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Aim and Scope

The aim of the Research Journal is to provide a venue for the publication of research studies of the various units of the Davao Medical School Foundation, Inc. It responds to the need for a venue to publish on a frequent basis and reach a wider readership particularly for the dissemination of research findings.

Table of Contents

The Badjao Concepts of Health and Health Service Utilization <i>Jessievilita C. Fabian, MD, MCH</i>	1-12
--	------

Acute Toxicity Dose in Mice, Approximate Effective Dose, Effective Dose (ED ₅₀) and Bioassay of Calabash (<i>Crescentia cujete</i>) Fruit Decoction as a Hypoglycemic Agent in Alloxan-induced Hyperglycemic Rabbits <i>Sittie Jebrailyn S. Amilhasan, et al.</i>	13-19
--	-------

Doctor-Patient Relationship: How Do Patients Perceive It? <i>Sheila Marie Quiachon-Hernandez, MD, FPCR, MHPed</i>	21-27
--	-------

Acute Toxicity Dose of Chayote (<i>Sechium edule</i>) Leaf Extract in Mice and Effective Dose (ED ₅₀) In Lowering Serum Uric Acid Level in Pyrazinamide-Induced Hyperuricemia in Rabbits <i>Francis Gerwin U. Jalipa, et al.</i>	29-38
---	-------

A Prospective Randomized Double-Blind Controlled Trial of the Effect of <i>Centella asiatica</i> Cream and Silver Sulfadiazine on Acute Superficial Wounds of Patients at Southern Philippines Medical Center <i>Charlie A. Clarion, RMT, et al.</i>	39-50
---	-------

ABSTRACTS

The Cut and Blackened Teeth of the Matigsalug • <i>Sandra Kay H. Alojado, et al.</i>	51
--	----

Pulmonary Function Test Results of First Year Medical Students Exposed to Formaldehyde • <i>Mikhail M. Olalo, et al.</i>	52
--	----

Phytochemical Screening, Acute Dermal Toxicity, and Approximate Effective Dose of Hibiscus rosasinensis linn Leaf Essential Oil as Topical Agent for Hair Growth on Male Albino Rabbits • <i>Katreena Galang, et al.</i>	53
--	----

From Birthing Facility to Home: The Story of Three Mothers • <i>Angeli Dominique Tupas, et al.</i>	54
--	----

Burnout among Medical Students in Davao Medical School Foundation, Inc. • <i>Justine Issa Yu, et al.</i>	55
--	----

Intestinal Helminthiasis among Children Aged One to Five Years Old • <i>Prasuna Pasagada, et al.</i>	56
--	----

Practices on Solid Waste Disposal • <i>Felipa Digamon, et al.</i>	57
---	----

Analysis of Water from Binugao Creek, Toril District, Davao City • <i>Maria Joy Arca, et al.</i>	58
--	----

Compliance to Mass Treatment for Schistosomiasis among Adults in Bunawan, Agusan del Sur • <i>Joey Albert R. Pinili, RN, MCH</i>	59
Quality Prenatal Care Intervention Plan for Pregnant Women in the Municipality of Pantukan • <i>Ma. Corazon S. Mendez, RN, MCH</i>	60
Dietary Assessment of Selected Hypertensive Employees of Davao Oriental State College of Science and Technology: A Case Study Series • <i>Jury Lyn P. Torreno, RND, MCH</i>	61
Impressions of Barangay Health Workers in Region XII on Kalusugan Pangkalahatan • <i>Dr. Venancio B. Ang</i>	62
Utilization of Prenatal Care Services in Poblacion Magpet, Cotabato • <i>Elena D. Laus, RN, MCH</i>	63

The Badjao Concepts of Health and Health Service Utilization

Jessievilita C. Fabian, MD, MCH

ABSTRACT: The limited access and use of health care services by the indigenous people pose a challenge in effectively assessing the health care system in terms of equitable delivery of quality health services to a large number of diverse ethnic populations of the country. Following a qualitative, descriptive research design, this study explored the concepts of health and health service utilization drawn from the narratives of 15 Badjao, aged 16 to 75 years old, who had established residence at New Canaan, Matina Aplaya, Davao City for at least a year. The reasons for non-utilization of health services were explored while recommendations to improve health service utilization from the socio-cultural perspectives of the Badjaos were identified. Findings revealed that the Badjao informants defined health as freedom from illness and regard illness as impairment of physical strength and mobility. Procrastination and a habit of social isolation delay health-seeking behaviors until the later stages of the disease. The informants included the following recommendations to improve health service utilization: provision of training to qualify Badjao BHWs, adequate health center facilities, supplies, and medical personnel, sustained health education program and community visits, and a health center facility for the Badjaos.

KEYWORDS: *Badjao, health concepts, health service utilization*

INTRODUCTION

Because of the great diversity of the indigenous population in the Philippines, equal access to health services to all segments of the population, though mandatory by virtue of national and international laws, poses a challenge to the country's health care system. Some available data suggest that the indigenous segment of the population is at higher risks of infirmity and has less access to health services. Limited data on the indigenous peoples' access and use of health care services, however, hamper any attempt by public health officials to realistically evaluate access and provision of quality care for the indigenous segment of the population (DOH, 2004).

Among the indigenous tribes in the country, the Badjaos are more visible because of their presence in the streets in destitute condition. In Davao City, it is common to see Badjao women roaming the streets to beg, a ragtag band of their malnourished children trailing behind them. This scenario reflects the disturbing reality of the Badjaos' extreme poverty. It appears that while free public health care may be within reach, the observable conditions of malnutrition and poverty suggest the Badjaos' continuing poor access to health services. If quality health care should be accessible to the indigenous people as mandated by law, it should start with the poorest group: the Badjaos in the city.

