1	Hookworm	2.54	2.63	2.81	3.33	2.72	2.69	2.33	3.46	3.31	3.54	3.23	12.00
C2	Hookworm	2.15	2.72	2.22	3.33	2.95	3.25	1.66	2.95	1.38	1.23	1.29	12.00
C3	Tapeworm	3.11	2.81	2.23	3.31	3.11	2.23	1.66	2.94	1.38	1.23	1.29	12.00
C4	Ascaris	2.73	3.27	2.62	2.33	2.36	3.02	3.00	3.71	2.84	1.23	3.17	12.00
C5	Hookworm	3.42	3.36	3.46	3.67	3.36	2.21	2.33	3.52	3.15	1.23	2.82	13.00
C6	Hookworm	3.23	3.18	3.05	3.09	3.77	1.86	2.33	2.83	2.15	2.77	2.58	12.00
C7	*Trichiuris*	2.96	3.21	2.63	2.55	2.55	2.25	2.21	3.74	3.46	1.23	3.47	13.00
C8	*Trichiuris*	2.88	3.00	2.64	3.11	2.95	2.52	2.67	3.55	3.77	1.76	2.11	12.00
C9	*Trichiuris*	2.38	2.45	2.62	2.55	2.85	3.55	1.55	3.73	3.53	3.15	3.94	10.00
C10	*Schistosoma*	3.04	2.45	2.63	2.22	2.63	2.69	2.51	3.34	3.15	1.23	2.41	12.00
C11	*Schistosoma*	2.65	2.82	2.66	2.44	2.05	2.52	2.33	3.54	3.38	2.92	3.74	12.00
C12	Hookworm	2.38	2.45	2.65	2.55	2.86	3.25	2.79	2.75	2.07	1.23	1.47	12.00
C13	*Trichiuris*	2.23	2.36	3.01	3.22	3.22	1.81	3.32	3.78	1.23	1.23	3.52	13.00
Mean		2.75	2.52	2.71	2.91	2.87	2.41	2.21	3.31	2.62	1.83	2.48	12.08

Note: C (Child), HWP (hand washing practices); FNC (foot/nail care); FH (feeding habits); WS (water storage); FS (Food storage); UW (use of water for bathing and cleaning purposes); AWS (access to water supply); ED (excreta disposal); GD (garbage disposal); PO (pet ownership); PC(pest control); SWS (sanitation of water supply). Hygienic practices and environmental sanitation scale: 1.00-1.24 (*never*), 1.25-2.49 (*rarely*), 2.50-3.24 (*frequently*), 3.25-4.00 (*all the time*). *Sanitation of water source*

scale: 1.00-3.99 (*poor*), 4.00-6.99 (*fair*), 7.00-9.99 (*good*), 10.00-13.00 (*very good*).

Shown in Table 2 is the summary of the infected children's scores of their hygienic practices and environmental sanitation. These mean scores are interpreted in the subsequent discussions. The infected children indicated that they frequently washed their hands when (a) after touching people, surfaces (i.e., table, furniture, doorknobs, toilets), and objects (i.e., slippers, rags, boots, woods, garbage); (b) before preparing their food, eating, treating wounds or giving medicine, touching a sick or injured person, (c) after preparing food, especially raw meat or poultry; using the toilet, changing a diaper, touching an animal or toys, leashes, or waste; blowing their nose; coughing or sneezing into their hands; treating wounds; touching a sick or injured person; handling garbage or something that could be contaminated, such as a soiled clothes and dirty shoes; handling pets or animals; and when looking dirty.

Most (9 of 13) of the infected schoolchildren indicated that they frequently used foot wears when outside and inside the house, when taking a bath, and when under the rain. They frequently brushed feet and nails and cleaned them with soap when taking a bath, and cleaned and cut their nails.

Most (9 of 13) revealed that they frequently used spoons and forks when eating. They would also frequently wash or clean their hands when eating by their bare hands.

Most (10) of the infected school children frequently, if not "all the time," use food-grade containers (i.e., plastic buckets or bottles) to store water (see Table 3). They would frequently clean containers and rinse them thoroughly before and after use and would strictly avoid the use of water containers previously used to store non-food products. They would frequently empty and refill water containers, protect stored water from being exposed to heat and light, check leakage or holes/cracks in these containers, and tightly cover them to prevent the invasion of insects and animals (see Table 2).

Most of the infected schoolchildren indicated that they with their parents supervision frequently if not "all the time" would store their food after cooking and after a meal. They would wash peeled or cut-up fruits and vegetables; clean eggs, uncooked meat, fist, and other dairy products; and store them in the refrigerator. They would reheat or cook fish, meat, or any poultry products before eating them. They also frequently cooked canned foods before eating them. Their parents marinated food items at room temperature only and would discard food items producing foul odors (Table 2).

Results of the researchers' inspection showed that the households of the

13 infected schoolchildren utilized level 1 water source. The water sources were found to be either protected wells or developed springs with outlets but without a distribution system to individual homes. With regard to the sanitation of the 13 schoolchildren's water source, the water supply was very good (see Table 2). The researchers found that the 13 inflected children's households had very good sanitation of their water sources.

The DOH-approved ideal water sources are in three levels. Level 1 are protected wells or developed springs with water outlets but without a distribution system to individual households. Level 2 sources as water systems composed of a sources and respective reservoirs, piped distribution networks, and communal faucets. Level 3 waterworks systems with reservoirs and piped distribution networks/connections to individual households/ residences. However, 8 of the 13 infected pupils rarely accessed or used levels 1 to 3 water supply that the DOH approves even if they were available.

As regards the use of water for cleaning and bathing, five (c1, c4, c8, c10, & c11) and three (c2, c9, and c12) of the infected schoolchildren frequently and all the time, respectively, washed their clothes and would take a bath using the river, faucets, open-dug well, spring, artisan well, or water pump. Most of them frequently used water from several sources (i.e., river, faucet, spring, artisan well, or water pumps) to wash the dishes and kitchen utensils, clean household furniture and toilets, and wash food items. However, the other five infected school children rarely did those aforementioned behaviors. The infected school children C3 (Tapeworm), C5 (Hookworm), C6 (Hookworm), C7 (*Trichiuris trichiura*), and C13 (*Trichiuris trichiura*) (coded in Table 3) revealed these behaviors. This means that these kids rarely washed their clothes and rarely took a bath

Most of the households of these infected children indicated that they rarely cared for their pets. The researchers observed that most of them owned free-living animals such as dogs, cats, chickens, and pigs. Interviews with these infected schoolchildren and their parents revealed that they would rarely remove animal wastes from their backyard; take these animals to the veterinarian; treat with flea or tick; and would rarely play, cuddle, and fondle with their cats and dogs. The dogs and cats were just free to enter their houses, tracking inside their waste.

Eight of the 13 household of these infected children conducted regular and frequent pest control at home. The keep food protected from ants and other insects (i.e., centipedes, cockroaches, ants, etc.), and would kill any

insect that would crawl in or scamper around. They frequently keep foods covered and would patch holes and openings in the house to prevent rats from coming inside. They would also scrape tunnels of termites and kills these insects and destroy ant hills. They also indicated that they would kill rats and mosquitoes when found. However, households of each school child infected with respective parasites—C2 (Hookworm), C3 (Tapeworm), C12 (Hookworm), C8 (Trichuiris), and C10 (Schistosoma) — rarely practiced pest control (see Table 3).

All 13 households indicated that they frequently adhered to some garbage disposal practices. They installed a specific garbage site/compost pit for all their garbage and the site was not near a water source. In their homes, they would use garbage containers and place them away from the reach of animals and water containers. They endeavored to protect these cans from the invasion of insects and frequently instructed household members to refrain from scattering plastic bags, wet-strength paper bags, and other non-biodegradable items around the front and back yards.

The 13 households "and all the time"complied with proper excreta disposal practices. The 13 households had their own water-sealed toilets, and they would wash their hands after using them. They would use enough water to flush toilets, and they would use soap to clean their toilets. They cleaned their toilets twice a week.

The Mann-Whitney test showed that the pest control (z = -1.717, n = 203, p = .01) and garbage disposal (z = -1.718, n = 203, p = .01) showed significant difference between those infected with ascaris and the rest of the respondents. Environmental sanitation and hygienic practices did not show significant differences between those non-infected children the infected schoolchildren with other parasites, not Ascaris.

PARENTS' PERCEPTION

After identifying the 13 schoolchildren having intestinal parasites, the researchers interviewed their parents as regards their thoughts and feelings about their children's medical condition.

General Theme

This section presents the thoughts and feelings expressed by all the parents of the schoolchildren infected with intestinal parasites. The themes

below are the most common initial reaction of the interviewees after knowing the medical condition of their children.

Wonder. All parents of the infected schoolchildren wondered where and how their children acquired such parasitic infections despite the mass treatment in the school and protective measures and control they practice at home. They confided:

> *Nagtumar man daw to sila ug pangpurga...ambot nganong naka kuha pud siya niana* (Parent 1). *(They took deworming drugs, but I am wondering why he still has it).*
>
> *… ambot nganung nagka schisto na siya...gipalitan man nako na sya ug butas… giampingan jud nako nang bataa* (Parent 2). *(I don't know why she has schistosomiasis. I actually bought her a pair of boots. I've taken better care of that child).*

Typical Themes

Typical themes reflect the thoughts and feelings of the majority of the interviewees. The themes are happiness, worry, and anger.

Happiness. The parents were happy because they were personally informed earlier about their children's medical situation. The fact that there will be distribution of antihelminthic drugs had, at least, alleviated their fears and worry. They expressed:

> *…nalipay kay nahibaw-an iyang sakit aron matambalan ba...kay aron dili mapasagdaan, lisud na…nalipay pud ko kay nianhi jud mo* (Parent 1). *(I am happy to have known his illness so he could be treated and not be left unattended. I am also happy that you came).*

> *…nalipay kay nakahibalo mi nga naa siyay bitok aron mapatambalan... maayo kay nakahibalo mi sa iyang sitwasyon. Lipay ko kay naa man diay libre nga tambal ipanghatag* (Parent 2). *(I am happy because I learned that he has an intestinal parasite and that treatment can be initiated. Good that I now know his situation. I am glad to know that there are free drugs to be distributed).*

Worry. At the same time, the parents were worried about the reality of their children's medical problem and the health threat it might pose. They

conveyed:

> *… Nabalaka kaayo ko sir…kuyaw kay kuan bya kanang sisto…lifetime bya na…taas man ang kinabuhi anang magtiayon nga sisto. Makapatay raba gyud na..kuyawan ko* (Parent 1). *(I am very worried sir. Being infected with schistosoma is a lifetime burden. It can even lead to death).*

> *…ambot lagi oi wala man mi kwarta palit tambal.. murag mahadlok ta oi.. makulaban sadta ah kay lisud ng naay bitok. Makaapekto sa pageskwela ug pagtubo* (Parent 2). *(I really don't know. We don't have money to procure medications. I am likely to feel scared. It's not easy to have a parasite which may potentially impair schooling and growth).*

Anger. Eight parents sounded and appeared angry with their children for stubbornly disregarding their constant reminders concerning contact with contaminated water and objects. They disclosed:

> *may pagkagahig ulo man …ay kasuka-an sir ah, kung pwede gani bunalan nako kay di man magpatuo lagi gud…manguhag kanang—tadpole gani sir unya magsige ug kaligo sa suba bisan hugaw ug magdula-dula sa mga lim-aw nga magtiniil* (Parent 1). *(Very hard-headed…I'll scold him sir. I can even spank him for being so stubborn. He has been fond of collecting tadpoles, taking a bath in the river, and playing in the little dirty ponds).*

Variant Theme

Variant themes are indicative of the thoughts and feelings of the minority of the interviewees. The theme was confirmed suspicion.

Confirmed suspicion. The parents' suspicions were confirmed following the dissemination of the result of the stool analysis. The suspicions were based on the objective and subjective health problems of their children. They explained:

> *…bantog ra kay magsakit-sakit diay iyang tiyan* (Parent 1). *(No wonder he's been complaining of constant abdominal pain).*

> *..akong na-obserbahan pud sa iya pirmi lang sya ga-ubo sip-on..oo ah* (Parent 2). *(I have observed that he has been having frequent cough and*

colds. Yes).

DISCUSSION

Among the 203 schoolchildren, 13 (6%) were infected with some intestinal and schistosoma parasites. The presence of intestinal parasites and schistosoma may either be due to rapid reinfection or resistant infection as 11 of the infected children received and took deworming drugs—Mebendazole/ Albendazole for other types of intestinal parasites and Praziquantel for schistosomias. The deforming process was three weeks before this study was conducted. Also, the results of the interviews with the 8 of the 13 parents of the infected children revealed that their children had been fond of collecting and playing with tadpoles, taking a bath on rivers, playing in little dirty ponds, walking around and playing on dirty ground barefooted despite their scolding and reprimanding.

The physical conditions of the infected children showed some pallor, cough/colds, abdominal pain, loss of appetite, body weakness, and few had BMI below-normal (Hurst, 2008). These physical conditions may be indicative of the presence and effects of the parasitic infections.

This study revealed the presence of hookworms, pinworm, tapeworm and schistosoma. It should be noted that the most prevalent intestinal parasites were hookworms and *Trichiuris trichiura*. This is partly consistent with the study conducted by Kim et al. (2003) which cited that *Trichiuris trichiura* (27.6%) ranked as the second most prevalent parasite while *Ascaris lumbricoides* (51.2%) as the most frequently occurring parasite. *Ascaris lumbricoides* accounted 40% and 36% of the studies conducted by Lee, Ann, & Yong (2000) and Baldo et al (2004) respectively. However, this present study found that hookworms ranked as the most prevalent parasite and *Trichiuris trichiura* second. Hookworm by nature of the parasite which buries its head into the mucosa of the digestive tract can be relatively resistant to de-worming processes. A single deworming procedure may not be able to completely eliminate this parasite.

Our findings highlighted the ways that the parents reacted to the infection of their children. Looking at the results, four initial major reactions emerged from the parents after they learned about the laboratory results: wonder, confirmation of suspicion, worry, and anger. Parents wondered about the effectiveness of the deworming process and the efficacy of the deworming

medications. They have bought adequate footwares and watchfully took care of their children, but still they got the parasites. They worried about their children's medical and health conditions because the medications did not show efficacious results. In fact, they already suspected their children to have health problems prior to this examination after the May 2010 de-worming procedure. Now, they throw in anger to their kids for, despite their careful attention adequate health practices, the children were stubborn. The infected school children would still practice unhealthy health practices despite constant parents' reminders (i.e., playing barefooted, collecting tadpoles, playing in dirty pond, etc.). To alleviate their worries, fears, and anger, they were happy that May 2011 will be another de-worming procedure.

One on hand, it can be argued that the infection is due to the schoolchildren's disregard of the health practices measures that they should follow. They did otherwise. On the other hand, consistent with the known prevalence of schistosoma in the area, the parents were aware of the dangers of schistosoma parasitism. They indicated that they tried their best in promoting good health practices (i.e., hygienic practices and environmental sanitation at home). However, the researchers' evaluation showed that these households scored low in their pest control activities and management or care of their pets and animals at home. This could be the other culprit.

This suggests that the regular de-worming processes introduced to this community could be coupled with adequate and comprehensive health education so that parents and children would fully understand the mode of infection and differential manifestations of any parasitic infections.

The conclusion of this study regarding hygienic practices was limited by the fact that the deworming process happened three weeks prior to the conduct of the study. This probably presented an artificial condition not reflective of the regular hygienic and environment sanitation practices of the respondents. Second, this study did not assess all the parasites but only limited to the common parasites for which tests are available in the PHO of Bukidnon.

In conclusion, 13 out of 203 children of an elementary school in a rural community in Bukidnon, Philippines had parasitic infections despite a deworming procedure conducted 21 days previously. This may indicate either a resistant infection or rapid reinfection. It is noteworthy that hookworm was the most prevalent parasite observed. A rapid reinfection could have also occurred especially with the children playing barefooted in contaminated watery areas such as what some of the parents have indicated. The free-living

pets that come in and out of the house could have contributed to the rapid reinfection.

Translation to Health Education and Clinical Practice

The results of the study carry several implications for health education, public health, and clinical practices. Fist, replication of this study should done at a later (i.e., 3 months and then 6 months) time to determine the rate of return of infection which would be the basis for translational research and community health education. In April of 2011, another examination should be conducted prior to the de-worming process scheduled on May 2011 to establish a strong data base for this prevalence of parasitic infection. The DOH should take notice of this data that could inform them of health-related activities toward at-risk communities of Bukidnon and by extension to the whole country. Second, teachers should be made aware of these results that indicate the presence of parasitic infections among the children. The infection could be passed on to the non-infected children. Hence, precautionary measures may be initiated for teachers and parents of this community under investigation through adequate orientation of prevention measures as regards intestinal parasitism.

Future Directions

Future studies may focus on the prevalence of intestinal parasitism in some other nearby communities in Valencia City and the whole Bukidnon. The next five highest communities infected with parasites in Valencia City may be evaluated. Incidence of parasitism among adults may also be compared with that of the prevalence among the schoolchildren. Another direction of the study on parasitism may consider its potential effect on the academic performance and the growth and development of the infected respondents.

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Visual Biofeedback: Adjunct Mirror Intervention during Stage Two Labor among Primiparous Women

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Abstract - Since time immemorial, difficulty in bringing forth another human being has been one of the greatest apprehensions women have to confront themselves with. As exemplified by cases of infant mortality and incidence of death among mothers due to giving birth in such an alarming rate. It can be noted that techniques to efficiently assist birthing process have become a prevalent trend. In connection, this research study was conducted in the spirit of providing ample information on a unique feedback method which is deemed to have a high probability in the improvement of assisted birthing process. Problem: This determined the effectiveness of visual biofeedback in hastening stage II of labor between primiparous women administered with adjunct intervention and those who were not. Specifically, this study answered the question: Is there a difference in the length of stage II of labor between the control and experimental groups? Methodology: A non-equivalent post-test design with twenty primiparous women distributed

to both control and experimental groups chosen through purposive sampling. A 3 x 2 foot mirror to provide visual biofeedback (treatment), a stopwatch to measure the length of time elapsed from full cervical dilatation and effacement to the delivery of baby, and a tally sheet for recording of data were used in data gathering. Results: Findings show that the control group (not subjected to mirror) obtained the mean of 18.92 (SD=7.17) while the experimental group (subjected to mirror) obtained a mean of 6.77 with a mean difference of 12.15 (SD=5.24). The computed t- test value is 4.37, which was greater than the table value of 2.23 tested at 0.05 level of significance. Results showed a significant difference in the duration of second stage of labor, thus, the use of mirror as a feedback mechanism during the second stage of labor reduces its duration.

INTRODUCTION

BACKGROUND OF THE STUDY

Since time immemorial, difficulty in bringing forth another human being has been one of the greatest apprehensions women have to confront themselves with. As exemplified by cases of infant mortality and incidence of death among mothers due to giving birth in such an alarming rate. It can be noted that techniques, in whatever form or design, to efficiently assist birthing process have become a prevalent trend.

In connection, this research study is/was conducted in the spirit of providing ample information on Visual Biofeedback: Adjunct Mirror Intervention During Second Stage of the Labor Process of Primiparous Women which is deemed to have a high probability in the improvement of assisted birthing process. Traditionally, Bradley method of delivery ("husband-coached childbirth" although the coach is not necessarily the husband of the woman), is employed as a conditioned stimulus using the sound of voice, use of particular words and repetition of practice in encouraging shorter delivery time. As compared to traditional coaching, visual biofeedback is used as an alternative technique that would ultimately answer the need to hasten the specified phase of the labor process. The use of a "reflection apparatus" or a

mirror, aims to provide immediate visualization of the birthing progress thus encouraging correct bearing down by the mother consequently lessening the hard work. As a corollary, a significant change and difference can be noted in the delivery of a newborn. However, it is imperative to recognize the fact that the researchers formulated quantitative analysis to make the study well grounded and credible.