In order to provide adequate health services and improve health service utilization, it is imperative for the health service providers to understand fully the Badjaos' concepts of health and health care utilization. According to Hammoud et al. (2005), understanding the unique perspectives of the indigenous people is an essential component to providing culturally competent health care—a system that provides care that is culturally acceptable.

STATEMENT OF THE PROBLEM

The study specifically aimed to answer the following questions:

1. What are the Badjaos' concepts of health?
2. What are the Badjaos' perceptions and utilization of health services?
3. What are the Badjaos' recommendations to improve health service utilization?

REVIEW OF LITERATURE

The Badjao People

The Badjaos are popularly known as "Sea Gypsies" of the Sulu and Celebes Sea. According to Daug et al. (2013), the Badjaos adhere to their own ways of life and culture. They are culturally separated from mainstream Philippine society, thus limiting their access to health education and health care.

Compared with the other ethnic groups in the country, the Badjaos are the most socio-economically deprived people. Tamayo (2007) unequivocally characterizes the tribe without exception as the poorest—collectively and individually.

Health and Health Care Access of Indigenous People in the Philippines

The Department of Health (DOH) admits that its data on indigenous peoples are severely limited. Thus, without the crucial information on which to reckon its goals for service delivery, it is hard for the public health care system to set realistic targets even though professional consensus may have it that indigenous peoples have considerably higher risk than the total population. It appears that indigenous peoples do not fully utilize free public health services due to insufficient knowledge of existing services, as well as irregular and insufficient service providers and medical supplies (DOH, 2004).

Factors Affecting Access and Utilization of Health Services

Several factors influence utilization of health services (Shengelia et al., 2005). Among these are perceived need, distance, price, the opportunity cost of seeking care, cultural acceptability, perceived quality of a provider, and the individual's economic status. Even when the service is freely provided, individuals are not likely to seek an intervention unless there is a perceived need. Similarly, culture greatly affects help-seeking behavior. Culture provides by and large the patient's explanatory model of illness and influences his definition of the problem, how his illness will be expressed (somatically, behaviorally, or affectively), who should be consulted, and what treatment strategies are preferable (McGoldrick et al., 1982).

METHODOLOGY

Research Design

Following a qualitative descriptive design, this exploratory study culled interview transcripts for the concepts of health held by selected Badjaos as well as their reported health service utilization behaviors. It explored further their recommendations to improve health service utilization for the Badjao community.

Study Population and Sampling

The informants included five male and ten female members of the Badjao community in New Canaan, Matina Aplaya who had been known to be residing in the area for at least a year. Criteria for selection of respondents considered optimal representation of the Badjao across gender, civil status, age, and educational attainment.

Data Collection Procedure

Data were collected via in-depth key informant interviews (KII) using a semi-structured interview guide. While the interview questions were translated to Visayan, a Badjao interpreter was also present during the interviews for when there was a need to clarify.

The interview guide was pilot-tested among two selected volunteers from the community. Individual interviews were audio-recorded and lasted about 45 minutes each. The informants were given remuneration after the interview.

Data Analysis

The audio-recorded interviews were transferred into the recorder of a laptop computer and were meticulously transcribed verbatim. Jot notes were made during the first reading of the transcripts to ensure that the meanings of each sentence were understood. To generate the codes, every transcript was read again to identify closely related or recurring ideas and comments. These codes, with all supporting quotations, were grouped into related themes and analyzed in order to answer the research questions. Related studies were used to affirm the findings of the study.

Ethical Consideration

Prior to fieldwork, the research plan was first submitted to the Ethics Review Committee (ERC) of the Davao Medical School Foundation, Inc. to ensure the acceptability of its procedures in addressing the sensitivities of the target population. Upon the approval of the ERC, the researcher sought the endorsement of the Badjao community leader for the conduct of the study in New Canaan. With his help, the researcher was then able to access and initiate contact with potential participants and acquaint them with the purpose of the study. Those who were willing to participate were asked to sign a written consent before they were interviewed.

FINDINGS AND DISCUSSIONS

Demographic and Socio-economic Characteristics

Fifteen Badjao residents of New Canaan, Matina Aplaya in Davao City participated in this study. As mentioned earlier, there were five

males and ten females. Among the young adults, one was married (16 years old) while two (17 and 18, respectively) were single. There were two older persons, both widowed, and aged 60 and 75 years old, respectively. The seven middle-aged adults, aged 21 to 48 years old, were all married at the time of the interview. The average number of children per informant is six. One informant had 11 children.

Two of the informants completed 2nd year high school, two were high school graduates, two were elementary graduates, two have studied in the Alternative Learning System (ALS) for reading and writing, and the remaining seven had not attended any formal schooling. The men reported earning a living from fishing and pearl vending. Five of the female informants were unemployed while the other five sold fish and used clothing (*ukay-ukay*).

Concepts of Health and Illness

As can be derived from the Badjaos' responses on what a healthy person is, their general concepts of health have three dimensions: physical, psychological, and social.

Physical Health

From the point of view of the Badjao informants, a healthy person is one who is free from illness (*walay sakit*), has a physical constitution that is not weak (*dili luya*), is strong (*lagsik*), quick/active (*abtik*), and ambulant (*makalakaw-lakaw*). Built and appearance also characterize the health of a person. A healthy person is described as muscular (*bus-ok*), fat (*tambok*), and agile (*abtik mulihok*). A burly person is perceived to be healthy and a thin person (*payat*) is not healthy. One informant, however, understands that some unhealthy people may look physically healthy but may actually be suffering from a hidden illness such as diabetes, hypertension, and heart disease.

An unhealthy person, as opposed to a healthy one, is characterized by degrees of physical incapacitation impairing his normal ability to walk and work. They are seen as weak

(*luya luyahon*), lacking in appetite (*dili ganahan mukaon*), and bedridden.

Psychological Health

Psychological characteristics include attitudes, dispositions, and states of mind that people consider as indicators of good health (IPHIC, 2010). One Badjao informant described a psychologically healthy person as stress-free, having "no problem". This finding is consistent with the study conducted by the Institute of Primary Health Care (2010) on the concepts of health of the indigenous people in Compostela Valley.

An informant also believes that health connotes good and right attitude of people. When one is ill, his attitude will likely change. Sick people tend to have low energy levels, get easily irritated, and be psychologically disturbed.

"Kung magakit ka nang luya gani imong lawas, murag tapulan mulihok. Murag dali ra masuko" (If you are sick, your body is weak, you do not feel like moving. You are easily irritated). Jea, 16

Social Health

Social health connotes the ability to show concern and support to other people at all times (Gabay, 2008). An informant characterized a healthy person as one who is able to actively participate in important family events, such as weddings. Healthy people are enthusiastic and happy. They exude a sunny disposition, making them gregarious and sociable towards other people and to the larger community.

"Activities naa siya. Sa amoa man gud, example kasal, tulo ka adlaw gyud na. Kung naa kay gibati, luya ka, dili ka kaatend". (One should have activities. In our case, for example a wedding, it's really three days of celebration. If you are ill, weak, you cannot attend these). Binoy, 22.

"Ang himsug, madasigon sa iyang bulohaton". (A healthy person is enthusiastic and happy in his work). Tiya, 60

The informants generally observe that ill health tends to change the attitude of people towards others. For example, a sick person who used to be nice, sociable, and upright might turn nasty, withdraw from social contact, and fixate on negative thoughts.

"Ang healthy nga tawo maayo batasan, maayo managad, tarong. Kung nay sakit murag malain man". (A healthy person has a good attitude, good at dealing with people and upright, but when he is sick, he changes for the worse). Mely, 21

The over-all concept of health among the Badjaos is consistent with the findings of Ortigas and Regalado (1978) in the study they did on Filipinos in rural community setting: Health is the absence of disease. Disease is recognized as something which hampers a person's mobility to the extent that he or she is unable to stand up and walk.

Perceived Causes of Illness

Perceived causes of illness are personal ideas people have about the etiology of illness. Evident from the answers given were some concepts about pathology, contagion, and hygiene. The three young informants know that germs cause disease. They linked diseases with improper hygiene and poor environmental sanitation practices of the Badjao. Several practices were identified as unsanitary and potentially disease-causing, such as not taking a bath, eating with dirty hands, and bathing along the dirty seashore. The lack of potable water supply was also mentioned.

Aspects of healthy lifestyle were also alluded to by the informants. One of them recognized the contagious nature of diseases, pointing out that contact with the sick could make someone ill. Another informant knows that cigarette smoking and alcohol intake can also cause disease and irregular or improper intake of food could cause abdominal ulcers, food poisoning, parasitism, hypertension, and diabetes.

In some books, the Badjaos are said to believe in supernatural forces and beings that

cause disease. When probed in the interviews, however, the informants aver that this does not apply to them since they have been Christianized. They do not believe in disease-causing spirits. Nevertheless, they observe that some non-Christian Badjaos do believe that illness (*nihinanghinang*) is caused by bad spirits.

The respondents refer to *orem-orem*, a traditional healing ritual for the sick that is performed by a Badjao healer. Allegedly, it involves some chanting over the sick person as he lies in bed and sometimes end with the healer spitting at the patient's head. The informants qualified that when the patient does not get well even after the performance of the ritual, they would still have to go to the hospital for treatment anyway. The Christianized Badjaos have dismissed these traditional healing practices because they have seen that these rituals do not work. To get well, they say that it is better to pray to God for healing, and then still take the right medicine.

"Ang dili Kristiano, mutuo og nihinanghinang, sakit tungod sa dautang espiritu. Wala nay mutuo karon tungod ka yang ilang tambal nga orem-orem o ritual, wala may epekto. Maayo pa muinom tambal deretso. Sa una nay bago diri, nag orem-orem pero wala man maayo. Gidala na lang sa hospital. Maayo pa mag-ampo sa Ginoo arom mayo ang sakit, pero muinom pud ug tambal". (Those non-Christians believed in spirits causing disease. No one believes in that anymore because their treatments and rituals do not work. It's better to take medicine immediately. A newcomer here performed the healing ritual but the patient was not cured so they had to bring him to the hospital. It's better to pray to God for cure, but then you still have to take medicines). Lota, 35

Health Care Behavior and Practices

Care-seeking Behavior

The general attitude of the informants is to seek medical care when needed. This reflects their concept of health which defines the healthy person as one who is up and about and

able to walk. Unfortunately, health care-seeking often comes late in the course of illness. Usually, the Badjaos self-medicate first. They would ask their relatives, neighbors, or the barangay health worker (BHW) what medicine is usually given for a certain kind of illness. They take this advice when they can purchase the medicine and give to their patients. When the medicines do not work or when the patient is already weak (*kung luya na*), this is when they are likely to go to the public hospital to seek medical care. When they cannot go to the hospital due to financial constraints, and free medicines are not available, they just entrust their fate to God.