Biofeedback technique and its principle have been universally known. Not only has their contribution become very significant in science but also in ordinary daily activities. Citing one simple example is the task of combing the hair. By looking at the mirror, a person is guided on how to fix his hair. Visual stimulation is utilized in controlling and doing appropriate actions.

REVIEW OF RELATED LITERATURE

Labor is traditionally divided into three stages: a first stage of dilatation, beginning with true labor contractions and ending when the cervix is fully dilated; a second stage, from the time of full dilatation until the infant is born; and a third stage or the placental stage, from the time the infant is born until the delivery of the placenta.

With full dilatation of the cervix, which signifies the onset of the second stage of labor, the woman typically begins to bear down with the descent of the presenting part. Uterine contractions and accompanying expulsive forces may last 11/2 minutes and recur at times after a myometrial resting phase of no more than a minute. (Chapter IV: 314. Management of Normal Pregnancy. William's Obstetrics).

In most cases, bearing down is reflex and spontaneous in the second stage of labor, but occasionally the woman does not employ her expulsive forces to good advantage and coaching is desirable. Her legs should be half-flexed so that she can push with them against the mattress. Instructions should be to take a deep breath as soon as the next uterine contraction begins and with her breath held, exert a downward pressure exactly as though she were straining at stool. Usually, bearing down efforts are rewarded by increasing bulging of the perineum -- that is, by further descent of the fetal head. *The mother should be informed of such progress, for encouragement at this stage is very important.*

The median duration of the second stage (from complete dilatation of the cervix to delivery) is 50 minutes in nulliparas and 20 minutes in multiparas, but it can be highly variable. In a woman of higher parity with a stretched

vagina and perineum, two or three expulsive efforts after the cervix is fully dilated may suffice to complete the delivery of the infant. Conversely, in a woman with a contracted pelvis or a large fetus, or with impaired expulsive efforts, the second stage of labor may be abnormally long. (Chapter IV: 314. Management of Normal Pregnancy. William's Obstetrics)

The present study is an attempt to develop a new means of hastening the stage II of the labor process. Visual Biofeedback is relatively noninvasive and practical, using a device (e.g. mirror) that provides immediate visualization of the birthing process. There are at least two reasons to expect that visual biofeedback may be used to assist patients during labor: First, therapies that incorporate sensory feedback provided by a clinician (e.g., EMG, spirometers, etc.) have reported substantial success. For example, two studies using electromyography (EMG) have recently explored biofeedback as a means of assessing and re-mediating movement disorders associated with focal brain damage (Bradley L, et al, 11-22). These findings suggest visual biofeedback could be used in obstetrics to promote correct "bearing down" tecniques of a woman in labor to further expedite the birthing process.

Second, adjunct visual biofeedback therapy may offer several important features that cannot be found in the conventional, traditional methods. For example, in visually-guided biofeedback, when the patient generates appropriate motor behaviors, they are positively reinforced. The visual feedback stimuli and other non-verbal information is usually much faster and accurate than the clinician's comments (O'Sullivan, et al, 707). These considerations may be especially important for individuals having a primary difficulty in coordinating voluntary contractions during labor. With these considerations in mind, the researchers explored visual biofeedback as a means of expediting stage II of labor. Specifically, the researchers have looked into any significant change in length of time in the stage II of labor in patients employing the adjunct intervention.

This study is anchored on the growing body of evidence in other health sciences suggesting visual biofeedback can assist individuals in training by providing a graphic representation of physiological data and by facilitating awareness and a faster development of self-regulation (Wong AM, 322-7). Biofeedback is a technique intended to teach patients self-regulation of certain physiologic processes. The technique involves the feedback of a variety of types of information not normally available to the patient, followed by a concerted effort on the part of the patient to use this feedback to help alter the physiological process in some specific way.

Patient motivation plays a major factor in any therapy. Biofeedback therapy actively involves the patient in the therapy process, providing visual input that challenges and motivates the patient. Although biofeedback technique has been practiced in birthing centers throughout the United States, there had been limited documentation regarding the effectiveness of biofeedback in obstetrics (O'Donoghue, 2004). Nevertheless, the utilization of this intervention is well documented in other health fields. In physical therapy for example, the uses of biofeedback in treating certain conditions have been widely employed. As a tool for muscle re-education, electromyographic (EMG) muscle biofeedback measures the electrical activity created by muscle contractions. The goal of EMG biofeedback is to train subjects to increase, decrease, or stabilize muscle tension. Biofeedback is provided through proportional changes in a moving meter, bar graph, polygraph display, or an auditory tone. Training patients to increase EMG activity above a predetermined criterion is used clinically during muscle rehabilitation, where patients are encouraged to increase muscle activity of weak or flaccid limbs such as may result from a stroke or accident.

Another study conducted by Dr. Eric Altschuler and colleagues, from the Univ. of Calif. assessed whether a new mirror therapy can be used to help these patients regain movement in the limbs. Patients tried to move their hands or arms symmetrically while watching their good arm in the mirror. The said study reported that the mirror therapy provides patients with proper visual input because the reflection helps the patient think that their affected arm is moving correctly, hence stimulating the brain to help with nerve control of limb movement. The study suggested that this therapy may help to reverse elements of learned disuse of the affected limb (Altschuler et al, 2003).

Wong et al. (1997) chose 60 individuals with hemiplegia after stroke or traumatic brain injury and randomly divided them into the control or experimental group. All of the patients received therapy using a training table device intended to improve postural symmetry. The experimental group also received feedback about posture with the use of a mirror, while the control group did not receive any feedback. After 4 weeks of training, the group receiving feedback had a lower percentage of postural asymmetry.

In a more recent study under the guidance of Technol, researchers examined the effect of the use of a biofeedback device using a mirror in addition to physical therapy in training stroke patients with impaired sitting balance compared with outcome in patients receiving conventional physical therapy only. Biofeedback intervention, by providing visualization of postural

trunk control, is a useful adjunct to conventional physical therapy in the rehabilitation of stroke patients with impaired sitting balance. (Technol, 2000)

In another area of health care, real-time continuous visual biofeedback were employed in the treatment of speech breathing disorders following childhood traumatic brain injury (Murdoch, et al., p. 234-235). In this study, the efficacy of traditional and physiological biofeedback methods for modifying abnormal speech breathing patterns was investigated in a child with persistent dysarthria. The results of the study demonstrated that real-time continuous visual biofeedback techniques for modifying speech breathing patterns were not only effective, but superior to the traditional therapy techniques for modifying abnormal speech breathing patterns in a child with persistent dysarthria. These results show that physiological biofeedback techniques are potentially useful clinical tools for the remediation of speech breathing impairment in the paediatric dysarthric population.

Biofeedback has also been utilized for the treatment of stress and/or urge incontinence in cognitively intact patients who have failed a documented trial of pelvic muscle exercise (PME) training. In this study, biofeedback was not a given as the main treatment, per se, but a tool to help patients learn how to perform PME. Biofeedback-assisted PME incorporates the use of an electronic or mechanical device to relay visual and/or auditory evidence of pelvic floor muscle tone, in order to improve awareness of pelvic floor musculature and to assist patients in the performance of PME (Kegel, 1979).There has also been some interest in using biofeedback re-education to treat other musculoskeletal conditions including, but not limited to spasmodic torticollis, decreasing blepharospasm (involuntary eye blinking), bruxism, TMJ disorder and training to enhance retention in fecal and urinary incontinence.

However, in the study conducted by Bradley et al. (1998) the effects of electromyographic (EMG) biofeedback training on the recovery of gait in the acute phase (4 – 6 weeks) post stroke were examined. At follow-up, there was no difference in the rate of improvement between groups.

In 1996, Kohlmeyer set out to evaluate the effectiveness of biofeedback and electrical stimulation on the recovery of tenodesis grasp in tetraplegic individuals during the initial phase of acute rehabilitation. Based on the author's conclusion, biofeedback and electrical stimulation alone or in combination did not offer any advantages over conventional rehabilitation treatment of wrist extensors in tetraplegic patients after spinal cord injury.

With reference to the study conducted by Geiger et al. (2001), 13 patients

with post-stroke hemiplegia were enrolled to determine whether the addition of visual biofeedback/forceplate training could enhance the effects of other physical therapy interventions on balance and mobility following stroke. While both groups showed some improvement following the four weeks of physical therapy, no additional effects were demonstrated in the group that received visual biofeedback/ forceplate training in combination with other physical therapy.

While there have been different views regarding the value of biofeedback in other specializations, the researchers aim to establish its relevance in the field of maternal and obstetric nursing through this study.

SIGNIFICANCE OF THE STUDY

Biofeedback is a technique to reveal to human beings some of their internal physiological events, be they normal or abnormal, in the form of visual or auditory signals in order to teach them to manipulate these otherwise involuntary or unfelt events.

Visual biofeedback is a technique currently utilized in other fields of health care. This study will benefit the nursing profession as a whole in the sense that it will create an awareness of the feasibility of the use of visual biofeedback in the delivery room setting.

Incorporating visual biofeedback to the traditional intervention such as coaching would create less strenuous and consequently efficient delivery; thereby minimizing mother and child complications otherwise brought about by a prolonged labor process.

This study will benefit, first and foremost, Primiparous women, as they are exposed to the availability of the option to use the suggested biofeedback technique during childbirth. Second, the unborn child in the mother's womb will have better chances of surviving the extra-uterine life since the said technique would foster lesser risk of complications such as hypoxia and meconium staining, infection and possible death.

Furthermore, the mother will experience less difficulty and stress as a corollary of a prolonged labor process. Also the delivery room staff will benefit by the shorter wait brought about by a shorter labor process.

STATEMENT OF THE PROBLEM

This study aims to determine the effectiveness of visual biofeedback in hastening stage II of labor between primiparous women administered with adjunct intervention and those who were not.

Specifically, this study answers the question:

Is there a difference in the length of stage II of labor between the control and experimental groups?

SCOPE AND LIMITATION

This study focused on the effectiveness of using visual biofeedback as a new technique in hastening the stage II of the labor process. This study was conducted from February 7, 2005 – February 21, 2005.

The group of women studied were primiparas with no fetopelvic disproportion, no fetal malposition or malpresentation, no multiple pregnancy, and none treated with heavy sedation, oxytocin, or operative intervention; uterine contractions are regular and of adequate intensity, all had a normal pelvis and were at term with a vertex presentation and delivered averaged sized infants.

The constraint of the study involved the unpredictability in the number of deliveries by primiparous women at the Cebu City Medical Center which translated to low sample population. The inadequate sample size could also be attributed to the limited time given to the researchers to conduct a full-scale research.

NULL HYPOTHESIS

There is no difference in the length of stage II of labor between the control and experimental groups.

MATERIALS AND METHODS

RESEARCH LOCALE

Subject selection and data collection took place at Cebu City Medical Center (CCMC) located at Panganiban Street corner N. Bacalso Avenue, Cebu City. This public hospital, catering to the needs of Cebu City residents, houses a delivery room which offers services to pregnant women belonging to the lower socio-economic bracket. This facility was chosen as the place to conduct this research due to its high number of referrals and admissions.

The labor and delivery room are located at the right wing of the second floor adjacent to OB ward. The labor room, consisting of 2 adjoining quarters,

houses 5 beds that can accommodate as many as 10-15 clients. The delivery room is suited to handle two simultaneous deliveries.

RESEARCH DESIGN

This quasi-experimental study, with a control group, tested the effectiveness of employing biofeedback among primipara clients undergoing stage II labor. No randomization was done in obtaining sample population.

Non-equivalent post-test only design was employed in measuring the effectiveness of the intervention administered.

RESEARCH SAMPLE

The target population included 20 primiparous women undergoing the second stage of the labor process. The second stage of labor starts from full cervical dilatation and effacement to delivery of the baby. A purposive sampling of women meeting the inclusion criteria was done. A sample of 20 had the capability of providing preliminary evidence as to the effectiveness of the intervention given to the experimental group.

RESEARCH INSTRUMENTS

This quasi experimental research utilized the following instruments: a 3 x 2 foot mirror to provide visual biofeedback (treatment), a stopwatch to measure the length of time elapsed from full cervical dilatation and effacement to the delivery of baby, and a tally sheet for recording of data. Direct observation was employed throughout the course of the experiment.

RESEARCH PROCEDURE

A.1 PREPARATORY STAGE

Ethical approval was secured from the institution where the study is to be conducted.

A.2 IDENTIFICATION OF RESEARCH SAMPLES

A purposive sampling plan was utilized to select target population in two

groups of equal size. Inclusion criteria required that clients are primiparous and are planning to deliver via normal spontaneous vaginal delivery (NSVD). The clients selected represented a variety of ages, socio-economic status, and educational levels in the general community. After the pre-interview, the population sample was established. The first 10 clients were considered as the experimental group (administered with mirror intervention), while the next 10 clients were designated under the control group (conventional only). Signed informed consent was obtained from all intervention participants prior to the experiment.

B. ADMINISTRATION OF TREATMENT

Once clients have achieved full cervical dilatation and effacement per doctor's confirmation, administration of the treatment will be initiated. This research utilized a 3 x 2 foot mirror held overhead and directed towards the perineum providing the client a full view of the progress of the entire birthing process.

C. DATA COLLECTION

The length of the stage II of labor of both groups as measured from the time of full cervical dilatation and effacement to delivery of the baby was noted using a stopwatch. Data was then recorded using a tally sheet.

D. DATA COLLATION AND STATISTICAL TREATMENT

Collected data was analyzed statistically using t-test of mean difference to determine the significant disparity between the two groups. Statistical results were interpreted and documented.

RESULTS

The table shows that the control group obtained the mean of 18.923 while the experimental group obtained a mean of 6.774 with a mean difference of 12.149. The standard deviation of the control group is 7.166 while 5.240 for the experimental group. The computed t- test value is 4.37, which was greater than the table value of 2.228 tested at 0.05 level of significance two tailed. Thus, the null hypothesis of no significance is rejected. The rejection of the null hypothesis implies that there is a remarkable decrease in length of stage II labor process.

Table 1. Summary Table of the Duration of Stage II Labor of the Control and Experimental Groups

	CONTROL GROUP	EXPERIMENTAL GROUP
1	25.08	3.50
2	24.08	6.47
3	25.93	20.83
4	26.25	3.83
5	14.15	10.30
6	24.50	8.17
7	10.23	4.67
8	10.40	1.95
9	21.43	4.30
10	7.18	3.72

Table 2. Summary Table of the Significant Difference of the Duration of Stage II Labor of the Control and Experimental Groups

Group	X	SD	Mean difference	t-test value	Remarks
Control	18.923	7.166	12.149	4.33	Reject H_o
Experimental	6. 774	5.240			

DISCUSSION

The researchers sought to investigate whether there is a significant difference between the duration of stage II labor process of the control group and the experimental group that employed the adjunct mirror intervention.

The individual duration of stage II labor of the control and experimental groups were tabulated accordingly in Table 1. By simple observation of the study's results, one could readily note the apparent difference in the length of the labor process (Stage II) between the samples from both groups. Statistical treatment using t-test of mean difference further reinforced this observation as evident in Table 2. The data gathered from the experiment consistently showed a marked variation in the duration. Although this study used a small

population size, it provided ample evidence regarding the effectiveness of the said intervention applied in the field of maternal and child nursing. The results established that the use of visual feedback in maternal nursing is as effective as used in other disciplines as proposed by the study conducted under the guidance of Technol, wherein there was a significant effect with the use of visual feedback using the mirror in stroke patients with impaired sitting balance compared with the outcome in patients receiving conventional physical therapy.

The outcome of the study was further supported by the works of Dr. Eric Altschuler, et al. which assessed the use of new mirror therapy in helping patients regain movement in the limbs. The said study reported that the mirror therapy provides patients with proper visual input because the reflection helps the patient think that their affected arm is moving correctly, hence stimulating the brain to help with nerve control of limb movement.

Biofeedback used in this study employed the same modality and principle applied in other sciences. As reflected in the study, the visual feedback provided by the mirror becomes an immediate and continuous source of visualization of the birthing process thus affirming the mother's correct effort of "bearing down" resulting to ease of delivery hence, shortening the duration in stage II of labor.

Based on the results of this study, the researchers affirm the findings of previous studies adopted by other health sciences that visual feedback is indeed a useful tool in monitoring patients with motor performance through the use of sensory modalities, in this case, visual feedback to reinforce correct motor behavior.

CONCLUSION

Based on the findings of the study, utilization of a mirror as an instrument in providing visual feedback to the mothers on the second stage of labor reduces the length of this stage providing an effective adjunct intervention

RECOMMENDATIONS

This study provides preliminary evidence as to the effectiveness of the visual feedback: adjunct mirror intervention in hastening stage II labor among Primiparous women.

The future researchers shall conduct a more comprehensive study using

a bigger sample size that is representative of the whole population and taking into consideration other factors like weight, socio-economic status, activity level during pregnancy, diet, life-style, obstetric and healthy history of mother. This research will also serve as a reference guide for future related studies.

Health institutions and health professionals rendering obstetric care must become aware of the relevance of this study and apply the proposed technique in their pursuit of continuous development of their services.

This research will also serve as a reference guide for future related studies.

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Wong AM, Lee MY, Kuo JK, Tang FT. The development and clinical evaluation of a standing biofeedback trainer. J Rehabil Res Dev. 1997 Jul;34(3):322-7.).

Music on the Second Stage of Labor among Women in their First Pregnancy

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Abstract - This study determined the effects of music on the duration of the second stage of labor among primigravida or women in their first pregnancy at Cebu City Medical Center. An experimental design was utilized in this study with experimental and control group. A random sampling was utilized with the following criteria considered: a) primigravida or women on their first pregnancy admitted at the Delivery Room; b) age bracket: 20-30 years old; c) no complications of pregnancy. All respondents had Normal Spontaneous Vaginal Delivery (NSVD). Each qualified respondent was chosen randomly to three conditions. A total of forty-five respondents (15 for classical music group, 15 fast music group and 15 for silence or control group) was selected. The shorter the second stage of labor, the more effective is the treatment provided. Findings revealed that the group of mothers who had no music has the shortest duration of the second stage of labor, followed by the group using fast music and the longest duration was that of the

group using slow music. ANOVA computation was done which was significant at p=.05. Scheffe's Test further showed that fast music is more effective in hastening the second stage of labor than slow music and a significant difference between the slow music group and the no music group was also identified.

INTRODUCTION

The phenomenon of delivering a baby is considered as one of the oldest manifestations of the physiological wonders in the medical field. The process of labor, which is basically characterized by back pains and lower abdominal pains which accompany uterine muscle contractions has been the subject of study of different researchers focusing more on how to reduce pain during labor. It is indeed necessary to study this phenomenon of labor since pregnant women are subjected to a lot of stress and fatigue and incidence of maternal mortality are observed due to the mother's inability to withstand the rigors of labor. More so, when a mother approaches the second stage which is culminated by the delivery of the baby. Complications related to the delivery of the baby are caused by prolonged second stage of labor which can lead to the baby's inability to acquire adequate oxygenation (hypoxia) and maternal exhaustion. Thus, it is the aim of the health team assisting the deliveries to hasten the second stage of labor.