Traditional Birth Attendant

The Badjaos in Matina Aplaya do not have a traditional healer in their community. The community however has an elderly traditional birth attendant (*hilot*) who attends to home deliveries of women in the community. This *hilot* does not treat those with ailments that are not pregnancy-related. As an untrained traditional *hilot*, she uses unsanitary birthing practices (i.e., unclean birthing area, use of unsterilized kitchen knife, and no hand sterilization practices, among others) which have been identified among the major risk factors for the high maternal and infant mortality and morbidity among the Badjaos.

Use of Western Medicines

Surprisingly, the informants do not practice traditional medicine. Over the years, the Badjao have known to use western medicines for several ailments, although some misinformation on the proper use of these may have done more harm than good. They tend to self-medicate using medicines previously prescribed for similar complaints (i.e. use of Cotrimoxazole for cough, Metronidazole for diarrhea, and Amoxicillin for itchiness and skin diseases). Due to lack of expert instruction, they sometimes apply medicine improperly in terms of indication and dosage (i.e., sprinkling one-half capsule Amoxicillin to

the head lesions of the child while the other half is taken orally with water).

The Badjao Barangay Health Worker (BHW)

At present, one member of the community has been appointed BHW. She has become the community's main source of information on health services and facilitates the delivery of health services to her fellow Badjaos. Aside from her duties in the health center as BHW, she is also in charge of giving medications to all members of the community who are sick. She brings the sick to the hospital to assist them with the admission procedures and procurement of medicines, as well as with processing of payments and discounts. She also brings patients who cannot speak and understand the Visayan dialect to the health center for consultation.

Perceptions and Utilization of Health Services

Perceptions and Utilization of Hospital Services

The Badjaos prefer to bring their patients to the local public hospital, the Southern Philippines Medical Center (SPMC), rather than to the local health center (Matina Aplaya Health Center). Understandably, this is because they tend to self-medicate first and fail to recognize the health risk until the illness has become severe. Many informants complained that the doctor is not always available at the health center for consultation so they would rather bring their patient directly to the hospital. Likewise, they also reported that when they get to the SPMC, the medical staff immediately attends to their needs. They perceive the SPMC medical attendants to be good at what they do. One informant observed that the type of services and the way these health services were extended to them at the SPMC were the same as the way they were extended to the Bisaya or the non-indigenous peoples in Davao City. The doctors were fair in their treatment of patients, be they Badjao or not. The informants also reported that even though they are not members of the government

health insurance (Philhealth ng Masa) services, they can always go to the Office of the City Mayor to avail of some health benefits (i.e., free medicines, etc.)

Perceptions and Utilization of Matina Aplaya Health Center Services

The Health Center

The Matina Aplaya Barangay Health Center is adjacent to the Matina Aplaya barangay hall, some 500 meters away from the Badjao settlement area in New Canaan. This is well within the 5-10 kilometer radius recognized by the World Health Organization (WHO) as the standard distance of the health facility to be considered accessible. Surprisingly, not all Badjaos have been to the health center, know where the health center is, or have knowledge of the services they could avail of there.

The Health Center Services

Informants who have availed of the services of the health center appreciate its presence near their community because of the help they get and the other services available there. Some informants however lack knowledge of the services offered by the health center. An informant said that the health center does not have the facilities and capabilities to manage patients. The informants also expressed disappointment over the lack of medical supplies and the absence of an assigned doctor for the health center.

The Health Center Staff

Many of the informants who have been to the health center have good things to say. They appear to be satisfied with the services and the manner these were extended to them.

"Maayo ang serbisyo. Maayo ang mga doctor kay manghatag tambal, mutabang". (The service is good because she gave us medicine and treated us). Al, 58

An informant, however, observed that sometimes they were not being attended to because some health center personnel were busy just talking with each other.

Utilization of Other Sources of Health Services

Aside from the Matina Aplaya Health Center and the Southern Philippines Medical Center as sources of medical services utilized by the Badjaos, they also sought medical assistance from other private clinics in the area and the public health center of Trading Boulevard. Because of the expense, private clinics are utilized only when they need immediate attention. Other private clinics also offer free medical consultations to the Badjaos.

On the other hand, an informant revealed that when her child is febrile she seeks the help of a traditional therapeutic masseuse (*manghihiilot*) to bring the fever down. They learned from the non-Badjao that a recurring fever may likely be due to a sprain that can be relieved through the services of someone skilled at therapeutic massage.

Utilization of Maternal and Child Health Service

Badjaos normally deliver their children at home with the assistance of a traditional birth attendant (*hilot*). Home delivery is not without complications, though, especially if it is performed not by a medical professional. Home deliveries by untrained traditional hilot put the mother at risk of maternal complications and the baby of neonatal tetanus. This was the experience of one Badjao informant who experienced neonatal tetanus in five of her pregnancies.

There is a maternity clinic ran by a non-government organization to cater to the Badjaos in the hope of improving outcomes for pregnancy and childbirth in the community. This maternity clinic invites pregnant women in the neighborhood to come in for regular prenatal check-ups for free. However, most

Badjao mothers who deliver at home have not gone for prenatal check-ups. Their reasons were usually out of unfounded apprehension and misinformation. The same is true with maternal and infant immunization.

"Sa balay man ko nanganak. Walay prenatal. Dili man ko kabalo kung unsay pangutana didto. Kanang pangutan-on ko sa akong dugo, kung pila na ka bulan akong tiyan". (I delivered at home. No prenatal check-up. I don't know how to answer when they ask me about my menstruation and how many months I'm pregnant). Emmie, 31

"Wala magpa prenatal kay mahadlok ko magpa injection". (I did not go for prenatal because I'm afraid of injections). Mona, 28

"Wala pa immunize kay magkalintura ang bata". (No immunization because the child will have fever). Lina, 35

Family planning likewise is a taboo. A male informant said it is not in their culture to practice family planning.

"Family planning? Wala man gyud na sa amo. Kung unsa lang man tong gibuhad sa among katigulangan, mao pud among buhaton". (Family planning? We don't really have that. We only follow those that are done by our foreparents). Binoy, 22

While two informants do not use other family planning methods, they underwent tubal ligation for economic reasons.

Although the younger informants were more open to avail of modern maternal and child health services, the older Badjaos were just not as keen on the idea. The bottom line is, there is lack of information about the value of prenatal check-ups, immunizations, family planning, and the availability of these services at the health center.

Reasons for Poor Utilization of Health Services

Although the informants have many good things to say about the health care providers, this positive satisfaction rating does not translate into improved health service utilization. The following factors influence the Badjao's decision to avail of health services:

Culture and Cultural Acceptability

The Badjaos adhere to their own culture, keeping to their traditional beliefs and practices passed on from generation to generation. Modern health practices that are being promoted by public health care providers may not be culturally acceptable to the Badjaos. They express discomfort over the prospect of mingling with non-Badjaos when going for medical check-up and having their abdomen examined during prenatal visits. They are also not comfortable with the use of injections and contraceptives and the promotion of hand washing. It is hard for them to comprehend the introduction of a new health practice.

"Kung buhaton mabuhad gud, pero sa among kultura wala man gud na ma'am". (We can do it if we really want to, but it's not really in our culture). Binoy, 22

According to the study of Young (1982), conceptual incompatibility explains why members of another culture refuse to utilize health services because the treatment or intervention conflicts with their culturally rooted knowledge of illness and traditional practices. For the Badjaos, treatment commences when one is not able anymore to walk about without help. Some traditional practices that the Badjaos habitually do are considered unhealthy by modern standards. These include not washing hands before eating, not taking a bath, not cleaning the house and surroundings, indiscriminate throwing of garbage anywhere, and defecating by the seashore where children play.

Lack of Perceived Need

Consistent with the study of Shengelia et al. (2005), individuals are unlikely to use an intervention or to seek medical care, even if free, unless there is the perception of disease, injury, or health risk. Need is the most immediate motivation for health services utilization (Andersen, 1995). Judgement about need is made by the person by doing self-assessment of health status and symptoms he or she is experiencing

during a period of time. For the Badjaos, perceived need was probably low because they do not know they have a health problem or because they are unaware of the health risk.

"Kanang din a makaya, muadto mi sa doctor". (If we can not bear it anymore, then we go to the doctor). Eddie, 41

"Kung nay sakit, luyahon, sigi katulog, payat. Ang walay sakit, tambok". (The one with illness is weak, always sleeping, and thin. The healthy one is fat). Lina, 35

Lack of Financial Resources

In principle, consultations with the public health care providers remain to be free, but the prescribed medicines are not. Sometimes free medicines are available at the health center and public hospital but there is no steady supply. Many of the informants reported affordability as the main reason for not seeking medical attention, indicating that lack of financial resources is a barrier to health care among the Badjaos. Likewise, the Badjaos have not availed of any health insurance benefits from the government. This affirms the findings of a study which revealed that concepts of health held by people belonging to the lower socioeconomic classes tended to have a functional basis, such that only if a person was ill enough not to be able to work or move around (*luya na*) would medical attention be sought.

"Kailangan kung magkasakit naa gyuy kwarta. Unsa may among ipamasahe kung walay kwarta? Magpa check-up basta nay kwarta pero kung wala, antus na lang". (You should have money when you are sick. How can you pay for the transportation? I will go for check-up if I have money, if not, I just have to suffer). Al, 58

Lack of Doctor, Medicines, and other Facilities at the Health Center

The lack of supply of medicines and other equipments as well as the inavailability of the doctor would discourage the informants to seek

medical care at the health center. They expressed their disappointment over the absence of doctor and medicines. The medicines at the *Botika sa Barangay*, while priced lower than in the drug stores, are still beyond their means.

"Kasagaran walay libre tambal. Usahay walay doctor". (Mostly, there were no medicines. Sometimes, there were no doctors). Eddie, 41

Lack of Knowledge and Misconceptions about Maternal and Child Health Services

The poor utilization of maternal and child health services was primarily due to lack of knowledge and misconceptions the informants had about the program. Lack of knowledge is attributed to the lack of health information dissemination on the part of the health care providers. All these misconceptions would be erased when a good program on health education is available.

"Wala man mi control. Mahadlok ko. Basin magkasakit akong tiyan". (We did not control. I'm afraid. I may have abdominal pain). Lina, 35

Language Barrier

For some informants, access to health care is limited by their inability to communicate their medical needs. Language barrier is one of the factors that deter some Badjao from seeking medical help. This is especially true for most elderly Badjaos who are unable to speak the Bisayan dialect.

"Muadto ko sa center kung nay mouban". (I will go to the center if I have companion). Biya, 75

Discrimination

Many times, the Badjao suffer prejudiced discrimination because of their cultural-based habits, appearance, and smell or by the mere fact alone that they are Badjao. One informant identified the feeling of discrimination as one reason for non-utilization of public health services among the Badjaos. They are hesitant to access health services because they go with other non-Badjao (Bisaya) patients who they

feel dislike their presence and cover their noses when they are near.

"Ang mga tawo sa center mga Bisaya. Magtabon sila sa ilang nawong kung naa mi. Malain ko. Dili ko ganahan sa center". (The people in the center are Bisaya. They cover their faces when we are there. I feel bad. I don't like the center). Jimmy, 18.