The attitude of every health practitioners should constantly be identifying means which are conventional in nature which will be utilized by mothers in their labor and delivery experiences. Nurses, whose focus of care is the prevention of complications and the emotional and psychological support for women in labor should innovate means to provide comfort to mothers before, during and after delivery. It is indeed ideal to determine means that do not need pharmacological nor surgical interventions for pregnant women because these entails possible side effects or adverse reactions and complications.

One alternative means of hastening the second stage of labor, which is the delivery of the baby, is on the use of music. The use of music in reducing labor pains and distress has been advocated by many birthing centers. It has been identified that music has calming effect on the woman in labor (Phumduong, 2003). On the other hand, experiences and studies identified that music do not only have a calming effect but it motivates a person and increases

his or physical ability (Ferguson, A.R., Carbonneau, M.R. & Chambliss, C.,1994). The presence of music tends to motivate women about to deliver the baby to increase their effort in pushing the baby and can contribute to the reinforcement which the health team are providing the mother.

Ancient stories tell that in times of war, battalions of soldiers were always accompanied by musicians or bands who played marching songs while the fighting took place to motivate and strengthen the soldiers to fight against their enemies. This suggests that music has a psychological effect in individuals and can energize one into action. It is on this aspect that the researchers anchored the assumption of this study that if music has such effect on individuals, it can also have the same effect to a mother who is going to exert effort to push her baby out for delivery, thus reducing the duration second stage of labor.

Based on the premise cited above, the researcher underwent this study to determine the effect of music on the duration of the second stage of labor.

REVIEW OF LITERATURE

The delivery of a baby goes through a process of labor. Labor is the series of events by which uterine contractions and abdominal pressure expel the fetus and placenta from the woman's body (Pillitteri, 2003). Regular contractions cause progressive dilatation of the cervix and sufficient muscular force to allow the baby to be pushed to the outside. It is a time of change, both an ending and a beginning, for the woman, the fetus and the family.

Furthermore, labor and birth require the woman to use all the psychological and physical coping methods she has available. Pregnant women are subjected to physiological discomforts and distress due to the pain experienced prior to the delivery of a baby. Labor is categorized into three stages: first stage of dilatation, begins with true labor contractions and ends when the cervix is fully dilated; second stage, starts from the time of full cervical dilatation until the infant is born; and a third stage or the placental stage, from the time the infant is born until the delivery of the placenta.

The successful delivery of the baby depends basically on the ability of a mother to push when full cervical dilatation taken place. The bearing down is in most cases reflexive and spontaneous in the second stage of labor, but occasionally the mother needs to employ her expulsive forces to good advantage. Her legs should be half-flexed so that she can push with them against the mattress. Instructions should be to take a deep breath as soon as the

next uterine contraction begins and with her breath held, exert a downward pressure exactly as though she were straining during bowel movement. At this stage, mothers need to be cheered and reinforced so as to motivate her to push harder. This activity involves a lot of physical activity and strength, as well as, background motivation from the health team attending the delivery.

It is desirable that the second stage of labor should be shortened so as not to cause injury and complications to the baby. It is on this factor that interventions to shorten such stage should be innovated by health care members.

A unique treatment is conceived about in shortening the delivery of the baby such as music therapy. Literatures and studies cited that soft music is effective in reducing distress and pain of women during labor (Phumduong, 2003). But if soft music can have calming effect on women in labor, what could be the effect of stimulating music to the bahvior of a woman on the active state of delivering the baby? According to Karageorghis & Terry (1997), music has been widely recommended as a technique to enhance the psychophysical state of individuals in sports and exercise. Their study suggests that appropriately selected music can enhance enjoyment levels and adherence to physical activity. Kravitz (2004 as cited by Dainow, 1977) reported that in the study conducted the introduction of jazz music increases respiration and moderately increases heart rate which prepares the students for the forthcoming workout. Delivering a baby is metaphorically likened to a physical workout that has to be prepared for and through music the mother can be physically prepared for the strenuous effort of pushing the baby out.

Music is an ancient method for healing. In the year 550 B.C., Pythagoras from Greece developed a concept for the use of music in medicine, esteeming music higher than many other medical treatments. The Medical Resonance Therapy Music (MRT-Music) of the German classical composer and musicologist Peter Huebner is built on this concept of Pythagorean music medicine. Its therapeutic effect may be best explained by the natural phenomenon of resonance between the harmony laws of the microcosm of music and the biological laws of the body. The study of Sidorenko (2000) showed results received after application of MRT-Music indicate multiple positive effects on the organism of pregnant women both with a healthy pregnancy as with a pathologic one, reducing the rate of premature births very effectively. Furthermore, MRT-Music came out to be an effective method in the complex therapy of late gestoses and a nearly irreplaceable method for preoperative preparation of pregnant woman for caesarean section. It demonstrated a powerful anti-stress effect

and allowed to reduce the amount of administered pain-killers to pregnant women by the factor 1.5 to 2.0, thus reducing the negative pharmacological load to the foetus. It furthermore reduced labour time and shortened hospital stay. It helped to create optimal conditions for the course of pregnancy and heightened pain sensitivity threshold by means of improving the functional, hormonal, and psycho-emotional conditions of pregnant and lying-in women. Thus, the labour process became more natural, the delivery non-traumatic, and motherhood more happy and safe.

In the study of Clark, McCorkle & Williams (1981), a new clinical music therapy program was described for application in the labor and delivery setting, and presents results of a preliminary study to evaluate effectiveness of the treatment. Over 50 women participated in the project; however, inclusion of patients in the data collection portion of the project was limited by criteria designed to minimize the effects of spurious variables. An experimental group of 13 patients participated in six individual predelivery music therapy training sessions during the third trimester of pregnancy. Experimental patients listened to preselected musical works throughout labor and delivery, with the music therapist in attendance. A control group of seven subjects participated in labor and delivery according to regular hospital routines. Data consisted of patients' responses to questionnaire items reflecting subjective perceptions and recollections of the labor/delivery experience and reports of frequency and duration of home practice. Experimental subjects achieved significantly higher "success" scores than did control subjects on five of seven indices (p less than .05). A moderate correlation between music home practice and successful childbirth outcome was demonstrated, with frequency/ length of music home practice revealed as a significant predictor of success in the childbirth experience. In this study it presents the labor and delivery experiences of the respondents in relation to music. It further identified that music has an effect on the labor and delivery of women.

The application of music in pain management has become popular in the past two decades. The study of Browning (2000) described the responses of primiparas to the use of music therapy during the births of their children. In the study, eleven women who attended childbirth education classes in Brantford, Ontario, Canada, volunteered to participate in a music therapy exercise. During pregnancy each participant selected preferred music, listened to it daily, and received instruction about focused listening. Within 72 hours after birth they were interviewed about their use of music as a coping strategy during labor. The findings revealed that women selected the combination of

music and labor support as a helpful coping strategy during labor. All women used the music during labor to help distract them from the pain or their current situation. The study concluded that the planned use of music by mothers and caregivers can be an aid to prenatal preparation and an important adjunct in pain and stress management during labor and birth.

A study on effects of rhythmic stimuli in the rehabilitation of gait disorders. Neuromuscular and skeletal disorders may seriously affect the quality of a person's life by limiting a person's daily functioning capacity and impeding mobility. Research has steadfastly demonstrated that external auditory cues, such as rhythmic music and percussion pulses favorably affects coordinated walking and proprioceptive control (Rudenberg, 1982; Staum, 1983) . It has been suggested that the music or auditory stimuli improves gait regularity due in part to the use of the beat, which helps individuals to anticipate the desired rate of movement. This study implies that the use of music and auditory stimuli can be advocated to enhance a person's physical capability and gross motors skills, leading to increased stability and mobility of the clients. In application to pregnant women, music can enable them to control effort in pushing the baby in consonance with contraction so as to effectively deliver the baby.

A study suggested that reaction to music depends on the type of music which the respondents are exposed to. In the study of Pearce (1981 as cited by Kravitz, 2004) a comparison the influence of stimulative music, sedative music, and silence (no music) on measured grip strength of subjects which consisted of 33 male and 16 female undergraduate students randomly assigned to the order of the three types of stimulation (stimulative, sedative, and silence). Analysis indicated that listening to sedative music decreased strength significantly when compared to stimulative music and silence. However, no statistical significant difference was seen between stimulative music and silence. This implies that stimulating music increases muscle tension while sedative music decreases muscle tension. This study further implies that since women in the second stage of labor needs to increase their strength and energy in pushing the baby, stimulative music is the choice of music which they should be exposed to.

Another investigation of submaximal intensity walking/jogging on a treadmill showed that subjects had longer times to exhaustion when listening to slow, soft music as compared to loud fast music (Copeland & Franks, 1991 as cited by Kravitz, 2006) .

Most of the related literatures scanned were not specifically focused on labor but it is the focus of this study to investigate the effects of music on the shortening of the second stage of labor which involves physical activity and the motivation of the mother to exert effort to take part in the delivery. The studies and literatures cited above focused mainly on the effects of music to the physical strength and capability of the respondents. The therapeutic values of music apply to many experiences in life.

STATEMENT OF THE PROBLEM

The basic task accomplished in this study is to determine the effects of classical or soft and fast or stimulative music on the duration of the second stage of labor among primigravida or women in their first pregnancy at Cebu City Medical Center.

HYPOTHESIS

Based on the literatures reviewed it is hypothesized that there is a significant effect of certain types of music (classical or soft and fast or stimulative) in the duration of the second stage of labor among primigravida.

SIGNIFICANCE OF THE STUDY

The results of this study will benefit the following:

Pregnant Mothers. This study will provide them assistance in the safe and easier delivery of their baby, thus avoiding complications to develop on the mother and on the infant.

Medical Practitioners. This will help them in lessening their burden of waiting for the delivery of the baby and will enable them to provide care to other patients.

Nurses. They will be able to help pregnant women in the provision of a non-phramacological intervention in the easier delivery of infants, thus reducing their burden and stress of caring for a post-partum with complications.

Definition of Terms

Music. This referred to the type of music that will be used as treatment of the study categorized into: classical or soft music (Claire De Lune and

Rainforest Daybreak) and stimulative or fast music (Dancing Queen and the Hump).

Second Stage of Labor. This referred to the stage of labor characterized by full cervical dilatation or when the cervix has dilated at approximately 10 centimeters and ends when the baby is delivered.

Limitation of the Study

This study focused on the effect of types of music on the duration of the second stage of labor among women during the first pregnancy.

The respondents were limited to women ages 20 to 30 years old since ages younger or older than the proposed age range are considered high-risk age of pregnancy and pose a number of labor complications which affect the validity of the study. Furthermore, this study focused on normal deliveries since pathologic deliveries are expected to have prolonged labor duration due to pathological complications. Furthermore, women who are on pathologic labor process will not be receptive to environmental stimulations since most of them are either sedated or placed on anesthesia for cesarean section.

Research Methodology

This section includes research design, research locale, research sampling, research procedure and measurement of variables.

Research Design

A quasi-experimental design, specifically non-equivalent control group post test only design, was utilized in this study with experimental and control group. The treatment utilized in this study was the music therapy which was classified into two: classical or soft music and stimulating or fast music, and this also served as its independent variables. The dependent variable was the duration of the second stage of labor from the full cervical dilatation to the delivery of the baby which were measured in minutes. The median duration of the second stage (from complete dilatation of the cervix to delivery) is 50 minutes in nulliparas and 20 minutes in multiparas, but it can be highly variable.

Research Locale

This study was done in the Delivery Room of Cebu City Memorial Medical Center, Cebu City. This hospital caters to patients coming from the city of Cebu.

Research Sampling

A random sampling was utilized with the following criteria considered: a) primigravida or women on their first pregnancy admitted at CCMC Delivery Room; b) age bracket: 20-30 years old; c) no complications of pregnancy. All respondents had Normal Spontaneous Vaginal Delivery (NSVD). Each qualified respondents were chosen randomly as each qualified respondents were assigned randomly to three conditions. A total of forty-five respondents (15 for classical music group, 15 fast music group and 15 for silence or control group) were selected. The random selection of respondents were done in all three shifts.

Research Instrument

In order to introduce the treatment of this study, the researchers used an audio component and the compact disc player for the music which were played through headphone once the doctor announced a full cervical dilatation. To measure the duration of the second stage of labor, the researchers utilized a stopwatch which determined the gap between the full cervical dilatation to the expulsion of the fetus in minutes. The shorter the second stage of labor, the more effective is the treatment provided. The same stopwatch were used for all respondents.

Research Procedure

This study commenced once the researchers obtained the permit from the CCMC Chief Officer. The researchers stayed the Delivery Room of CCMC to screen the possible respondents of the study. An informed consent was obtained from the respondents before they can be considered as part of the study.

To control extraneous variables the following conditions was fulfilled: a) the music started upon full cervical dilatation or when cervical dilatation has reached approximately 10 centimeters and this was played at a duration of 30 minutes for both classical music and fast music group; b) the same audio component was played for all respondents and the same set of volume and amplitude was imposed; c) the data was gathered throughout the whole shifts (5 for 7:00am to 3:00 p.m.; 5 for 3:00 pm to 11:00 pm; 5 for 11:00 pm to 7:00 am) to control the effects of environmental noises; d) only one respondent was tested every session even if there was more than one cases are simultaneously in second stage of labor. Other cases were not included in the study. In timing the duration of the second stage of labor, the researchers assigned three

members of the team who acted as timekeepers using a stopwatch and the result of the three timers were averaged to get the final duration per patient.

Statistical Treatment of Data

A One-way Analysis of Variance (ANOVA) was used to determine the significant difference in the duration of the second stage of labor between control and experimental group. Statistical results were interpreted as significant at 0.01 level of significance.

Results and Discussion

The findings of the study are presented based on the main problem of the study. Table 1 shows the group means of the group using fast music, slow music and no music at all in minutes which shows the duration of the second stage of labor.

Table 1. Means of Three Groups

Group	N (Group Count)	Mean
Fast Music	15	16.8
Slow Music	15	35.87
No Music	15	14.8
Total	45	22.49

From among the three groups, it is clearly noted that the group of mothers who had no music has the shortest duration of the second stage of labor, followed by the group using fast music and the longest duration was that of the group using slow music. This findings imply that the usual environment in the delivery room without the influence of music promotes shorter duration of labor. Yet, it should be noted that the group with fast music also shows a shorter duration which shows a closer mean value with that of the no music group. Furthermore, this findings imply that the type of music plays a role in the shortening of the second stage of labor favoring the fast music.

Based on the results, it is further analyzed that the reason for the shorter duration of labor among mothers in the no music group could be attributed to the fact that the respondents were not totally deprived of any sound since they were not made to wear earphones to block the noises but this could be due to the health team's voices and verbalizations of either positive or negative

reinforcements to hasten the labor process. Furthermore, the researchers also entertained the possibility that the respondents in the fast and slow music may have felt self-conscious with the earphones in place thus affecting their reactions to the labor process.

To determine the significance of the difference between the three groups, Table 2 shows the ANOVA results.

Table 2. Test of Difference

	Sum of Squares	**df**	**Mean square**	**F**	**Sign-ificance**	**Levene Statistic**	**Signi-ficance**
Between Groups	4056.7	2	2028.3				
Within Groups	5712.5	42	136.0	14.91	.00	22.13	00
Total	9769.2	44					

As per computation of the F-value it is noted at 14.91 with the computed level of significance at .00. This result implies that the null hypothesis is rejected, thus the difference in the duration of the second stage of labor is significant . The test of homogeneity shows a Levene's statistic of 22.13 with a p-value of .00 which makes the researchers assume that the variances of the populations from which the samples were drawn are equal.

These findings support the studies of Rudenberg (1982) and Staum (1983) which states that the auditory stimuli perceived by individuals tend to affect their physical strength and gait. In this study, music has shown a significant influence on the second stage of labor which implies that music has really an effect on the motivation and strength of a person to mobility such as a woman in labor.

In order to determine which groups differ significantly from each other, a multiple comparison was computed using Scheffe's Test as shown in Table 3.

Table 3. Multiple Comparison

		Mean Difference	Significance
Fast	slow	-19.07*	.00
	No music	2.0	.89
Slow	fast	19.07*	.00
	No music	21.07*	.00
No music	fast	-2.0	.89
	slow	-21.07*	.00

** The mean difference is significant at .05.*

From the table it is gleaned that the type of music used has significant difference which indicates that fast music is more effective in hastening the second stage of labor than slow music. There was also a significant difference between the slow music group and the no music group. This implies that no music is more effective than slow music . But between fast music and no music there is no significant difference noted. This findings are supported by the study of Pearce (1981) in which greater strength is noted when respondents were subjected to stimulative or fast music than slow music. It was noted in the study that when respondents were subjected to slow music they tend to show reduction of strength. However, the same observation was noted in the study that there was no difference noted between stimulative music group and the silent group.

CONCLUSION

It is concluded that fast music aids women in labor hasten the second stage of labor.

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Anthelmintic Effects of Processed Mature Betel Nut as Dewormer to Native Chicken and Small Ruminants (Sheep and Goats)

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Abstract - The aimed to determine the anthelmentic effects of processed matured betel nut (Areca catechu) and commercial dewormer to native chicken, sheep and goats. The study consisted of four treatments: For Chicken; Treatment I, administered with 1g powdered betel nut per 1 kg body weight; Treatment II, administered with 2 grams powdered betel nut per 1 kg body weight; Treatment III, administered with 3 grams powdered betel nut per 1 kg body weight; and Treatment IV, administered with commercial dewormer, mebendazole niclosamide. The result of the study reveals that after thorough laboratory examination of the feces, it was found out that round worms, tapeworms and parasite eggs were expelled by the processed matured betel nut. Among the treatments used, Treatment I, 1g processed nut per 1 kg body weight is the most effective. However, those administered with 2 and 3 grams of powdered betel nut is also effective but the chickens showed unhealthy condition. While in Goat and Sheep; Treatment I, administered with 20g/20kg.BW; Treatment II, administered with 30g/20kgLW; Treatment III, administered with 240g/20kgLW; and

Treatment IV, administered with 1 ml/10 kgBW using albendazole, a commercial dewormer. The result of the study revealed that the processed native betel nut can expel eggs and adult parasites like roundworms and tapeworms, while commercial dewormer can expel only roundworms. Among levels of powdered betel nut used, Treatment II, 30g/20kgBW showed better result.

Keywords - betel nut, commercial dewormer, adult parasites

INTRODUCTION

Betel nut (supari) is a fruit of a tall, graceful asiatic betel palm, Areca catechu, chewed with lime and PAN (betel leaf). The tree is slender, erect up to 30 meters tall with a smooth trunk and a crown of large pinnate leaves 1-2 cm long, orange coloured when ripe, with hard fibrous endocarp and a single seed, commonly called a nut.

The Philippines and the Nicobar Island have been known as the centers of origin of betel nut. Various types have been described differing in size and shape of the fruits. The tree is very sensitive to drought and in areas with less than 1250 mm of rainfall per annum.

Handsome tree of the palm family with a single, slender stem, growing up to 25 meters or more. Male and female flowers appear on the same tree; male flowers are less numerous and located on the lower part of the flowering stalk. The fruits are conical, about 2 to 2.5 inches long with a flattened base, orange to red in color with a soft and fibrous outer covering over a hard seed which is mottled brown in color. The see is mostly known as a narcotic used by certain natives. It is cut into narrow pieces and rolled up inside a betel (piper betle) leaf, rubbed with lime and chewed.

New technology arises to resolve the problem of poultry and livestock raisers particularly infestation of internal parasites of their chicken. Betel nut which is abundant in many communities can be a good substitute to commercial dewormers as experimented by many researchers. In this study, the researcher will try to find out whether the different methods of processing betel nut will be an effective dewormer to poultry and livestock.