Badjao's Recommendations to Improve Utilization of Health Services

From the perspectives of the Badjao, the following interventions were recommended to improve the Badjao's utilization of public health services:

1. Badjao as Barangay Health Worker (BHW)

The Badjaos appreciate the presence of a Badjao BHW in their community. Considering however the enormous task expected of her and her limited educational background, she needs more training and requires extra attention and guidance in the performance of her duties in the community.

2. Access to Free or Cheaper Medicines

Because of extreme poverty, the Badjao cannot afford to buy medicines. The income they earn may just be enough or may be lower than their daily requirement for food. Being sick therefore is an added burden for the Badjao. Free medicines and cheaper medicines, as well as free insurance coverage, provide relief to their burdened pockets.

3. Adequate Health Center Facilities, Supplies, and Medical Personnel

One informant observed that the Matina Aplaya Health Center lacked basic equipment, laboratory, and examination facilities, as well as obstetrical facilities for expectant mothers. These they need so that they will not have to spend any more for transportation expenses to go to distant and expensive health facilities for treatment. The assignment of a regular medical staff (the nurse,

or the midwife) who will attend to the needs of the Badjaos is likewise recommended.

4. Sustained Health Education Program and Community Visits

Preventive care should be given more focus for the Badjao. These are measures to be taken to prevent diseases rather than curing them or treating their symptoms. Health education programs and community visits are aspects of preventive care. One informant emphasized the value of persistence on the part of the health care providers in order to educate the Badjaos on health programs and appropriate health practices. In doing so, the Badjao people may learn how diseases are prevented.

5. Health Center for the Badjao

Simply put, the Badjao want their own health center where they will be culturally comfortable, can freely communicate, and will not have to bother with what the Bisaya would say. While this may not be feasible in some aspects, the barangay health center may find other solutions by providing special clinic schedules, delineating clinic area, and assigning clinical staff known to the community (including the Badjao BHW) to attend to the health concerns of the Badjaos.

SUMMARY AND RECOMMENDATIONS

Summary

The government's health care system has the responsibility to provide equal access of quality health care to all segments of the population. In order to ensure equitable access to appropriate health care for the Badjaos, the health care system needs to know their concepts of health, utilization of health services, as well as the problems they experience when interacting with health services. The lack of knowledge on these aspects prompted the researcher to undertake this study.

The following are highlights on the outcome of the study:

1. The informants' concepts of health can be categorized into three areas: physical health, psychological health, and social health. A state of good health is generally described as freedom from illness. A healthy person is able to walk, able to work to earn for the family, and has good attitude towards other people. An unhealthy person is weak and bedridden, irritable and withdrawn.
2. The care-seeking behavior of the Badjao is a multi-faceted phenomenon which has developed through the years as influenced by cultural, demographic, and socio-economic factors. The Badjaos generally seek medical help late in the course of the disease. They tend to self-medicate first in the hope of relieving the symptoms. They bring their patients to the hospital if, despite their interventions, his symptoms become severe.
3. The informants prefer to bring their patients to the hospital for medical check-ups rather than to the barangay health center. The lack of doctor and medicines are major deterrents in their availing the services of the health center.
4. Health service utilization was generally poor, as indicated also by the records from the barangay health center. The preventive aspect of primary health care which is the primary function of the public health center has barely made an impact on the Badjao people, as there are few takers of maternal and child health programs, more so with the family planning program. Also, there was lack of knowledge and misconceptions about health services.
5. Poor health service utilization is aggravated by poverty, cultural differences, and social discrimination.

Implications

The qualitative nature of this study limits the provision of an unequivocal insight into Badjao health-seeking behavior for possible plan of actions on the part of health care providers and other concerned agencies of government. A culture-sensitive preventive health care—an appropriate quality health service that is considerate of the cultural sensitivities of the indigenous people like the Badjaos—should be given utmost concern.

Based on the findings of the study, the following courses of actions are proposed:

1. The local government unit (LGU) must review the Matina Aplaya Barangay Development Plan to ensure fair allocation of funds for health programs and services. Special consideration should be given on the promotion of health and socio-economic upliftment among the poorest segment of the population, including in particular the Badjaos that have been settled in the area.
2. In order to provide quality health services, the health center should be equipped with adequate facilities, supplies, and competent human resources. Health programs should be responsive to the unique needs and perspectives of the Badjaos brought about by their poverty, lack of education, and culture. Strategies include community-based health education program, a separate clinic area, and the assignment of regular staff to attend to the needs of the Badjaos. Other culture-sensitive strategies include: the development of picture-based information materials that are easily understandable; conduct of information drive for the Badjaos at appropriate places and time; continuous teaching for better understanding of health programs and awareness of health risks; and community visits for immunization and treatment during epidemics of communicable disease in the area.

3. Proposed health interventions for the Badjaos must be able to appropriately address the cultural dimension, socio-economic conditions, and individual realities that characterize the Badjao community. The delivery of health care services must factor in the financial capacity of individuals to avail of health services. Provision of support mechanisms is therefore essential. These include socio-economic support and livelihood activities, provision of potable water supply, health and environmental sanitation support, and formation of community-based organizations.
4. Because of the low visibility of indigenous populations in official demographic reporting, there is a need for better quality epidemiological and other health-related data in order to better understand the condition of the indigenous people and come up with appropriate measures for equitable distribution of wealth and health services. In view of the foregoing, the researcher would like to challenge future researchers to dig deeper on the following topics: social determinants of Badjao's health, value of children, community diagnosis, high-risk health behavior among Badjao teenagers, fertility regulation, and pregnancy outcomes.

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Acute Toxicity Dose in Mice, Approximate Effective Dose, Effective Dose (ED₅₀) and Bioassay of Calabash (*Crescentia cujete*) Fruit Decoction as a Hypoglycemic Agent in Alloxan-induced Hyperglycemic Rabbits

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ABSTRACT: Diabetes ranks fourth in the leading causes of mortality worldwide and eighth leading cause of death in the Philippines. Treatment options for diabetes are being expanded beyond the practice of conventional medicine, with the increasing popularity and use of herbal medicines. This study was conducted to investigate folkloric claim on the potential of calabash (*Crescentia cujete*) decoction in reducing blood glucose level. The study aimed to determine the acute toxicity dose, approximate effective dose (AED) and effective dose (ED₅₀) of calabash fruit decoction and test this in a bioassay using Metformin and Normal Saline Solution (NSS) as positive and negative controls, respectively. To test for acute toxicity, 2,000mg/kg and 5,000mg/kg doses of the calabash decoction were tested in mice. To determine the AED and ED₅₀, alloxan was used to induce hyperglycemia in rabbits. The results showed that all mice survived the 2,000 and 5,000mg/kg doses of the calabash decoction leading to the fruit decoction's classification as Category 5 on the Global Harmonized System of Classification and Labelling of Chemicals rendering it as non-toxic. AED was noted to range from 3.98 to 15.84 mg/kg. ED₅₀ Probit analysis of the fruit decoction was determined at 9.88 or 10 mg/kg. Experimental bioassay showed the mean blood glucose levels at 283.00, 261.87 and 241.47mg/dl for NSS, Metformin, and calabash decoction, respectively. Evaluation using Post Hoc Pair-wise test demonstrated that calabash and Metformin had comparable hypoglycemic effect. In conclusion, this study showed that the calabash fruit decoction is non-toxic and is effective in lowering the blood glucose levels of alloxan-induced hyperglycemic rabbits at a dose of 10mg/kg. Its hypoglycemic effect is similar to Metformin.

KEYWORDS: *Crescentia cujete*, diabetes, hypoglycemic agent, toxicity dose, alternative medicine

INTRODUCTION

Worldwide, in the last few decades, victims of diabetes have increased more than twice and are expected to grow from the current 246 million to 380 million by the year 2025 (Chua, 2008). Recent estimates indicate there were 171 million people in the world with diabetes in the year 2000 and this is projected to increase to 366 million by 2030. Diabetes is a condition primarily defined by the level of hyperglycemia giving rise to risk of microvascular damage (retinopathy, nephropathy, and neuropathy). It is associated with reduced life expectancy, significant morbidity due to specific diabetes related microvascular complications, increased risk of macrovascular complications (ischaemic heart disease, stroke, and peripheral vascular disease), and diminished quality of life (World Health Organization, 2008). Diabetes worldwide ranks fourth in the leading causes of mortality (National Diabetes Information Clearinghouse, 2008). In the Philippines, it is the eighth leading cause of death.

In the Philippines, 95 percent of Diabetics have type 2 or adult onset diabetes. Mostly, obese individuals are affected. In 2007, a survey was conducted by the Philippine Cardiovascular Outcome Study on Diabetes Mellitus (DM) revealed that three out of five Filipinos are diabetic (Punzalan, et al., 2007).

STATEMENT OF THE PROBLEM

This study was conducted to investigate the folkloric claim on the potential of calabash (*Crescentia cujete*) in reducing blood glucose level. The study focused on the use of calabash fruit decoction as this is the form used in the community where folkloric claim of its blood glucose lowering effect came.

Specifically, the study aimed to determine the acute toxicity dose in mice, approximate effective dose (ED), and effective dose (ED₅₀) of calabash fruit decoction as a hypoglycemic agent in alloxan-induced hyperglycemic rabbits.

Furthermore, the study determined through a bioassay the effect of the ED₅₀ dose of calabash decoction in lowering hyperglycemia compared with plain normal saline solution (NSS) and Metformin as negative and positive controls, respectively. Determining the proper dosage to which the fruit is effective and establishing its toxicological information provides baseline data which can be utilized by future clinical studies.

REVIEW OF LITERATURE

Glycemic control is the most important aspect in the prevention of complication in DM. Thus, normoglycemia - or near the normal range - is desired for most patients. Inzucchi et al. (2012) claimed that a decrease in the blood glucose level of 10mg/dl reduces the risk of Acute Myocardial Infarction.

Alternative medicines, or herbal medicines in particular, are increasingly becoming popular as far as management of diabetes is concerned. However, many claims of therapeutic effect are not supported by scientific studies. Thus, the department of Pharmacology of the Davao Medical School Foundation is exerting efforts to provide scientific basis for a number of folkloric claims on herbal medicines.

The Philippines has more than 600 identified medicinal plants; among these the calabash (*Crescentia cujete*). Also known as "Magic Fruit," Calabash belongs to the family *Bignoniaceae* (Philippine Medicinal Plants, 2009), mostly found in areas such as the Caribbean region, Central America, Mexico, West Indies, and the Amazon region of Brazil. Its fruit, bark, and leaves are used in many ways. The leaves are used for treating diarrhea, hypertension, and stomach ache. The fruit is also used to cure respiratory ailments, bronchitis, cough, colds, toothache, headache, and for menstrual irregularities as a laxative, anti-inflammatory, and febrifuge.