REVIEW OF LITERATURE

Encyclopedia Americana, (1988:626) revealed that betel nut, the seed of the betel palm (areca catechu), which is chewed as a stimulant throughout southern Asia. The betel nut is about 2 inches (5cm) long and is mottled brown and gray in color. The ripened seeds are gathered between August and November, boiled in water, cut into slices, and dried in the sun, giving them a dark brown or reddish color. Each dried nut is then wrapped, together with a piece of shell lime, in a leaf of the betel pepper and chewed.

Betel nuts contain the alkaloid arecoline a mild stimulant that produces a feeling of well being. They are not habit forming, but habitual chewing of betel nuts eventually blackens the teeth and may cause them to decay. In some parts of the Orient, betel nuts are used to destroy intestinal worms. Elsewhere, they are used as dewormer in veterinary medicine.

In an internet, Tripod.com/betelnut.htm, it is mentioned that betel nut has medicinal uses: astringent, stimulant laxative, diuretic, acid, bitter, mildly toxic; also relieves hunger and abdominal discomfort due to bloating and flautence due to constipation. It kills intestinal parasites (tapeworms, roundworms, pinworms, body flukes). Both the extract of the seed and decoction show 100% cure for pork tapeworm and a 94.1% cure in 120 cases of cestodiasis. In case of faslolopsis buski, a single dose was effective for 54.7%, while 3 successive doses cured 98.4%.

It has medical action and uses, the leaves are stimulant antiseptic and sialogogue; the oil is an active local stimulant used in the treatment of respiratory catarrhas as a local application or gargle, also as an stimulant in diphtheria. In India the leaves are used as a counter-irritant to suppress the secretion of milk in mammary glands absesses. The juice of 4 leaves is equivalent in power to one drop of oil.

Betarmos (2002:8) in his undergraduate thesis stated that betel nut could be suitable to native chicken using 2 grams per kilogram body weight. Betel nut is also a good alternative dewormer for tapeworm only.

He further revealed that commercial and herbal medicine are very effective by using 2 grams betel nut and one caplet of piperazine plus niclosamide in deworming native chicken but using betel nut is more economical.

Calma and Parami (2003:07) revealed that the betel nut is commonly cultivated throughout the country. The nut is emmenagogue, purgative, the young ones make very effective laxative, mature seeds are vermifuge, good

for urinary disorder, and is reported to have aphrodisiac properties. It is used in Tincture forms as an astringent gargle for mouth sores. Fresh areca nut is sometimes intoxicating to some persons. Powdered nuts are used as anthelmintic, antiseptic, alkaloids abundant in the kernel and leaves, traces of amygdaline in leaves.

PCCARD as cited by Ramon V. Valmayor states that besides roundworm (Ascaris and Heterakis), tapeworm is a common parasite of poultry.

Tapeworm infection could be a serious problem specially if the birds are allowed free on the range as normally practiced in small animal production systems. However, it has been observed, although not properly documented among fighting cock owners, that the betel nut (Areca catechu L.) can expel tapeworms. Saraspe, E.B et al. (UPV, Mangao, Iloilo). States that in preparing the natural parasiticide into powder formulation, the researchers used green fruits of bunga and the vines of makabuhay. The plant materials were chopped into small pieces, dried, and then ground using a hammer mill. Dextrose powder was added to the ground plant materials to improved the taste and act as a preservative.

The powder formulation of bunga was brownish red and it had 5.28 pH and moisture content of 7.2. Makabuhay had pH of 5.36, moisture content of 5.8, and was greenish brown. Both powder formulations had pleasant smell. Researchers states further that these natural dewormers are relatively cheaper than commercial anthelmintics. The computed cost of formulated bunga parasiticide was P155.49/kg. On the other hand, the price of commercial dewormer (triclabendazole) is very prohibitive (P6,600.00/liter, 2003 price) while tetramizole is P26.00 per 500mg tablet. At the dose of 30g/20 kg BW, the cost involved was only P4.66. This amount is about one-third the amount if triclabendazone is used at a dose of 2 ml/20 kg BW (P13.20), or less than one-fifth the cost of tetramisole (P26.00 per 500 mg tablet). The cost can still be reduced if plant materials are obtained in the locality and the farmers are the ones who prepare the formulations themselves.

Estimates show that more than 300 million cattle, buffaloes, sheep, goats, pigs, and horses worldwide are infected with liver fluke causing significant economic losses of $ 3 billion yearly. Locally, it was reported in 2001 that liver flukes were responsible for 361 deaths and 12,008 cases in carabaos, 215 deaths and 8,994 cases in cattle, and 267 deaths and 5,252 in goats and sheep.

According to Seraste et al, as a dewormer against liver fluke in goats, bunga was effective when given at a dose of 30g/20 kg body weight (BW). The

researcher noted that at these doses, bunga and makabuhay had comparable effects with those of commercial anthelmintics in reducing the liver fluke egg per gram counts. As such , the researchers concluded that bunga and makabuhay are practical, good substitutes for expensive commercial dewormers.

OBJECTIVES OF THE STUDY

The study aimed to determine the effects of processed mature betel nut as dewormer to livestock and poultry. In particular it determined the efficacy of processed mature betel nut to small ruminants and chicken, and found out what specific parasites will be expelled.

MATERIALS AND METHODS

Methods

Gathering and Collection of Betel nut. Fresh native mature betel nut was gathered from different places in the Municipality of Dumingag, Zamboanga del Sur. The same variety of betel nut was used in this study.

Removing the Fresh Betel Nut. The fresh betel nut fruit was cut into halves and the meat of the nut was separated from the shell by using knife or teaspoon and was placed in a clean container.

Oven-drying the Meat of the Betel Nut. The fresh nut was oven-dried using an electric drier by setting the temperature at 100oC for thirty minutes or until the nut was fully dried ready for milling or grinding.

Grinding the Dried Meat of the Betel Nut. As soon as the meat of the nut was fully dried, it was milled or ground into powder using a manual grinder until it turned into powder.

Source of the Stock. Native Chicken freely ranged in the backyard was used in this study. Experimental Goats and sheep from the small ruminants project of the school were also used. They were examined if they are positive of internal parasites through fecal analysis using floatation method. Animals that were found positive of parasites were placed in the cage three days before the administration of processed betel nut.

Weighing the Animals. The experimental animals were weighed individually to determine the amount of powdered nut given.

Administration of Processed Betel Nut to the Animals. Experimental animals were orally administered with processed mature betel nut buy drenching in goat and sheep while chicken were administered by wrapping the powdered nut with tissue paper.

Collection of Feces. Animals were properly observed after the administration of dewormer. Feces excreted were immediately collected and examined. Adult parasites were placed in the labeled vials for proper identification.

Determination of Anthelmintic Effects. Anthelmintic effects were determined through fecal examination. The parasites expelled were counted to determine which treatment is more effective in deworming.

Classification of Parasites. Collected parasites were identified as gastro-intestinal parasites further classified as Nematodes (roundworms), Cestodes (tapeworms), and Trematodes.

Data Gathered. The data gathered are as follows:

For Goat and Sheep:

1. Frequency Counts of Parasites' Eggs Before the Administration of the Powdered Nut
2. Frequency Counts of Internal Parasites' Eggs Three Days After the Administration of Powdered Nut
3. Efficacy of Different Processed Mature Betel Nut
4. Frequency Counts of Adult Parasites Expelled per Lot After Administration
5. Costs and Return Analysis

For chicken:

1. Frequency counts of adult parasites expelled per lot
2. Frequency counts of parasites' eggs expelled before and after administration of different processed mature betel nut

Scope and Limitation of the Study

This study used processed mature betel nut representing the different treatments as follows:

For Goat and Sheep:

Treatment I - administered with 20g/20kgBW

Treatment II - administered with 30g/20kgBW
Treatment III - administered with 40g/20kgBW
Treatment IV- administered with 1 ml/10 kgBW using albendazole

For Chicken
Treatment I- 1 gram per kilogram body weight
Treatment II - 2 grams per kilogram body weight
Treatment III- 3 grams per kilogram body weight
Treatment IV – Commercial dewormer

Time and Place of the Study

This study was conducted at the JT Cerriles State University, Dumingag, Zamboanga del Sur.

RESULTS AND DISCUSSIONS

Table 1. Frequency counts of internal parasites' eggs before the administration of the powdered betel nut

Treatments	Roundworms		Tapeworms		Flukes	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	100	90	0	30	232	3
T2-30g/20kgbw	234	72	1	37	100	29
T3-40g/20kgbw	12	75	0	0	68	19
T4-1ml/10kgbw	237	92	0	1	193	79
Total	583	329	1	68	680	130

Table 1 shows the frequency counts of internal parasites before administering the processed powdered betel nuts. The examination showed that all experimental animals were severely affected with internal parasites like roundworms, tapeworms and flukes due to the number of eggs present.

Occurrence of roundworm parasites got the highest total of 329 eggs, which was followed by the fluke parasites with a total of 130 and the last was the occurrence of tapeworm eggs with a total of 68 in goats while sheep got a total of 583 roundworms and 680 flukes. The table shows that occurrence of

internal parasite eggs were many just because the experimental animals did not undergo deworming.

Table 2. Frequency counts of internal parasites' eggs three days after the administration of processed powered betel Nut

Treatments	Roundworms		Tapeworms		Flukes	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	93	39	0	6	105	179
T2-30g/20kgbw	44	32	4	0	0	20
T3-40g/20kgbw	153	129	9	94	59	351
T4-1ml/10kgbw	53	12	0	0	57	106
Total	343	212	13	100	221	843

After deworming, the feces of the animals were collected and examined by floatation technique to determine the expelled parasite's eggs.

Table shows the frequency counts of internal parasite eggs after three days of administration of processed betel nut in goats. Eggs of the fluke parasites obtained the highest total of 843 eggs, followed by the roundworms eggs with a total of 212 tapeworms eggs. While in sheep, many of roundworm eggs expelled compared to flukes and tapeworm parasites with a total of 343, 221 and 13 eggs respectively. All experimental animals were severely positive of internal parasites as shown in the result of the examination. The result of the reducing number of eggs expelled is due to the administration of processed powdered betel. Adult parasites were expelled and production of parasite eggs was stop.

Table 3. Efficacy of processed mature betel nut

Treatments	Roundworms		Tapeworms		Total	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	**3**	13	**0**	5	**3**	18
T2-30g/20kgbw	**2**	22	**2**	8	**4**	30
T3-40g/20kgbw	**2**	1	**1**	7	**3**	8
T4-1ml/10kgbw	**31**	77	**3**	0	**34**	77
Total	**38**	**113**	**6**	**20**	**44**	**133**

This table shows the efficacy of the different processed mature betel nut. Commercial dewormer obtained the highest number of parasites expelled with a total of 34 parasites followed by T2, 30g/20 kgBW with a total of 4 parasites, then T1, 20g/kgBW and T3, 40g/kgBW with only 3 parasites. Commercial dewormer, albendazole is more effective than betel nut. While in goat commercial dewormer got the highest number of parasites expelled followed by T2, T1 and T3 with a total number of 77, 30 and 18 parasites respectively. Nevertheless, the dosage of 30g/20kgBW ranks second to the commercial dewormer.

Table 4. Frequency counts of adult parasites expelled per lot after administration in sheep

Classification of Parasites	LOTS					
	20g/20kg bw	30g/20kg bw	40g/20kg bw	Valbazine 1m/10kgbw	Fresh Betel nut	Total
Roundwors	0	0	0	0	0	0
Pinworms	3	2	2	31	0	38
Tapeworms	0	2	1	3	0	6
Flukes	0	0	0	0	0	0
Total	3	4	3	34	0	44

Table 4 shows the frequency counts of adult parasites expelled per lot after administration. Treatment V, administered with fresh betel nut, had no parasites expelled. Treatment IV, administered with commercial dewormer Valbazine got the highest number of pinworms with 31 and 3 tapeworms. Treatment I, administered with 20g/20kgbw, expelled only 3 pinworms. Treatments II and III had only 2 pinworms expelled.

Table 5. Frequency count of adult parasites expelled per lot after administration (goat)

Classification of Parasites	LOTS				Total
	20g/20kgbw	30g/20kgbw	40g/20kgbw	CD 1m/10kgbw	
Roundworms	11	17	0	0	28
Pinworms	2	5	1	77	85
Tapeworms	5	8	7	0	20
Flukes	0	0	0	0	0
Total	18	30	8	77	133

Table 5 shows the frequency count of adult parasites expelled per lot after administration of processed powdered betel nut. After the examination of the individual feces, Lot II, 30g/20kgBW, got the highest count of adult parasites expelled with a total of 30 parasites, followed by Lot I, 18 parasites and the last is Lot III, had 8 parasites expelled. These three lots expelled adult tapeworms, roundworms, and pinworms.

The control shows the highest total number of 77 parasites compared to three different lots due to the effectiveness of the commercial dewormer, but only pin worms were expelled. It goes to show that albendazole a commercial dewormer is only effective to pinworms.

Chicken

Table 6. Frequency counts of internal parasites' eggs before the administration of powered betel nut

Classification of Parasites	TREATMENTS				Total
	I 1G	II 2G	III 3G	IV CD	
Ascaridia galli	17	68	17	82	184
Amaeboaenia shenoids	0	1	0	0	1
Capillaria annulata	24	1	5	91	121

Davainea prolottina	0	17	15	0	32
Heterakis Galliae	72	61	8	39	180
Prosthogonimus Sp	42	0	1	0	43
Raillietina tetragona	0	11	0	0	11
Suburula brumpti	0	3	0	0	3
TOTAL	155	162	46	212	575

The feces of the experimental birds were examined before the dewormer was administered to ascertain that the birds used are really infested with internal parasites. During the fecal examination only eggs were seen and the frequency counts are reflected in Table 6.

As reflected in this table, all of the sample feces from each of the treatments were infested with internal parasites hence, the birds used in this study are recommendable for deworming.

Table 7. Frequency counts of internal parasites' eggs three days after the administration of powdered betel nut

Classification of parasites	Frequency Counts				Total
	I 1g/kgbw	II 2g/kgbw	III 3g/kgbw	IV CD	
Ascaridia galli	5	16	6	2	29
Amaeboaenia shenoids	0	0	0	0	0
Capillaria annulata	0	0	1	0	1
Davainea Prolottina	0	1	1	0	2
Heterakis Galliae	1	8	3	3	15
Prosthogonimus Sp	3	0	0	0	3
Raillietina Tetragona	0	3	0	0	3
Suburula brumpti	0	0	0	0	0
TOTAL	9	28	11	5	53

Three days after the administration of the powdered betel nut and commercial dewormer, the feces were again examined. The eggs were counted separately from the adult. The frequency counts of the eggs are shown in Table 7.

The data show that the eggs expelled after the deworming is fewer than when it was not yet dewormed. So far the grand total number of eggs counted only reached to 53. This result indicates that one effect of dewormer is melting the eggs of the parasites because they were no longer visible during the fecal examination after the administration of dewormer.

Table 8. Frequency counts of adult parasites expelled as influenced by different levels of processed mature betel nut to chicken

Treatment (Processed betel nut)	Number of Parasites Expelled		Total
	Roundworms	Tapeworms	
Treatment I 1 gram/kgbw	11	62	73
Treatment II 2 grams/kgbw	9	26	25
Treatment III 3 grams/kgbw	7	23	20
Treatment IV Commercial Dewormer	2	0	2
Total	29	111	140
Mean	7.25	27.75	35

Table 8 shows the frequency counts of the different adult parasites expelled after deworming with processed betel nut administered at different levels. As examined only roundworm and tapeworm were expelled. As shown in this table, Treatment 1 expelled 62 tapeworms and 11 roundworms. This was followed by Treatment 2 with 26 tapeworm and 9 roundworms, then Treatment 3 with 23 tapeworm and 7 roundworm. The commercial dewormer only expelled 2 roundworms.

This table shows that betel nut is more efficient in expelling tapeworm than roundworm, more effective than commercial dewormer. These findings parallel the result of Betarmos' study using fresh betel nut. This result indicates that betel nut whether fresh or processed is a good dewormer for chicken.

Table 9. Frequency count of adult parasites expelled per lot after administration of processed betel nut

Classification of Parasites	TREATMENTS I 1g/kgbw	II 2g/kgbw	III 3g/kgbw	IV Commercial Dewormer	Total
Roundworms	11	9	7	2	29
Tapeworms	62	26	23	0	111
Total	73	35	30	2	140
Mean	36.5	17.5	15	1	70

Table 9 shows the frequent occurrence of adult parasites being expelled by the different treatments. Treatment I administered with 1g/kgbw powdered betel nut expelled the highest number of adult parasites followed by Treatment II, III and IV respectively.

This figure shows that among the different dosages used, T1- using 1g/kgbw is the most effective and showed no salivation to chicken compared to higher dosage.

CONCLUSIONS

From the findings of the study, it is concluded that processed mature betel nut possessed anthelmintic effects to chicken and the dosage of 1 gram per kilogram body weight is effective in expelling roundworm and tapeworm.

In goat and sheep, the use of 30g/kilogram body weight is effective in expelling eggs and adults of roundworms while commercial dewormer albendazole expelled only adult roundworms. Based on the findings of the study, it is concluded that processed matured betel nut is effective in expelling parasite eggs while valbazen, a commercial dewormer, is effective in expelling adult parasites.

Recommendations

Based on the results of the study, the following are hereby recommended.

1. Processed mature betel nut as herbal medicine is very effective alternative to commercial dewormer to chicken.
2. A dose of 30g/20kgBW processed betel nut is safe and effective dewormer to goats and sheep.
3. Similar study may be conducted to large animals using the same dosage and other poultry species.
4. Another study may be conducted placing the powdered betel nut in a capsule or making it in a pellet form for easy administration.

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Vitamin D Receptor Gene *Bsm1* Polymorphism Positively Correlates with Prostate Cancer

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Abstract - The biologically active 1,25-dihydroxycholecalciferol has been shown to regulate the growth and differentiation of the normal prostate gland. This hormone exerts antiproliferative and oncostatic effects on prostatic cells through the vitamin D receptor, a member of the steroid/retinoid receptor superfamily of nuclear receptors that possesses tumor-suppressive functions. In a case control study, the authors evaluated the allelic frequencies and examined whether the *Bsm1* vitamin D receptor (VDR) gene polymorphism could influence the development of benign prostate hyperplasia (BPH) and prostate cancer among Filipino patients through Restriction

Fragment Length Polymorphism (RFLP). The predominant genotypes showed the absence of the *Bsm1* restriction site in both the BPH group (*BB*, 28%; *Bb*, 44%) and the control group (*BB*, 44.4%; *Bb*, 50%). In contrast, majority of the prostate cancer cases had the *bb* genotype (70%) indicating the presence of the *Bsm1* restriction site, and only 28% with *Bb* genotype. Furthermore, homozygosity (*bb*) for the presence of the *Bsm1* restriction site positively correlated with the development of prostate cancer (p=0.0014, Odds Ratio=38.9) but not with benign prostate hyperplasia (p=0.06). These results indicate that the molecular variants of the *VDR* gene play a significant role in the development of prostate cancer among Filipinos and can be employed to identify high-risk individuals.

Keywords - benign prostatic hyperplasia, prostate cancer, polymorphism

INTRODUCTION

Prostate cancer (PrCa) is one of the most common causes of cancer death in men and determinants of PrCa risk remain unlargely unidentified. In 2000, the age-adjusted incidence was over 10/100,000 men in Japan, Taiwan, Singapore, Malaysia, the Philippines and Israel. At the national level, PrCa ranks third as the most common malignancy among Filipino men and seventh for both sexes combined. However, the incidence rate for PrCa among Filipinos is one of the lowest in the world, with 20 new cases per 100,000 person-years as compared to 149 for American black, 107 for American white (1) and 39 for our Asian neighbor, the Japanese (2). Moreover, it has been shown that the development of PrCa increases with age, migration to the US and with marriage. These epidemiological studies reflect that the incidence of PrCa is influenced by both genetic and environmental factors.

The majority of the cases appear to be a multifactorial etiology that includes a genetic component. It has been suggested that the low levels of circulating steroid hormone, 1,25-dihydroxyvitamin D3 are associated with an increased risk of prostate cancer (3). Several studies demonstrate a

strong and consistent prodifferentiation and growth-inhibitory effect of the 1,25-(OH)2D3 (vitamin D) and its analogs in PrCa both *in vivo* and *in vitro* (4,5,6,7,8,9). The action of vitamin D is mediated by its cognate receptor, the vitamin D receptor (VDR), which is member of the nuclear steroid-retinoid receptor superfamily. The binding of the steroid vitamin to the VDR forms a heterodimer ligand-receptor complex (LRC) that associates with specific DNA sequences, i.e. vitamin D response elements (VDRE), and regulates transcription of the genes involved in cell cycle, apoptosis and differentiation. The same mechanism is particularly involved in the regulation of growth and differentiation of breast and prostate cancer cells (10,11,12,13,14,15,16,17,18). Dysregulation of VDR-mediated gene expression would alter mammary and prostate gland development or function and possibly predispose cells to transformation.

The human VDR gene (Figure1) is approximately 75kb long, located on chromosome 12 that straddles a short segment from the centromere to the proximal long arm [12cen-q12] (19) containing 11 exons together with intervening introns. Three exons (Ia, Ib and Ic) are found in the 5′ non-coding sequence and 8 exons (II-IX) encode for the structural portion of the product. Exons II and III encode the DNA binding domain (zinc fingers), and exons IV-IX encode the ligand-binding region (20). It has several known allelic variants including a *FokI* restriction fragment length polymorphism in exon II, *BsmI* and *ApaI* polymorphisms in the intron between exons VIII and IX, and a mononucleotide [$(A)_n$] repeat polymorphism in the 3′ untranslated region (21). The *TaqI* polymorphism is located in exon IX but leads to a silent codon change.

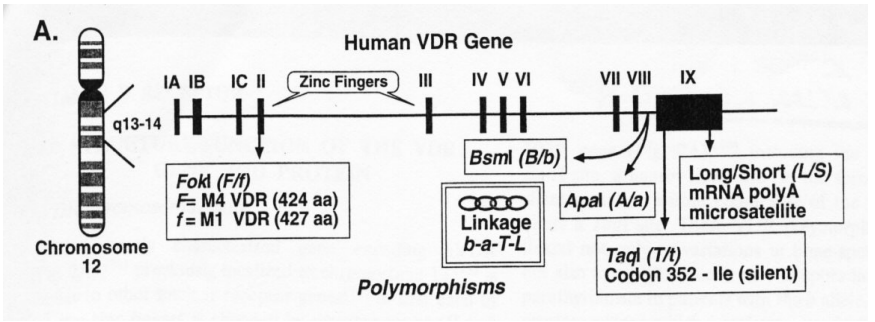

Figure 1. The human VDR gene polymorphisms (22).

Polymorphisms in genes involved in metabolism of and/or response to hormones, drugs, and other factors may affect the onset and/or prognosis of diseases and, thus, act as modifiers. The three single nucleotide polymorphisms (SNPs) *BsmI*, *TaqI* and *ApaI* contain alternative bases of G and A, T and G, and T or C, respectively. These polymorphisms can be distinguished by digestion with restriction enzymes (23). The presence or absence of a restriction site defines the specific allele. Allelic variations of the VDR gene have been associated to several conditions. In Zmuda's (21) review on molecular epidemiological studies, it was reported that certain VDR gene alleles could be associated with mineral bone density, hyperparathyroidism, osteomalacia, osteoarthritis, IDDM, coronary artery disease and cancer. Several studies show that *FokI*, *BsmI*, *TaqI* and *ApaI* polymorphisms have been associated with the risk of osteoporosis in postmenopausal women (24,25,26). These polymorphisms have been implicated in the causation, initiation and progression of breast cancer (27,28,29) and prostate cancer (10,11,12,13,14,15,16,17,18,23,30,31,32,33,34,35,36).

Association of the VDR polymorphisms with prostate cancer varies with ethnicity, presence of family history of cancer, age, and stage of the disease. In the United States, Taylor et al. (32) reported that *TaqI* polymorphism in the 3'UTR was associated with PrCa in American whites and suggested in a race-adjusted combined analysis that men who are homozygous for the *t* allele (shown to correlate with higher serum levels of active form of vitamin D) have one third risk of developing PrCa compared to men who are heterozygotes or homozygotes for the *T* allele. Thus, there was 70-80% lower risk of PrCa associated with the *TaqI tt* genotype. Ingles et al. (30) reported that a novel VDR polymorphism defined by length of polyadenosine residues in the 3'UTR was associated with the risk of PrCa among non-Hispanic whites. The *Tt* genotype of the *TaqI* RFLP shows an association with PrCa among populations from Germany and France with stronger association among patients < or = 70 years old, and no association was observed between *FokI* RFLP and the disease (34). On the other hand, Tayeb et al. (37) observed that the incidence rate of PrCa was higher in BPH European patients having CYP3A4 variant genotype compared to those with wild type and no association between VDR *TaqI* variant genotype and risk of developing PrCa.

Moreover, Habuchi et al. (35) were not able to find any correlation between the *TaqI* and *ApaI* polymorphisms and PrCa or BPH but found a significant reduction in risk associated with *BsmI* polymorphism in the VDR gene among

Japanese population. In a study among US male physicians, Ma et al. (33) claimed no significant association of the *BsmI* or the *TaqI* genotype compared with PrCa, but found a 57% reduction in risk for PrCa with the *BB* versus the *bb* genotype in men with low plasma 25-hydroxyvitamin D, which is the major circulating metabolite of vitamin D. In a population-based case control study in China, Chokkalingam et al. (38) found no association between the *BsmI* or *FokI* VDR gene polymorphisms and PrCa risk.

To date, there have been no epidemiological studies conducted on the genetic analysis of prostate cancer among Filipinos. Since VDR polymorphisms have been implicated in the causation, development and progression of PrCa and BPH in numerous reports, the authors decided to venture on the evaluation of these polymorphisms as inheritable genetic risk factors in the Filipino population. This pilot study aimed to explore the association of *BsmI* polymorphism of the VDR gene to BPH and PrCa. Specifically, the genotypic and allelic frequencies of the *BsmI* SNP were determined and correlated with the incidence of BPH and PrCa.

METHODOLOGY

Study Population

A total of 66 subjects, consisting of 23 prostate cancer patients, 25 BPH patients and 18 male controls from various medical centers in Metro Manila were recruited and enrolled in this study. Prostate cancer patients have been diagnosed histologically by transrectal needle biopsy or trans-urethral resection of the prostate for voiding symptoms, while the BPH group consisted of subjects who presented with lower urinary tract infections and prostate enlargement by digital rectal examination. On the other hand, the control group was composed of subjects who showed no voiding problems nor lower UTI and no prostatic enlargement by digital rectal examination. The serum PSA levels of both the BPH and PrCa groups were measured.

Genotyping of *BsmI* VDR polymorphism

DNA was isolated from blood samples collected from each patient using the DNAzol® BD Reagent [GibcoBRL®]. The 825-bp fragment encompassing the *BsmI* polymorphic site in intron 8 was amplified using the primer pair described

by Morrison et al. (26): 5′-CAACCAAGACTACAAGTACCGCGTCAGTGA-3′ and 5′-AACCAGCGGGAAGAGGTCAAGGG-3′. The amplification was performed with initial denaturation at 94°C for 2 min followed by 30 thermocycles of denaturation at 94°C for 30 sec, annealing at 55°C for 45 sec and elongation at 72°C for 90 sec per cycle and a final elongation at 72°C for 5 minutes. When the *BsmI* polymorphic site was present, restriction fragment length polymorphism (RFLP) was carried out using *BsmI* endonuclease at 67°C for 2 hrs. The digestion products containing ethidium bromide were electrophoresed on 1.0% agarose gel and photodocumented. The 825-bp *BsmI* product was divided into 650 and 175-bp fragments. An intact PCR product indicates absence of *BsmI* restriction site (*B* allele), whereas the presence of the *BsmI* site (*b* allele) is denoted by two or three fragments.

Statistical Method

Measures of central tendency were used to evaluate the age, PSA profile and allelic frequencies in the different groups. Differences in the mean frequencies were analyzed using the *t* test (a=.05). Chi-square and Fisher's exact test (*P*s) were used to evaluate the variations and association of the genotype frequencies among the cases and the controls. Odds ratios were calculated as an estimate of the relative risk of BPH and prostate cancer.

RESULTS

The *BsmI* polymorphism in the VDR gene was investigated by PCR-RFLP analysis in BPH and prostate cancer patients. The mean ages of PrCa patients, BPH patients and male controls were 68.3 ± 9.3, 62.2 ± 11.7, and 61.6 ± 11.7 years, respectively. There were no statistically significant differences between and among mean ages of the PrCa, BPH and control groups using unpaired two-tailed *t* test. The serum PSA levels of both the PrCa and BPH patients were measured. The mean PSA level of the PrCa group was 27.0 ± 26.8 ng/ml (0.37-98.3 ng/ml) and found to be significantly elevated compared with the normal serum PSA (< 4 ng/ml). On the other hand, there was also an elevation in the BPH group mean PSA level [4.43 ± 1.0 ng/ml (2.4-5.09 ng/ml)], but not significant (Table 1).

The determination of the *BsmI* genotype and allele type of subjects in all the three groups was done by evaluating the PCR products after the PCR-RFLP analysis. The size of the PCR product for *BsmI* polymorphism was 825bp. Following digestion two restriction fragments of 650bp and 175bp were observed for *bb* homozygotes. A single 825bp band was obtained for *BB* homozygotes. Heterozygote individuals displayed all the three bands (Fig. 2). The "*B*" allele denotes absence of the *BsmI* restriction site, while "*b*" allele indicates presence of the restriction site.

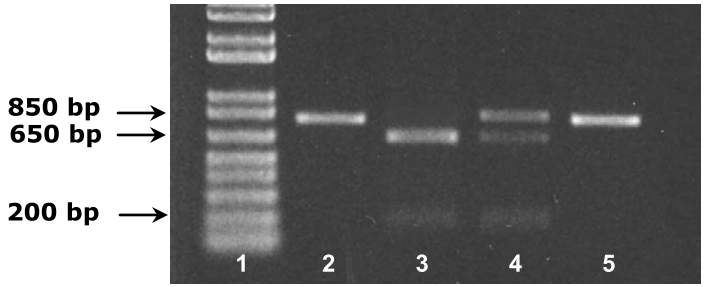

Figure 2. 1% AGE of the PCR product (Lane 2) & *Bsm*I digests *bb* homozygote (Lane 3), *Bb* heterozygote (Lane 4) and *BB* homozygote (Lane 5) ran against 1-Kb Plus DNA ladder [Gibco] (Lane 1).

The *BsmI* genotyping results are shown in Table 2. Among the population controls, the frequencies of each of the *BB, Bb,* and *bb BsmI* genotypes were 44.4, 50.0, and 5.6%, respectively. Seventy percent (70%) of the PrCa patients were homozygous *bb* for the *BsmI* polymorphism, 21.7% were heterozygous *Bb*, and only 8.7% were homozygous *BB*. There was an equal frequency for the *BB* and *bb* homozygotes (28%) among the BPH cases, with the majority (44%) having the heterozygous *Bb* genotype. The *B* allele was more frequently found than the *b* allele among the control group which was otherwise in the PrCa patients. However, the frequencies of both alleles were equal in the BPH group. The overall occurrence of *B* and *b* alleles in the entire population were 45 and 55%, respectively. Hence, the allele and genotype frequencies at *BsmI* gene were found to be in Hardy-Weinberg equilibrium.

Statistical analyses of the genotype prevalence showed that significant differences were observed between the PrCa patients and male controls

(c^2=17.62, P=0.003, df=2), and between PrCa and BPH groups (c^2=8.42, P=0.13, df=2). No significant difference in the *BsmI* genotype was found between the BPH and control groups (c^2=3.73, P=0.59, df=2). Similarly in allelic frequencies, significant differences were observed between PrCa patients and the control (c^2=20.6, P=0.0001, df=1) and between PrCa and BPH patients (c^2=3.29, P=0.35, df=1). No significant difference in the *BsmI* allelic prevalence was found between BPH and control groups.

Based on these findings, the presence of "*b*" allele and homozygous *bb* genotype was correlated with the incidence of PrCa and BPH groups (Table 3). Presence of the "*b*" allele was associated with increased risk for PrCa relative to "*B*" allele (OR, 9.34; P=0.0001). Moreover, presence of homozygous *bb* genotype has shown a stronger positive correlation with the incidence of PrCa and that persons having this genotype would confer a much greater risk of developing the disease (OR, 38.9; P=0.0014) compared with the *BB* + *Bb* genotypes combined. *BsmI* polymorphism of the VDR gene was found not to correlate with BPH.

Table 1. Mean age and serum PSA levels of PrCa and BPH patients.

	Age, years		Serum PSA, ng/ml	
	Range	Mean (SD)	Range	Mean (SD)
PrCa (n=23)	50-86	68.3 ±9.3	0.37-98.3	27.0 ±26.8
BPH (n=25)	1-80	62.2 ±11.7	2.4-5.09	4.43 ± 1.0
Male control (n=18)	42-82	61.6 ±11.7	-	-

*Normal serum PSA < 4 ng/ml.

Table 2. Genotypic and allelic frequencies (%) of the BsmI VDR gene polymorphism among PrCa patients, BPH patients and control group.

VDR *BsmI* Genotypes	Prostate Ca N=23	BPH n=25	Male Control n=18
BB	2 (8.7)	7 (28.0)	8 (44.4)
Bb	5 (21.7)	11 (44.0)	9 (50.0)
bb	16 (69.6)	7 (28.0)	1 (5.6)
Alleles (Total %)			
B (45%)	9 (19.6)	25 (50.0)	25 (69.4)
b (55%)	37 (80.4)	25 (50.0)	11 (30.6)

Table 3. Odds Ratios by BsmI genotype.

	Odds Ratios	*P* values
(*bb* vs *BB*+*Bb*); PrCa vs Control	38.9	0.0014
(*bb* vs *BB*+*Bb*); BPH vs Control	6.61	0.0671
("*b*" vs "*B*"); PrCa vs Control	9.34	0.0001
("*b*" vs "*B*"); BPH vs Control	2.27	0.3477

DISCUSSION

Relatively few risk factors are known for prostate cancer and familial aggregation and ethnic origin have far been clearly established for this disease. The evaluation of inheritable genetic risk factors may be more appropriate in the low risk Filipino population because similarly with the Japanese, it is considered to be much less influenced by environmental factors for PrCa. It was hypothesized that vitamin D deficiency may increase the risk

of initiation and progression of PrCa (3,39) because its mortality rate increases significantly as the availability of UV radiation exposure decreases. UV light is essential in the synthesis of vitamin D and vitamin D deficiency is less likely a condition predisposing a Filipino to develop PrCa. Relevant to vitamin D and the prostate, it has been recently demonstrated that polymorphisms in the VDR gene may contribute to the risk of PrCa.

In the current pilot study on Filipino population the predominant genotypes showed the absence of *BsmI* restriction site in both the male controls and BPH patients (*BB* and *Bb*). On the contrary, majority of the PrCa cases had the homozygous *bb* indicating the presence of the polymorphic site in the *BsmI* VDR gene. There was evidence linking *BsmI* polymorphism of the VDR gene with PrCa risk. This finding was corroborated with previous studies showing significant association of *BsmI* polymorphism with PrCa among Japanese (35,36). Guy and co-workers found significant association of VDR *BsmI* polymorphism not only with PrCa but also with breast cancer among UK Caucasian population (40). In these studies (36,40), VDR polymorphism was significantly associated with increase risk in PrCa with "*b*" allele at risk. On the other hand, Habuchi et al. (35) found that the homozygosity and heterozygosity for the absence of restriction site (*BB* and *Bb*) was associated with 1/3 risk of PrCa and ½ risk of BPH and suggested that the *BsmI* polymorphism plays a significant role in the protection against PrCa and BPH.

However, the present result was not consistent with studies done among groups of African-Americans (31), Caucasian Americans (33), and Chinese (38) showing no significant association with PrCa. Although no association was established between *BsmI* polymorphism and PrCa, Ma et al. (33) found significant reduction in risk for PrCa with the *BsmI BB* genotype having low levels of serum 25(OH) vitamin D. In determining haplotypes that can be used as allelic markers among African-Americans, Ingles et al. (31), otherwise observed that the *BsmI* "*b*" allele carrying a long (L) allele of the poly(A) microsatellite was associated with 2-fold decrease in risk of advanced PrCa, and the allelic variant that confers increased risk appears to be associated with the *BsmI*/poly(A) BL haplotype. Such association was applicable for more advanced disease suggesting that VDR allelic variants may influence the progression, rather than initiation, of the PrCa.

BPH has an inheritable genetic component (41) and vitamin D may play an important role in the growth and differentiation of stromal and epithelial

cells of the prostate (42). It was reported by Yanagisawa et al. (43) that a cross-talk between the vitamin D signaling pathway and the transforming growth factor-b (TGF-b) signaling pathway is involved in the formation of BPH. Considering these, VDR gene polymorphism may be associated to some extent with prostate enlargement. This was supported by the association of *BsmI* polymorphism with BPH established in studies conducted by the groups of Habuchi (35) and Suzuki (36) among the Japanese, which was contradicted in the present study. The non-association of the *BsmI* polymorphism with BPH and strong correlation with PrCa in the local study may signify that the presence of risk allele "*b*" probably exerts much effect on the initiation and development of prostatic cancer cells, rather than on the proliferation of normal cells leading to prostate enlargement.

The effect of polymorphisms on PrCa risk may be the result of differential activity of the variant VDR alleles in transactivation of vitamin D target genes. The prostate is a vitamin D target organ supported by the presence of VDR within the epithelial cells and the regulation of the expression of a number of prostate genes by calcitriol in both PrCa lines as well as primary cultures of epithelial and stromal elements derived from normal, BPH and PrCa specimens (44,45,46,47). The affinity of the VDR for calcitriol in PrCa is similar to other vitamin D target organs. But the exact mechanism through which *BsmI* polymorphism in the VDR gene may influence the risk for PrCa has not yet been fully elucidated until the present time. The *BsmI* variants do not alter the amino acid sequence of the protein product and are unlikely to have functional consequences because of its intronic location. However, Morrison et al. (26) have publicized that the polymorphisms near the 3'UTR may be involved in the regulation or mRNA stability and degradation and may alter the level of the VDR mRNA transcripts. Since polymorphisms at the 3'UTR are non-functional, linkage disequilibrium with one or more truly functional polymorphisms elsewhere in the VDR gene is assumed to explain the association observed.

CONCLUSIONS

The present results found that the "*b*" allele is the predominant form in the PrCa cases while the "*B*" is for the control group indicating "*b*", the allele at risk. Furthermore, the molecular *BsmI* variants of the *VDR* gene play a significant role in the development of prostate cancer among Filipinos and

can be employed to identify high-risk individuals. Additional studies are warranted to verify the correlation among the age, size of the prostate, stage of the disease and VDR polymorphisms in a larger Filipino sample population.

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Preparation of the Blood-Enriched Agar with the Use of Red Cell Suspension

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Abstract - A culture medium is said to support the growth and development of different microorganisms. Certain bacteria like *Staphylococcus aureus* and *Staphylococcus epidermidis* entail hemoglobin found in the red blood cells. Because of its cost effectiveness and availability, expired human blood is being utilized in some developing countries. Despite the widely accepted disadvantages of using human blood as enrichment agent, many laboratories still opt to use it due to the unavailability of sheep blood or due to budgetary reasons. This study determined if the washed expired human blood can be used as an alternative enrichment agent in the preparation of Blood Agar Plate (BAP) culture medium in the isolation of *Staphylococcus aureus* ATCC 25923 and *Staphylococcus epidermidis* ATCC 12228. The cultural characteristics and hemolytic reactions of the selected microorganisms were recorded, assessed and compared with their growth in BAP. The stability of the washed expired human blood was evaluated in terms of

temperature and storage period. Results reveal that expired human blood with washing improved the morphologic and hemolytic pattern of *Staphylococcus aureus*. The washing of blood had no effect on *Staphylococcus epidermidis* because it is a gamma hemolytic bacterium. Both unwashed expired and fresh human blood produced gamma hemolysis due to the interferences still present in them. Both washed expired human blood and washed fresh human blood produced beta hemolysis. Washed expired human blood could be stored for seven days and still could be used for microbial culture.

Keywords - Blood, Blood Enriched Agar, Red Cell Suspension

INTRODUCTION

Like humans, microorganisms have their own preference when it comes to food. The cultivation and development of a particular organism will only be possible if their needs are fulfilled. Such needs are met in a culture medium.

Culture medium is a mixture of the nutrients needed by microorganisms. It is categorized based on its contents and composition. In diagnostic bacteriology, it is necessary to use several types of media for routine culture, particularly when the possible organisms are aerobic, facultatively anaerobic, and obligately. Unfortunately, these requirements pose logistic and economic problems, especially in resource-limited areas where bacteriological culture facilities are few and the allocation of fund is limited.

A variety of animal blood and banked human blood (BHB) is used to enrich microbiological culture media and to highlight growth characteristics such as hemolysis. In most clinical microbiology laboratories, the selection of colonies from primary cultures for further workup as putative beta-hemolytic streptococci (BHS) is made on the basis of the hemolytic reaction on blood agar (BA) as well as the colonial morphology (Anand et al., 2000).

Even with such advantages, sheep blood is still the most ideal for blood enriched agar. Many researchers reported disadvantages of using human blood such as variation in hemolysis production due to old red cells present resulting to misidentification, production of larger zones during antibiotic susceptibility testing, lack of characteristic morphology , and the difficulty of

discerning where the growth began (Russell et al., 2006; Changsri et al., 2001; Anand et al., 2000). The presence of citric acid as an anticoagulant, antibiotics, antibodies, or other anti-infective agents inhibits the growth of the desired bacterium (Russell et al., 2006).

Despite the widely accepted disadvantages of using human blood as enrichment agent, many public hospitals in the Philippines utilize outdated human blood as enrichment agent for its accessibility and cheaper price compared to sheep blood. There is a need, therefore, to develop an alternative technique to improve the use of human blood as enrichment agent. The possibility of removing by washing the interferences found in expired human blood that will be used as enrichment was never done by previous researches, thus became the main focus of this study.

Staphylococci are Gram-positive bacteria that tend to form grapelike clusters. These organisms are facultative anaerobic and grow on routine laboratory media such as blood (BAP), chocolate agar plate (CAP), colistinnalidixic acid (CAN), and phenyl ethyl alcohol (PEA) agars. Colonies are circular, opaque, smooth and have a butyrous (butter- like) consistency. *Staphylococcus aureus* colonies are often beta-hemolytic with a yellowish pigment (Bartelt, 2000). The appearances of the colonies of *Staphylococcus aureus* are medium to large, smooth, slightly raised and translucent. Visible growth appears on 5% sheep blood and CAP incubated at 35 degree Celsius under carbon dioxide or ambient air usually within 24 hour. *S. aureus* is a major pathogen for humans. (Forbes et al., 2007).

Staphylococcus epidermidis resemble *S. aureus* in morphology and in the Gram stain preparation. It appears to be Gram- positive cocci in clusters, white, creamy, raised growth on blood-enriched agar, coagulase negative, and DNase negative. *S. epidermidis* is normal flora of the skin and mucous membranes of humans and other animals. With the increasing cases involving this organism, it is now one of the Pathogenic bacteria (Delost, 2004).

Bacteria have numerous nutritional needs that include different gases, water, various ions, nitrogen, sources of carbon and energy. Carbohydrates and proteins most commonly provide the latter two. In the laboratory, nutrients are incorporated into the culture media on or in which bacteria are grown. Bacterial growth after inoculation also requires that the medium be placed in optimal environmental conditions (Forbes et al., 2007). In addition to carbon, other elements are needed by microorganisms for the synthesis of cellular materials. The synthesis of DNA and RNA requires nitrogen and some

phosphorous, as does the synthesis of ATP; the molecule is important for the storage and transfer of chemical energy within the cell. Nitrogen makes up about 40 percent of the dry weight of bacterial cell, and sulfur and phosphorus together constitute about another 4 percent. They require very small amount of other mineral elements such as iron, copper, molybdenum, and zinc. Most are essential for the function of certain enzymes, usually cofactors, although these elements are sometimes added to a laboratory with tap water and other components of media. Even most distilled water contains adequate amounts; tap water is sometimes specified to ensure that these trace minerals will be present in culture media.

Media are categorized according to their function and use. Enrichment media contain specific nutrients required for the growth of particular bacterial pathogens that may be present alone or with other bacterial species in a specimen. Supportive media contain nutrients that support growth of most nonfastidious organisms without giving any particular organism a growth advantage. Selective media contain one or more agents that are inhibitory to all organisms except those being sought. Inhibitory agents can be in the form of dyes, bile salts, alcohols, acids and antibiotics. Differential media employ some factor that allows colonies of one bacterial species to exhibit certain culture characteristics that can be used to distinguish them from other bacteria growing on the same agar plate (Forbes et al., 2007).

Blood agar (nutrient agar plus 5% sheep red blood cells) and chocolate agar (nutrient agar plus powdered hemoglobin) are examples of solid-enriched media that are routinely used in the laboratories (Burton and Engelkirk, 2007). Variety of animal bloods and banked human blood is used to enrich microbiological culture media and to highlight growth characteristics such as hemolysis. The use of pig and goat bloods was shown to be suitable alternative to sheep blood in the preparation of enriched culture media (Anand et al., 2000).

The isolation of some organisms requires blood as a culture medium supplement. Human blood agar is widely used in developing countries for the isolation of bacteria from clinical specimens. Defibrinated sheep, horse, pig or goat blood agar is recommended for the isolation of *S. pneumoniae* and *S. pyogenes*. Agar prepared with human blood is not suitable, partly because of the safety risk to the laboratory personnel, but mainly because it results in poor bacterial isolation rates, although there were few published data to support the method (Russell et al., 2006). The loss of RBC viability has been

correlated with the "lesions of storage," which is associated with various biochemical changes. These changes include a decrease in pH, a decrease in glucose consumption, a buildup of lactic acid, a decrease in ATP levels, and a reversible loss of RBC function (Harmening, 2005). Despite this, human blood agar has been routinely used in bacteriology laboratories in seven developing countries in the Asia Pacific Region (Russell et al., 2006).

Packed red cells that underwent inadequate washing might possibly contain antigens, antibodies and complement proteins. The presence of antigen receptor in red blood cells can induct such actions, thus resulting in the lysis of the red blood cells.

Bacterial metabolism involves all the cellular processes required for the microorganism's survival and replication. Nicotinamide adenine dinucleotide serves as carrier molecule during the process of producing energy. 2-3, DPG is very important in glycolysis wherein the production of ATP is dynamic (Forbes et al., 2007). Washing the red blood cells removes free unbound serum globulins. Saline, used in washing, are stored for long periods in plastic containers has shown to decrease pH, which may increase the rate of antibody elution during the washing process. The expected hematocrit increase for washed red blood cell is the same as that for regular red blood cell unit (Harmening, 2007).

A study conducted by Russell et al. in 2006 compared the efficacy of agars that used citrated sheep blood agar and outdated human blood agar with defibrinated horse blood agar and defibrinated sheep blood agar for the isolation and antibiotic susceptibility testing of reference and clinical strains of *Streptococcus pneumoniae*, *Streptococcus pyogenes*, and *Staphylococcus aureus*. Susceptibility testing for *S. pneumoniae* and *S. pyogenes* was performed on defibrinated sheep blood Mueller-Hinton agar, citrated sheep blood Mueller-Hinton agar, and human blood Mueller-Hinton agar plates. For all organisms, the colony numbers were similar on all agars. Substantially smaller colony sizes and absent or minimal hemolysis were noted on human blood agar for all organisms.

Antibiotic susceptibility results for *S. pneumoniae* were similar for the two sheep blood agars; however, larger zone sizes were displayed on human blood agar, and quality control for the reference strain failed on human blood agar. For *S. pyogenes*, larger zone sizes were demonstrated on human blood agar and citrated sheep blood agar than on defibrinated sheep blood agar. Poor hemolysis made interpretation of the zone sizes difficult on human blood

agar. Citrated sheep blood agar is an acceptable alternative for the isolation of these organisms.

The characteristic morphology is not evident, and hemolysis is poor on human blood agar; and so human blood agar is not recommended for use for the isolation or the susceptibility testing of any of these organisms. Citrated sheep blood agar-Mueller-Hinton agar may be suitable for use for the susceptibility testing of *S. pneumoniae*. The growth of a clinical isolate of *S. pneumoniae* was similar on all blood agars. The morphological appearances were similar for colonies on horse blood agar, citrated sheep blood, and defibrinated sheep blood. However, colonies were much smaller and alpha-hemolysis was not obvious for any strain on human blood agar. The numbers of colonies and growth of the *S. aureus* reference strains were similar on all blood agars at all dilutions. The appearances and the sizes of the colonies were similar on all agars, but hemolysis was not obvious for any strain on human blood agar and was only faint on horse blood agar.

The group of Changsri et al. (2001) examined effects of acid-citrate-dextrose (ACD) anticoagulant solution on quality of blood agar and determined shelf-life of sheep blood agar and human blood agar. The prepared blood agars were observed on sterility and their media appearance along the experiment in blood agar supplemented with different types of 5 % blood such as DF, ACD sheep blood and ACD human blood. The research showed that ACD does not affect the blood agar quality and is likely that the age of blood agar more of than 11 weeks old was not suitable for determining hemolysis patterns.

In 2000, Anand et al. showed the growth characteristics and colony morphologies of selected microorganisms and assessed them according to the medium type and incubation conditions for comparisons. The study examined the use of pig and goat blood as potential substitutes for sheep blood in blood-supplemented bacteriologic media. All eleven strains of *Enterococcus* species produced alpha-hemolysis on sheep blood agar, goat blood agar, and pig blood agar when incubated in carbon dioxide. Strains of BHS groups grew equally well and gave identical hemolytic reactions on the three blood agars although individual isolates displayed variation in the size of the hemolytic zone and/or sharpness of the zone edge on the different blood agars. Colonies of *S. pneumoniae* were dome-shaped and more mucoid on pig blood agar compared to colonies on sheep and goat agar, which were flat with a central depression.

Nobuaki et al. (1999) examined the component on Beutin's washed sheep blood agar for the improvement of hemolysin production media. Twenty-

seven strains of VT-producing *E. coli* of 7 different O-serotypes, 74 strains of Verocytotoxin-nonproducing E. coli of 24 different O-serotypes and one strain of O157 coded *Escherichia hermanii* were used for this basic study. In comparison of washing times of sheep blood with PBS, 5 times washing was better than 3 times, the original. In sheep blood concentration, supplement with 4% sheep blood was best for hemolysis observation. In experiment of addition of 2 divalent metal ions, Ca2+ and Mg2+, supplement with Ca2+ was more suitable than Mg2+ for hemolysis, and the supplement with 10 mM CaCl2, the original, was the best concentration. On the basal medium used in Beutin's sheep washed blood agar, 4 kinds of media were compared. In addition to Soybean-Casein Digest (SCD) agar, the original, Nutrient agar, Heart Infusion (HI) agar and Brain Heart Infusion (BHI) agar were examined, HI agar was the best blood agar among the four media.

According to Gardam and Miller (1998), the combination of Trypticase soy agar and sheep blood agar is recommended for the presumptive identification of *Streptococcus pneumoniae*. Optochin or ethylhyrocupreine hydrochloride test is widely used as an inexpensive and reliable means to presumptively identify *S. pneumoniae*. The National Committee for Clinical Laboratory Standards guidelines regarding optochin inhibition recommended using a blood agar plate specifying neither the type of blood nor the type of agar. Three popular types of agar plates Trypticase soy agar (TSA), Columbia agar and Mueller- Hinton agar supplemented with sheep blood were tested for the optochin inhibition zone criteria. Seventy two clinical isolates of *S. pneumoniae* and twenty two isolates of *S. viridans* were used. The study showed that optochin sensitivity tests performed on different sheep blood agar media yield significantly disparate results. Using media other than TSA-sheep blood agar will yield in a substantial number of isolates with indeterminate zones, which will require further testing before the organisms can be identified as *S. pneumoniae.*

MATERIALS AND METHODS

The expired human packed blood cells used in this research was obtained from the Blood Bank of Batangas Regional Hospital. The freshly collected blood was obtained from one of the members of the research team. Sheep blood that served as the standard came from Research Institute for Tropical Medicine in Alabang, Muntinlupa City.

The researchers employed the red cell suspension technique in the preparation of blood agar having expired human blood as the main component. Two different microorganisms, namely *Staphylococcus aureus* ATCC 25923 and *Staphylococcus epidermidis* ATCC 12228, were inoculated in five different blood agars. These included sheep blood, unwashed expired human blood, unwashed fresh human blood, washed expired and fresh human blood. The morphologies and hemolytic patterns were compared. Each type of blood was added to Trypticase soy agar (Hi-Media, USA) in the preparation of BAP. BAP using washed expired human blood without test organisms and sheep blood with test organisms served as the negative control and positive control, respectively.

The growth of the microorganisms was evaluated in terms of the cultural characteristics and hemolytic reaction (Forbes et al., 2007). The washed blood agar was subjected to different storage duration to determine its stability. To determine the effect of the duration of storage, a batch of culture media was stored at a refrigerated temperature. The said culture media were then serially inoculated with *Staphylococcus aureus* everyday for seven (7) days.

RESULTS AND DISCUSSION

I. Washed Expired Human Blood

The assessment of the microbial growth characteristics of the test isolates in washed expired human blood was completed through the 24-hour incubation of the microorganisms at 37ºC. The obtained results are shown in the table.

Table 1. Assessment of microbial growth of *Staphylococcus aureus* in washed expired human blood

Plate Number	Cultural Characteristics	Hemolytic Reaction
w/ sheep blood	smooth, slightly raised and translucent	Beta
BAP without inoculum	no growth	No growth
1	smooth, slightly raised and translucent	Beta
2	smooth, slightly raised and translucent	Beta
3	smooth, slightly raised and translucent	Beta
4	smooth, slightly raised and translucent	Beta

5	smooth, slightly raised and translucent	Beta
6	smooth, slightly raised and translucent	Beta
7	smooth, slightly raised and translucent (but with contamination)	Beta
8	smooth, slightly raised and translucent	Beta
9	smooth, slightly raised and translucent	Beta
10	smooth, slightly raised and translucent	Beta

Table 1 presents the morphology and the hemolytic pattern produced by *S. aureus* in the washed expired human blood. After the 24- hour incubation of the ten plates with *S. aureus*, beta hemolysis and yellowish pigment were spotted in all the plates. The physical manifestation of the colonies was smooth, slightly raised and translucent. These observations correlate with the standard culture characteristics of the said microorganism (Forbes et al., 2007; Bartelt, 2000). The same cultural characteristics were observed in BAP with sheep blood, which served as the positive control. No growth of organisms was observed on BAP with washed expired human blood, which was not inoculated with the test organisms. This indicates that the prepared blood agar plates were not contaminated.

Results of the experiments indicate that expired human blood with washing is sufficient to show the morphologic and hemolytic pattern of *Staphylococcus aureus.* Washing the expired human blood can enhance its capability as enrichment for blood agar. It is possible that washing the red blood cells removes free unbound serum globulins (Harmening, 2007). Additionally, the anticoagulant citrate, which interferes with bacterial growth (Russell et al., 2006), is likewise removed resulting to a greater microbial yield in all the plates using washed blood. Through washing, interferences hindering proper microbial growth are removed, enabling the microorganisms to flourish and display their optimum morphologic and hemolytic pattern. A sample plate of the said agar is shown in Figure 1.

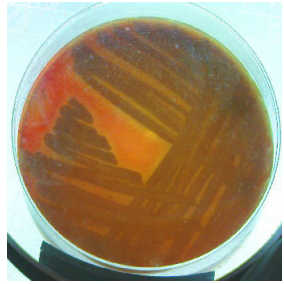

Figure 1. *Staphylococcus aureus* in washed expired human blood agar

Table 2. Assessment of microbial growth of *Staphylococcus epidermidis* in washed expired human blood

Plate Number	**Cultural Characteristics**	**Hemolytic Reaction**
w/ sheep blood	white raised colonies	Gamma
BAP without inoculum	no growth	No growth
1	white raised colonies	Gamma
2	white raised colonies	Gamma
3	white raised colonies	Gamma
4	white raised colonies	Gamma
5	white raised colonies	Gamma
6	white raised colonies	Gamma
7	white raised colonies	Gamma
8	white raised colonies	Gamma
9	white raised colonies	Gamma
10	white raised colonies	Gamma

In Table 2, *Staphylococcus epidermidis* created gamma hemolysis. White raised colonies were observed and recorded, which correlated with the expected culture characteristics for the said test isolate (Delost, 2004). This shows that there are no distinct changes in the morphologic and hemolytic reaction of *Staphylococcus epidermidis* when grown in washed expired human blood agar. Thus, washing of blood has no effect on *Staphylococcus epidermidis*

because it is a gamma hemolytic bacterium. No growth of organisms was observed on BAP with washed expired human blood, which was not inoculated with the test organisms.

Figure 2. *Staphylococcus epidermidis* in washed expired human blood

II. Points of Differences

To determine the disparity in the use of different types of blood as enrichment to blood agar, the researchers decided to use unwashed expired human blood, washed fresh human blood, unwashed fresh human blood, and sheep's blood as its standard. The results of the experimentation are presented below.

Table 3. Growth Characteristics of *Staphylococcus aureus*

Blood Agars	**Cultural Characteristics**	**Hemolysis**
BAP without inoculum	no growth	No growth
Sheep's blood	medium to large, smooth, slightly raised and translucent	Beta
Washed expired blood	medium to large, smooth, slightly raised and translucent	Beta
Unwashed expired blood	large, smooth and raised	Gamma
Unwashed fresh blood	medium and flattened colonies	Gamma
Washed fresh blood	large, smooth and green colonies	Partial beta

Table 3 shows the differences in growth of *Staphylococcus aureus* in four different blood agars. Each blood agar was tested in multiple trials. In sheep's

blood agar, the appearances of the colonies of *Staphylococcus aureus* were medium to large, smooth, slightly raised, and translucent as expected for the said bacterial specie as shown in figure 4.3 (Forbes et al., 2007). In the unwashed expired and fresh human blood shown in figures 4 and 5, different patterns were observed, which could be attributed to the interferences still present in the agars.

In washed fresh blood shown in figure 6, the result was unique. The morphologic characteristics of the isolate were slightly expressed but the hemolysis was not complete. No growth of organisms was observed on BAP with washed expired human blood, which was not inoculated with the test organisms. This indicates that the prepared blood agar plates were not contaminated. This study suggests that maybe adenosine triphosphate level in the blood plays a role in hemolysis.

When red blood cells are ATP-depleted, calcium and sodium are allowed to accumulate intracellularly, and potassium and water are lost, resulting in dehydrated rigid cell that decreases red blood cell survival (Harmening, 2007).

This low survival is increased hemoglobin presence in the agar extracellularly. The accumulation of hemoglobin during the growth of bacteria results in the formation of different hemolysis patterns (Henry, 2001).

In unwashed fresh blood agar, gamma hemolysis was observed probably because the ATP level was still high, which means most of the cells were still intact. In unwashed expired blood agar, gamma hemolysis was observed that could be due to the presence of interferences, thus hindering the flourishing of the isolates. The washed fresh blood agar displayed partial beta hemolysis due to the combination of ATP levels and washing. Its ATP levels were high, resulting in cells that were intact with hemoglobin kept inside. The interferences were removed through washing, thus allowing the bacteria to grow more easily but not abundantly. In washed expired blood agars, the ATP level was low plus washing allowed the microorganisms to abundantly grow.

This suggests that washing removes interferences for microbial growth. Both unwashed expired and fresh human blood show gamma hemolysis due to the interferences still present in them. Washed expired human blood produces beta hemolysis due to the removal of interferences plus the low ATP level that indicates low red blood cell survival, which means easy hemolysis for the red cells. Washed fresh human blood produces a partial beta hemolysis due to the removal of interferences, but can hardly makea full beta hemolysis due to high ATP levels that leave the red blood cell survival higher.

Figure 3
S. aureus in sheep's blood

Figure 4
S. aureus in unwashed expired blood

Figure 5
S. aureus in unwashed fresh human blood

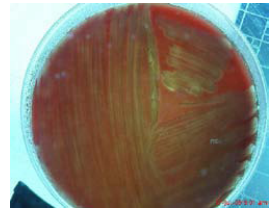

Figure 6
S. aureus in washed fresh human blood

Table 4. Growth characteristics of *Staphylococcus epidermidis* in different culture media

Blood agar	Cultural Characteristics	Hemolysis
BAP without inoculum	no growth	No growth
Sheep's blood	white raised colonies	Gamma
Washed expired blood	white raised colonies	Gamma
Unwashed expired blood	white raised colonies	Gamma
Unwashed fresh blood	white raised colonies	Gamma
Washed fresh blood	white raised colonies	Gamma

Table 4 presents the morphologic and hemolytic pattern of *Staphylococcus epidermidis* in different blood agars. The results were all the same because of the fact that this microorganism is naturally a gamma hemolytic organism (Delost, 2004). No growth of organisms was observed on BAP with washed expired human blood, which was not inoculated with the test organisms. This indicates that the prepared blood agar plates were not contaminated. Sample pictures are shown in Figure 7 to 10.

Figure 7
S. epidermidis in sheep's blood

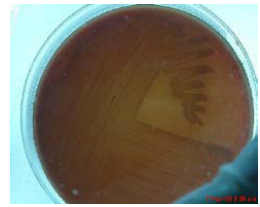

Figure 8
S. epidermidis in unwashed expired human blood

Figure 9
S. epidermidis in unwashed fresh human blood

Figure 10
S. epidermidis in washed fresh human blood

III. Stability of Washed Expired Human Blood Agar

The researchers decided to test the stability of washed expired human blood when stored in a refrigerated temperature for one week.

Table 5. Stability test for washed expired human blood with *Staphylococcus aureus*

Length of Storage (Days)	Result
With sheep blood	With growth
BAP without inoculum	No growth
1	With growth
2	With growth
3	With growth
4	With growth

5	With growth
6	With growth
7	With growth

Table 5 presents the length of time the blood agar prepared with washed expired human blood and be stored and still retains its capacity to grow microorganisms. From Day 1 to Day 7, colonies of *S. aureus* were observed. As revealed, washed expired human blood could be stored for seven days and still could be used for microbial culture. No growth of organisms was observed on BAP with washed expired human blood, which were not inoculated with the test organisms. This indicates that the prepared blood agar plates are not contaminated. Figure 11 to 13 are samples of growth on Day 5 to Day 7.

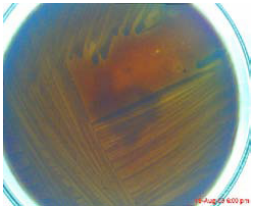

Figure 11
S. aureus in Day 5

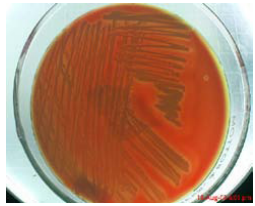

Figure 12
S. aureus in Day 6

Figure 13
S. aureus in Day 7

CONCLUSIONS

Results reveal that expired human blood with washing improved the morphologic and hemolytic pattern of *Staphylococcus aureus.* The washing of blood had no effect on *Staphylococcus epidermidis* because it is a gamma hemolytic bacterium. Both unwashed expired and fresh human blood produced gamma hemolysis due to the interferences still present in them. Both washed expired human blood and washed fresh human blood produced beta hemolysis. Washed expired human blood could be stored for seven days and still could be used for microbial culture.

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Investigating the Protective Effect of *Solanum melongena*

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Abstract - The aim of this study is to investigate the protective effect of *Solanum melongena* (*S. Melongena*). Different solvent were used to extract the fractions. Antiplatelet activity was monitored using dual channel Lumi aggregometer, antioxidant enzymes were measured using kits purchased from RANDOX, UK while calcium channel blocking activity was screened on guinea pig ileum using isolated organ bath assembly. Aqueous fraction, Ethyl acetate fraction and Chloroform fraction potently inhibited platelet aggregation, antioxidant and calcium channel

blocking activity respectively. These results indicated that all fractions of *S. Melongena* possesses antioxidant properties but aqueous fraction posses both AA and PAF antiplatelet activity and chloroform fraction acts as calcium channel blocker. We hypothesized that fractionation process may be responsible for the modification of the active compounds present in the extracts of *S. Melongena* and hence for their respective properties. Moreover, PAF aggregation cycle molecules which are involved in blocking may not be soluble either in ethyl acetate or chloroform.

Keywords - solanum melongena, platelet aggregation, antioxidant, calcium channel blockers, traditional medicine

INTRODUCTION

Traditional Use

The use of medicinal plants in therapeutics or as dietary supplements goes back beyond recorded history, but has increased substantially in the last decades (Woods, 1999; Khan et al., 2001; WHO, 2002). Plants having medicinal values are generally designated as medicinal plants (Iwu, 1986). *S. Melongena* (Brinjal; Solanaceae), a culinary vegetable that is also considered as medicinal plant, has been used in the Indian system of medicine for centuries. Various parts of the plant are useful in the treatment of inflammatory conditions, cardiac debility, neuralgia, ulcers of nose, cholera, bronchitis and asthma (Warrier et al, 1996). Its antioxidant (Sudheesh et al, 1999, Noda et al, 1998; 2000), CNS depressant (Vohera et al, 1984), analgesic (Mutalik et al, 2003) and hypolipidemic (Sudheesh et al, 1997) activities have already been reported.

Known Pharmacological Activity

Although Sudhesh et al. (1999) reported antioxidant activities of *S. Melongena;* however, it is likely that the plant possesses additional antioxidant enzymes. Over the past two decade or so, considerable evidence has been gathered in support of the hypothesis that free-radical–mediated oxidative

stress processes and specific products arising from them play a key role in the pathogenesis of a number of diseases. Low levels of total antioxidant status(TAS) has been reported in liver damage, myocardial infarction and angina pectoris (Mitrevky. et al., 1996), cancer (Salgo et al. 1997), diabetes (Maxwell et al., 1997), rheumatoid arthritis (Salgo et al., 1997) and in male infertility (Gavella et al., 1996). Low levels of glutathione peroxidase(GPx) may increase the incidence of cardiovascular diseases, such as Keshan disease and atherosclerosis (Baines et al., 1997). Super oxide dismutase (SOD) low level has been reported in patients suffering from angina pectoris and myocardial infarction (Sushil et al., 1995; Vukelic et al., 1997). These diseases are the major cause of morbidity and mortality in mankind and no longer exclusive to the industrialized nations but also affect developing countries such as Pakistan.

RATIONALE OF THE STUDY

In developing countries, remedies prepared by a traditional healer from plants of the local flora are the only drugs available for a large number of people. In Pakistan, for example, there are at least 45,000 traditional healers of whom about three-quarters are practicing in rural areas. This figure has not changed significantly over the years. Over 70% of the countries's population relies upon herbal remedies. However, these traditional remedies have not been widely investigated scientifically, mainly because of the lack of proper communication between traditional and modern health professionals, absence of modern technology, and a shortage of qualified scientists in the field of Natural Products Pharmacology.

More recently we have seen a revival of interest at a global level in the natural products for the health care. World Health Organization has emphasized the importance of scientific evaluation into the indigenous herbal remedies. In many countries of the world, native medicinal plants are looked upon as a possible addition to WHO list of "Essential Drugs" once their value has been clinically proven. Pakistan is rich in herbal wealth and a large number of medicinal plants grow abundantly particularly in the Northern areas (Nasir and Ali, 1972). It is likely that scientific studies for the exploration of new drugs from indigenous sources may yield fruitful results. This study aimed at exhibiting the effects of *S. Melongena* on oxidative stress induced pathogenesis. For that purpose, we investigated antiplatelet, antioxidant and calcium channel blocking potential of *S. Melongena* in different fractions.

MATERIALS AND METHODS

Plant Material

S. Melongena was procured from the market. Fruit part collected weighed approximately 5 Kg. identification was carried out by Dr. Humaira gul (Department of Botany, Faculty of Sciences, University of Karachi, Pakistan). A specimen has been kept in our laboratory for future reference. Fruit pulp at room temperature was mashed and stored in a tightly closed container for future use.

Preparation of plant extracts

Mashed fruit was soaked in 5 lit 70% aqueous methanol for 3 days with occasional shaking. It was then filtered through a muslin cloth and then through a Whatman qualitative Grade 4 (20–25 μm) filter paper. This procedure was repeated thrice and the combined filtrate was evaporated on a rotary evaporator under reduced pressure to a thick, semi-solid mass of dark brown color, the crude extract. Fractionation of the crude extract was done by standard phytochemical procedures using different organic solvents (Williamson *et al.*, 1998). A known quantity of the crude extract (50 g) was dissolved in 50ml distilled water. This was then introduced in a separating funnel. Ethyl acetate (50 ml) was then added into the same separating funnel. This mixture was shaken vigorously, regularly allowing the air to escape out. It was kept for about 30 min to let the two layers separate. The upper layer of ethyl acetate was acquired and the same procedure was repeated twice and all the ethyl acetate layers were collected and concentrated in a rotary evaporator to obtain the ethyl acetate fraction (EtAc). Chloroform (50 ml) was then added to the remaining layer and the same process was repeated as with ethyl acetate, finally obtaining the chloroform fraction (Chlm). The yield of both fractions was 20% and 25%, respectively, while the remaining layer was the aqueous layer (Aq).

Chemicals and Reagents

Verapamil, aspirin, vitamine C, arachidonic acid(AA), platelet activating factor(PAF), hydrogen peroxide ($H_2O_{2)}$ and sodium citrate were purchased

from Sigma Chemical Company, St Louis, MO, USA. Kits for antioxidant enzymes (superoxide dismutase (SOD), glutathione peroxidase(GPx) and total antioxidant status(TAS)) were purchased from RANDOX, UK.

All chemicals used were of the highest purity grade. Stock solutions of all the chemicals were made in distilled water and the dilutions were made fresh in normal saline on the day of the experiment.

Solution

Tyrod's solution in mM [KCl 2.7, NaCl 136.9, $MgCl_2$ 1.1, $NaHCO_3$ 11.9, NaH_2PO_4 0.4, glucose 5.6 and $CaCl_2$ 1.8 (pH 7.4)]. For making solution of PAF, we used *2mg/via,l which is 3.83 mM, dissolved and diluted (1:100) in saline to make 38.3 μM. 5-10 μL of this is added to PRP to cause aggregation.*

For making solution of AA, we used *20 μL of ethanol, 730 μL of 0.2% sodium carbonate (W/V in water) was added to a vial of AA (10 mg,) which gave 40.6 mM stock solution. A maximum of 20 μL was used to induce aggregation.*

Animals

Experiments were performed according to animal ethic rules of Aga khan University. Local Guinea pigs (1.5–2 kg) of either sex were used in the study, and were bred and housed in the animal house of The Aga Khan University under controlled environment (23–25 ˚C). Animals were exposed to regular dark and light cycles. Animals were given tap water *ad libitum* and a standard diet consisting of (g/kg): flour, 310; choker, 310; molasses, 12; salt, 5.8; nutrivet L, 2.5; potassium metabisulphate, 1.2; vegetable oil, 38; fish meal, 170; and powdered milk, 150.

BIOLOGICAL ACTIVITY EXAMINED

Preparation of platelets

Blood was taken after getting human ethic approval. Samples were collected from human blood via venepuncture from normal volunteers reported to be free of medication for 7 days. Blood samples were mixed with 3.8 % (w/v) sodium citrate solution (9:1) and centrifuged at 260g for 15min at 20°C to obtain platelet rich plasma (PRP). The remaining blood samples were

centrifuged at 1200g for 10 min to obtain platelet poor plasma (PPP). Platelet count was determined by phase contrast microscopy and all aggregation studies were carried out at 37°C with PRP having platelet counts between 2.5 and 3.0 x 10^8 ml^{-1} of plasma (Fatima Shad and Saeed, 2007).

Measurement of platelet aggregation

Aggregation was measured by Dual-channel Lumi- aggregometer (Model 400 Chronolog Corporation, Chicago, USA) using 0.45 ml aliquots of PRP (Shah and Saeed, 1995; Shah et al., 1996). The final volume was made up to 0.5 ml with the plant fraction, dissolved either in normal saline or appropriate vehicle known to be devoid of any effect on aggregation. Aggregation was induced by using AA/PAF. The anti-aggregatory effects of plant fractions were studied by incubating PRP with various plant fractions for 1 min followed by the addition of aggregating agents. The resulting aggregation was recorded for 5 minutes after the challenge, by the change in light transmission as a function of time. Once the anti-platelet activity of various fractions against agonists was established, dose-response curves were constructed to calculate the $1C_{50}$ values of the various plant fractions.

Measurement of Total Antioxidant Status (TAS)

TAS was measured in human plasma using commercially available kits from RANDOX, UK and assays were carried out on spectrophotometer DU 800 (Beckmann, USA). The assay to measure TAS levels was conducted as described by Mitrevky and his Colleagues (Mitrevky et. al., 1996). After adding all the chemicals, test fraction was added before the addition of substrate at the end. The concentration was then observed by measuring absorbance at 600nm. This assay relies on the ability of antioxidants in the plasma to inhibit oxidation of 2,2' azino-bis-[3-ethylbenz-thiazoline-6-sulfonic acid] (ABTS) to $ABTS^+$ by metmyoglobin. The amount of $ABTS^+$ produced was monitored by reading the absorbance at 600 nm. Under these reaction conditions, the antioxidants in the plasma cause suppression of the absorbance at 600 nm to a degree that is proportional to their concentration. The final plasma antioxidant concentration was obtained using the following formula:

Antioxidant concentration (mmol/L) = Factor x absorbance of blank - absorbance of sample

Where,

Factor = concentration of standard / absorbance of blank - absorbance of standard

Measurement of Glutathione Peroxidase Activity

GPx levels were determined using commercially available kits from RANDOX, UK and assays were carried out on spectrophotometer DU 800 (Beckmann, USA). After adding all the chemicals, test fraction is added before the addition of substrate at the end. The absorbance at 340nm was then measured. In this assay,

GPx was measured by coupling the peroxidase reaction with the reduction of oxidized glutathione by glutathione reductase and NADPH (Paglia et. al., 1967). t-Butyl-hydroperoxide (hydrogen peroxide or tert-butyl hydroperoxide) reduction was followed by the decrease in absorbance of NADPH at 340 nm. Activity was evaluated using GSH as the cosubstrate (Paglia et al., 1967).

Measurement of Superoxide Dismutase Activity

SOD activity was determined using commercially available kits from RANDOX, UK and assays were carried out on spectrophotometer DU 800 (Beckmann, USA). SOD activity assay was conducted as described by Oyanagui and his colleagues (Oyanagui et. al., 1984). After adding all the chemicals, test fraction was added before the addition of substrate at the end. The absorbance at 505nm was then measured. The method employed xanthine and xanthine oxidase to generate superoxide radicals, which reacted with 2-(4-iodophenyl)-3-(4-nitrophenol)-5-phenyltetrazolium chloride (INT) to form a formazane dye. The SOD activity was then measured by the degree of inhibition of this reaction. One unit of SOD caused a 50% inhibition of the rate of reduction of the INT under the condition of the assay.

Tissue preparation Experiments for Calcium Channel Blocking Activities:

The tissue experiments were carried out as described previously (Kulkarni, 2004). The animals had free access to water but were fasted for 24 h before the experiment. The animals were killed by cervical dislocation, the abdomen was cut open and the ilium was isolated. Preparations were mounted in 10 mL tissue baths containing Tyrode's solution maintained at 37°C and aerated

with a mixture of 5% carbon dioxide in oxygen (carbogen). The composition of Tyrode's, in mM, was: KCl 2.7, NaCl 136.9, MgCl2 1.1, NaHCO3 11.9, NaH2PO4 0.4, glucose 5.6 and CaCl2 1.8 (pH 7.4). A preload of 1 g was applied and the tissues were incubated for 30 min, after which control responses to a sub maximal dose of acetylcholine (0.3μM) were obtained and the tissue was presumed stable only after two consecutive doses of acetylcholine produced equal responses. After stabilization, plant fractions were investigated for calcium channel blocking activity; KCl was used as agonist (80 mM final bath concentration).

Statistical analysis

All the data expressed was analyzed using the mean ± standard deviation (SD). The statistical parameter applied was $p < 0.05$, noted as significantly different.

RESULTS

Anti-Platelet Activity:

Each solvent fraction (Aqueous [Aq] fr., 55% Chloroform [Chlm] fr 25%. Ethyl acetate [EtAc] fr 20%) from fruits of *S. Melongena* was tested for anti platelet activity. Platelet aggregation was induced by AA and PAF, both are strong platelet aggregators.

When Aq fraction of *S. Melongena* was screened for antiplatelet activity, it inhibited AA-induced platelet aggregation in a dose-dependent manner showing a value of 88% inhibition at 10 μg/ml dose with an IC_{50} of 3.24±0.35 μg/ml. For PAF-induced aggregation, this fraction was slightly less potent exhibiting 91% inhibition at a dose of 40 μg/ml with IC_{50} of 18.35±2.735 μg/ml. (Table1). Similarly, the Chlm fraction of *S. Melongena* showed strong antiplatelet activity induced by AA in a dose-dependent manner with IC_{50} of 12.78±3.25 μg/ml with a maximum inhibition of 86% at 50 μg/ml. Chlm fraction did not exhibit any inhibition up to maximum concentration in PAF-induced aggregation. Whereas, EtAc exhibited inhibition of AA-induced platelet aggregation between the range of 100 – 500 μg/ml with IC_{50} value of 183±31 μg/ml And has no effect on PAF induced aggregation.

Anti Oxidant Activity:

All fractions of *S. Melongena* were tested for their antioxidant activities including TAS, GPx and SOD. Before testing the extracts, TAS, GPx and SOD were measured in normal plasma, stress and with standard (Table 2(a)). After that, were measured the values of TAS, GPx and SOD in different fractions of the *S. Melongena* as shown in Table 2(b). All fractions doses dependently increased the antioxidant enzyme activities of *S. Melongena,* particularly; ethyl acetate fraction showed relatively higher antioxidant enzymes activity as compared to other fractions. At a maximum dose of 5 mg/ml, total fraction of EtAc activated TAS; GPX and SOD levels were 1.76 mmol/L, 8469 U/L and 218 U/ml, respectively. Whereas, for other fractions, maximum dose was 20 mg/ml for Chlm giving the values of 1.61 mmol/L, 7852 U/L and 197 U/ml for TAS, GPX and SOD respectively. For Aq fraction, TAS, GPx and SOD, activities at maximum concentration of 10mg/ml gave the values of 1.65 mmol/L , 8216 U/L and 203 U/ml, respectively.

While comparing the activities of all fractions at 5 mg/ml, SOD Aq fraction was 10% and Chlm fraction was 25% less effective than EtAc. Similar results were found with GPx and TAS.

Calcium Channel Blocking Activities:

Calcium channel blocking activities could not be measured in the plasma due to the lack of spectrophotometer sensitivity and unavailability of the specific filters. For that reason, these activities were measured in smooth muscle tissue using organ bath. The inhibitory effects of plant fractions (Aq, Chlm & EtAc) on calcium channel activity were studied against agonist-induced contractile responses. KCl produced submaximal contractions at (0.3μM). Pretreatment of tissue with plant fractions (0.3 mg/ml) caused approximately 5% and 85% inhibition (in Aq & Chlm respectively) of KCl responses (Table. 4). Next higher concentraction (1 mg/ml) further suppressed the agonist contractile responses to 7% and 85% inhibition (in Aq & Chlm respectively). Similarly, pretreatment of tissue with plant fractions at 5 mg/ml & 10 mg/ml concentrations caused 16% and 23% inhibition, respectively in Aq fraction and 87% and 89% inhibition in Chlm fraction respectively, There was no inhibition with EtAc fraction at any contraction. This inhibitory effect of the plant extract was reversible on wash out as the tissue regained its initial

sensitivity to agonist after 3-5 washings and testing the agonist response between washings.

DISCUSSION

Blood platelets are involved in many physiological events, including hemostasis. However, their dysfunction contributes to the development and progression of a number of cardiovascular diseases, including arterial hypertension, atherosclerosis, and thrombosis. Our results indicated that all fractions of *S. melongena* significantly reduced AA-evoked platelet aggregation in a concentration-dependent manner. Among the different fractions of *S. melongena,* the aq. fraction showed the highest inhibitory effect against AA-induced aggregation as compared to Chlm and EtAc fractions. Aq. fraction also inhibited the PAF-induced platelet aggregation while Chlm and EtAc fraction were ineffective. This is in line with many other studies where the Aq. fraction of plant demonstrated antiplatelet activity against PAF while other fractions of the same plant failed to inhibit PAF-induced platelet aggregation (Hui-chun hsu et al., 2006; Lee HS, 2006). It is interesting to note that all three fractions were much more potent than standard (Aspirin) as anti-aggregatory agents. Other studies have also shown the presence of plant constituents more potent than Aspirin (Lee HS, 2006).

Inhibition of both AA and PAF platelet aggregation by Aq. fraction suggested the presence of at least two compounds or two types of compounds i.e. one inhibiting AA-induced aggregation and the other PAF- induced aggregation. Alternatively, it is also possible that both of these inhibiting activities were performed by a single compound, as both AA and PAF activate PKC and IP_3 downstream of their receptor and, therefore, any compound blocking this pathway will inhibit both AA- and PAF-induced aggregation.

All three fractions of *S. melongena* exhibited antioxidant activities as indicated by the elevated levels of GPx, SOD, and TAS with EtAc fraction being the most potent. These activities might be due to phenolic compounds and flavonoids, which have previously been reported in *S. melongena* (Nisha et al, 2009; & Noda et al, 2000). Studies with other plants also revealed the presence of antioxidants in the EtAc fractions (Kurian et al., 2010; Farhana et al., 2009). Aq. and Chlm fractions, though not as potent as EtAc fraction elevated the antioxidant enzyme levels with maximum effects on 10 mg/ml and 20 mg/ml, respectively. Many reports have shown the antioxidant activities of this plant

present in Aq. (Jubuncic et al., 2005) and Chlm fraction (Joseph et al., 2009).

Many pathophysiological conditions like achalasia, myocardial ischemia, and bronchial asthma are associated with aberrant smooth muscle contraction. This study demonstrated the spasmolytic activities of different fractions of *S. melongena* using guinea pig ilium. To reveal the possible mechanism for this spasmolytic effect, a high dose of K^+ (80mM) was used to obtain sustained contractions, which were inhibited by different fractions of *S. melongena* at a dose between 0.03–10 mg/ml. This inhibition of K- induced contraction in guinea pig ilium (K- induced contraction is a result of the opening of calcium channels) was similar to that of verapamil, a standard calcium channel blocker. It is well known that the contraction of smooth muscle is dependent upon an increase in the cytoplasmic free [Ca^{++}], which activates the contractile elements (Karaki and Wiess, 1988; Karaki et al., 1997).

The increase in intracellular Ca^{++} may occur either via its release from intracellular stores in the sarcoplasmic reticulum (Godfraind et al., 1986). As discussed in the section in platelet aggregation, *S. melongena* may possess compounds that inhibit PKC and IP_3 pathway, the same phenomenon may explain the calcium channel blocking effects in guinea pig ilium. Alternatively, the inhibition of the spontaneous contractions by the plant fractions might have occurred via blockade of calcium entry through the VDCs.

As revealed in this study, each of the three fractions possessed components having at least one potent activity. Aqueous fraction seemed to possess the most potent antiplatelet activity against both AA- and PAF-induced platelet aggregations. Ethyl acetate is most effective in elevating the levels of antioxidant enzymes while chloroform fraction the most potent spasmolytic activity in guinea pig ileum.

CONCLUSION

In conclusion, the results of this study suggest that the fractions of *S. melongena* (aqueous, chloroform and ethyl acetate) possess antiplatelet, antioxidant, and calcium channel blocking activities. However, we do not know which compounds in the plant fractions show these activities or which signaling pathways are involved. Detailed studies on chemical composition of the plant fractions, as well as different signaling pathways, are necessary to further explain other mechanism. The findings of this study support the view that *S. melongena* is a promising source of antioxidants and may be efficient as

preventive agent in some diseases. The generated data may enhance the basic understanding of *S. melongena* extract as antioxidant, antiplatelet, and calcium channel blocker.

SIGNIFICANCE, APPLICATION AND IMPLICATIONS

Cardiovascular diseases such as thrombosis, myocardial infraction, and atherosclerosis are the major cause of morbidity and mortality in mankind and no longer exclusive to the industrialized nations but also affect developing countries such as Pakistan. Indeed, the migrant population of Indo-Pak Sub-Continent was found to be at high risk of cardiovascular diseases compared to the indigenous Europeans in a recent survey done in U.K. (Laws et al., 1994). Pharmacotherapy of such diseases usually requires life-long treatment, which is not only expensive and beyond the reach of a common man but also fails to provide complete cure against certain disorders. Therefore, we investigated these biological activities on this indigenous medicinal plant.

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Flow Chart: Extraction / Fractionation Procedure

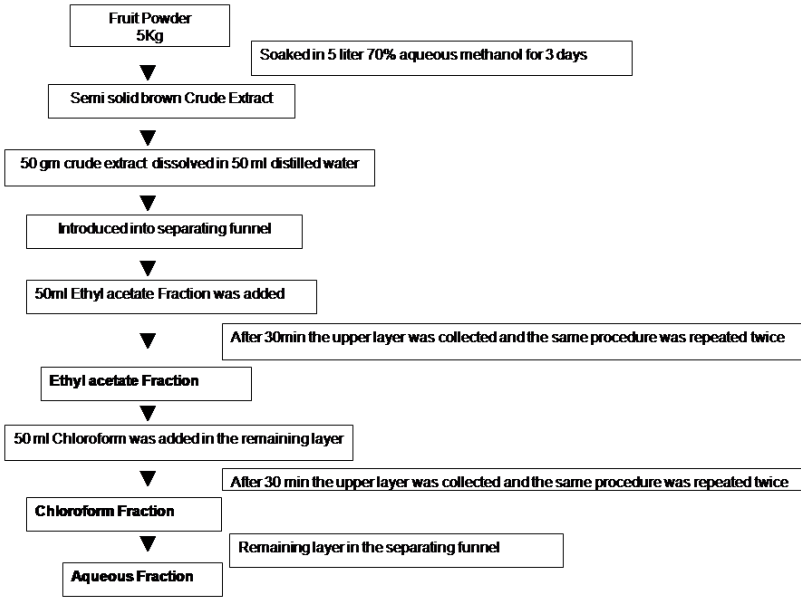
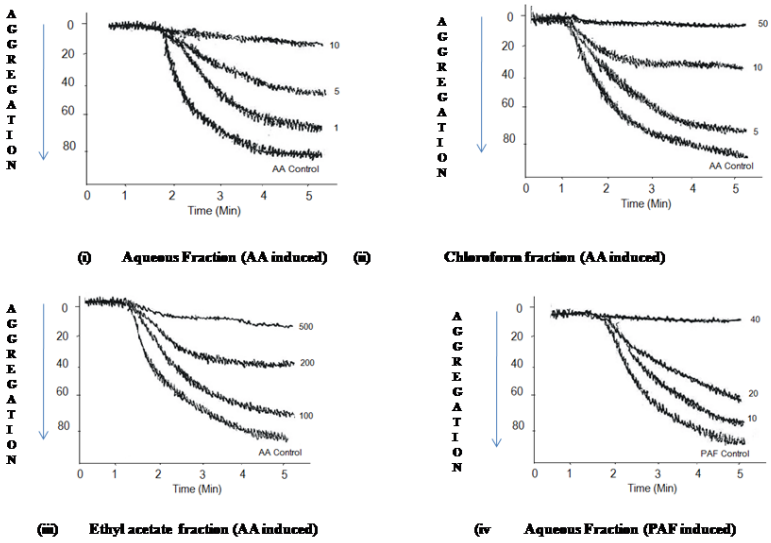


Table: 1. Anti Platelet Activities of Different Fractions of *S. Melongena*

CHEMICALS	ARACHIDONIC ACID (AA) n=5			PLATELET ACTIVATING FACTOR (PAF) n=5		
	Concentrations	Inhibition percentage (%)	IC_{50} Value	Concentrations	Inhibition percentage (%)	IC_{50} Value
Aspirin	10mg/ml 20mg/ml 40mgml	5% 93% 98%	13.12±2.19 mg/ml	10mg/ml 20mg/ml 40mg/ml	23% 76% 97%	15.34±2.35 mg/ml
Aq fraction	1 µg/ml 5 µg/ml 10 µg/ml	43% 61% 88%	3.24±0.35 µg/ml	10 µg/ml 20 µg/ml 40 µg/ml	28% 62% 92%	18.35±2.735 µg/ml
Chlm fraction	5 µg/ml 10 µg/ml 50 µg/ml	28% 55% 86%	12.78 ±3.25 µg/ml	NA NA NA	NA NA NA	NA
EtAc fraction	100 µg/ml 200 µg/ml 500 µg/ml	29% 71% 90%	183±31 µg/ml	NA NA NA	NA NA NA	NA

Fig: 1a. Anti Aggregatory Effect of Different Fractions of *S. Melongena*



(i) Aqueous Fraction (AA induced) (ii) Chloroform fraction (AA induced)

(iii) Ethyl acetate fraction (AA induced) (iv Aqueous Fraction (PAF induced)

Table: 2a. Measurements of Anti Oxidant Activities in Plasma Using RANDOX Kit

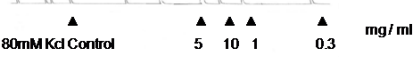
	ENZYMES ACTIVITIES		
Conditions	**TAS (mmol/L)**	**GPx (U/L)**	**SOD (U/ml)**
Normal	1.20±0.18	5187±590	170±16
Standard (vit C, 100 µg/ml)	1.80±0.14	8769±632	223±19
Stress (H_2O_2, 0.3 µM)	1.02±0.15	3923±530	137±24

Table: 2b. Anti Oxidant Activities of Different Fractions of *S. Melongena* in Plasma Using RANDOX kit

FRACTIONS	Concentrations mg / ml	TAS mmol/L	IC_{50} Value mg / ml	GPx U/L	IC_{50} Value mg / ml	SOD U/ml	IC_{50} Value mg / ml
Aqueous Fraction:	1	1.37±0.23	4.1±0.9	6075±675	3.9±0.9	182±15	4.3±1.1
	5	1.49±0.19		7280±819		193±15	
	10	1.65±0.20		8216±923		203±19	
Chloroform Fraction:	5	1.29±0.17	10.13±2.1	5865±534	9.2±1.7	172±13	7.67±2.3
	10	1.40±0.26		6509±517		182±11	
	20	1.61±0.28		7852±829		197±17	
Ethylacetate Fraction:	1	1.41±0.14	1.31±0.26	6208±423	1.46±0.37	186±15	1.52±0.31
	2	1.63±0.21		7570±650		201±13	
	5	1.76±0.26		8469±578		218±15	

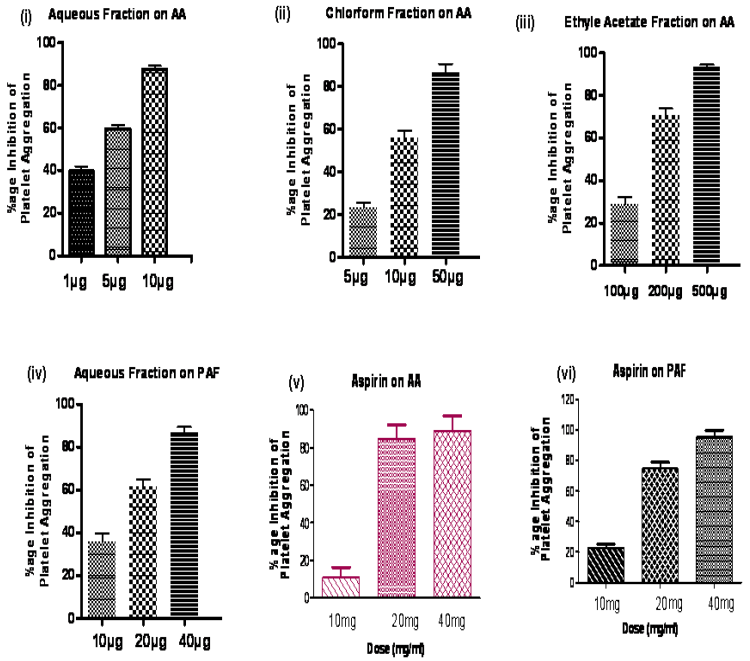
Table: 3. Calcium Channel Blocking Activities in Smooth Muscle in different fractions of *S. Melongena* Using Organ bath

FRACTIONS	CHEMICAL / DOSES	RESPONSE (mm)	Inhibition percentage (%)	IC_{50} Value
Aqueous Fraction:	KCl 80mM	43 mm		
	Verapamil 1mM	1.2 mm	97.2 %	
	0.3 mg/ml	41 mm	4.65 %	
	01 mg/ml	40 mm	7 %	
	05 mg/ml	36 mm	16.27 %	
	10 mg/ml	33 mm	23.25 %	
Chloroform Fraction:	KCl 80mM	42.2 mm		
	Verapamil 1mM	1.2 mm	95.34 %	
	0.3 mg/ml	6.4 mm	84.834 %	
	01 mg/ml	6.4 mm	84.834 %	
	05 mg/ml	5.5 mm	86.967 %	
	10 mg/ml	4.6 mm	89.099 %	
Ethylacetate Fraction:	KCl 80mM	NA	NA	NA
	Verapamil 1mM			
	0.3 mg/ml			
	01 mg/ml			
	05 mg/ml			
	10 mg/ml			



Typical tracing showing inhibitory effect of *S. Melongena*. on the contractions in isolated guinea pig ilium preparations.

Fig: 1b. Anti Aggregatory Effect of Different Fractions of *S. Melongena*



LEGENDS:

Flow Chart: Extraction / Fractionation procedure

Flow chart regarding phytochemical procedure for the extraction of *S. Melongena* by using different organic compounds we obtain the 20% Ethyl acetate fraction, 25% Chloroform fraction and 55% Aqueous fraction.

Table: 1. Anti Platelet Activities of Different Fractions of *S. Melongena*

This table exhibits concentration dependent inhibition of platelet aggregation induced by AA & PAF by using different fractions of *S. Melongena*. When compare with the standard (aspirin), we found that aqueous (Aq) fraction is of highest efficacy exhibiting IC_{50} Value of 3.24±0.35 µg/ml followed by ethyl acetate (EtAt) fraction with an IC_{50} of 183±31 µg/ml and chloroform(Chlm) fraction with an IC_{50} of 12.78±3.25 µg/ml in the AA induced aggregation. Whereas PAF induced patelet aggregation the only fraction which exhibits

any antiplatelet activity is of aqueous (Aq) fraction which gives the IC_{50} of 18.35±2.735 μg/ml

Fig: 1a. Anti Aggregatory Effect of Different Fractions of *S. Melongena*
The chart record exhibits the concentration dependant inhibitory effects of different fractions of *S. Melongena*. (i) Aq (ii) Chlm (iii) EtAc in AA induced aggregation. Whereas in (iv) we are looking at the anti aggregatory effect of Aq fraction on PAF induced platelet aggregation. Other fraction does not show any effect on PAF induced platelet aggregation.

Fig: 1b. Anti Aggregatory Effect of Different Fractions of *S. Melongena*
Similar results like that of fig (a) in the form of Bar diagram. AA and PAF induced activity of Aq, Chlm and EtAc fractions at different concentrations (1 - 500 μg/ml) using platelet aggregation assay. Data represent the mean ± SD (n = 5).

Table: 2a. Measurements of Anti Oxidant Activities in Plasma Using RANDOX Kit
Table shows the antioxidant enzyme activities in normal, standard and stress condition by using RANDX kit.
Table: 2b. Anti Oxidant Activities of Different Fractions of *S. Melongena* in Plasma Using RANDOX kit

Table shows the inhibition of different enzyme activities at various concentrations by Aq. Chlm. & EtAc. Fraction of *S. Melongena* with IC_{50} Value of each fraction for each antioxidant activity. Significant differences are found to be present at 5mg/ml EtAc being most potent and close to standard.

Table: 3. Calcium Channel Blocking Activities in Smooth Muscle in different fractions of *S. Melongena* Using Organ bath

Table exhibits calcium channel blocking activities induced by KCl using standard (verapamil) and different fractions of *S. Melongena.* Out of 3 fractions Chlm fraction shows maximum potency which is close to standard (verapamil). n = 5. Inset exhibits a typical trace showing the inhibitory effect of Chlm fraction of *S. Melongena* on the contraction KCl induced calcium channel blocking activity.

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