Calabash was one of the 28 plant species identified by Abbey and the Krobou People of Agboville (2009) in their ethnomedicinal

investigation of herbal sources as potential treatment for diabetes. Phytochemical studies have shown that the calabash fruit indeed has constituents that are known to decrease blood glucose levels (Ogbuagu, 2008). Among these are alkaloids, citric acid, malic acid, pectins, peptides (insulin), proteins (bixine), sterols, triterpenes, and flavanoids like cyanhidric acid, quercetin and ursolic acid (Koffi et al., as cited by Abbey et al., 2009). Koffi and his associates believed that cyanhidric acid stimulates insulin release and its alkaloids were involved in glycogenesis. In a different study, pectin at a dose of 20mg/100g body weight was found to increase the hepatic glycogen and decrease blood glucose levels in alloxan-induced diabetic rats (Gomathy, 1990). The blood glucose lowering activity of pectin was attributed to the increase in the activity of glycogen synthetase.

Alegre et al. (2009) did a local unpublished study on the hypoglycemic effect of calabash fruit pulp decoction in alloxan-induced hyperglycemic rats. The said study found significant hypoglycemic effect in borderline diabetic rats, but the effective dose and safety profile of the preparation were not clearly established.

Due to the increasing number of patients with growing reliance on multiple medications and the shift toward more expensive new medicines, the annual cost of treating diabetes in the United States nearly doubled in six years, rising from \$6.7 billion in 2001 to \$12.5 billion in 2007 (Archives of Internal Medicine, 2008). It is estimated that the cost of treating diabetes will triple by 2034. Today, management options for diabetes are being expanded beyond the practice of conventional medicine; there is now the blossoming popularity of using herbal medicines as adjuncts in the treatment of diabetes.

METHODOLOGY

A quasi-experimental design was used in the study. The first part of the study involved the determination of the Acute Toxicity Dose

of *Crescentia cujete* decoction in Swiss mice. The second part included the determination of Approximate Effective Dose and Effective Dose (ED_{50}) of *Crescentia cujete* decoction in rabbits. The ED_{50} dose was then used in a bioassay to compare its effect against those of NSS and Metformin as the negative and positive control, respectively.

Swiss mice were used to determine the acute toxicity dose, while rabbits were utilized to determine the effective dose (ED_{50}) and approximate effective dose. This study was limited to rabbits and Swiss mice of the same group and weight category—300-350 grams for rabbits and 200-250 grams for Swiss mice. Sixty rabbits (from Panabo City) and three Swiss mice (from BFAD) were utilized for the study.

The blood glucose level was determined using a dextrostix reagent pad and digital boots glucometer before and after introducing the hyperglycemic agent, as well as before the administration of Acute Toxicity Dose, Approximate Effective Dose, and Effective Dose (ED_{50}) of calabash decoction. Blood sample were taken from the ear vein of the rabbits. Metformin and NSS were respectively used as positive and negative controls.

Alloxan Monohydrate, used to induce hyperglycemia on the test animals, was procured from Chemline Enterprises in Tandang Sora, Quezon City. The calabash fruits, on the other hand, were brought to a taxonomist for confirmation. Ripe calabash fruits were cut open with the pulp scooped out and the seeds carefully removed. The pulp was then placed in a stainless steel cooking pot and cooked at minimum heat for one hour. During the course of cooking, formed bubbles were carefully scraped and thrown. The cooked pulp was then strained using a mesh cloth. The formed decoction was poured in tightly sealed containers and placed in the refrigerator at -12 to -20 degrees Celsius for proper storage.

In the determination of acute toxicity, the new OECD guidelines on animal experimentation were followed. For this part of

the study, three Swiss mice were used. After five days of acclimatization, each mouse was given a single dose of 2,000mg/kg of the decoction. The mice were monitored for 14 days. Since no death was noted, a higher dose of 5,000mg/kg was given to each. They were again observed for another 14 days.

Alloxanized hyperglycemic rabbits that reached the expected glucose levels greater than 250 mg/dL were randomized to receive the different dosages of the calabash decoction, starting at an arbitrary dose of 5 mg/kg increased logarithmically at 0.6 logarithmic interval. The blood glucose levels of all the groups were monitored consecutively from day 1 up to day 14 with a baseline glucose level taken before treatment was started. The significant decreases of the blood glucose level of the rabbits were noted.

To determine the effective median dose (ED_{50}), the test animals were treated to different concentrations of the decoction based on the computed approximate effective dose. Blood

sugar levels were noted before and after treatment from one to 14 days. A significant decrease of blood sugar was noted. Probit algebraic method was used for the computation.

For the bioassay, selected rats that met the expected glucose levels greater than 250 mg/dL were randomly allocated to three groups to receive Plain Normal Saline Solution (negative control), standard Metformin dose (positive control), and an ED_{50} dose of the calabash decoction (experimental group). Fasting blood glucose was monitored one, three, and six hours after induction. Results of the blood glucose levels were compared.

RESULTS

Acute toxicity testing following the new OECD guidelines resulted in the survival of all the three test animals. Table 1 below shows the results of the acute toxicity test on the Swiss mice.

TABLE 1. Acute Toxicity Dose of *Crescentia cujete* Fruit Decoction in Swiss Mice

Dose level (mg/kg)	Animal Number	Weight of Mice (kg)	Administered Dose (ml)	Volume of administered Extract (ml)	Remarks
2000	1	0.02kg	0.03ml	0.067	S
2000	2	0.03kg	0.03ml	0.071	S
2000	3	0.03kg	0.03ml	0.069	S
5000	1	0.03kg	0.08ml	0.067	S
5000	2	0.028kg	0.08ml	0.071	S
5000	3	0.03kg	0.08ml	0.069	S

Legend: S-Survived;

No perceptible changes in skin and fur, eyes, nails, mucus membranes, and physical activity of the test animals were observed during the 14 days following each dose. The results

showed that the *Crescentia cujete* decoction belongs to Category 5 (non-toxic) on the Global Harmonized System of Classification and Labelling Chemicals.

Data on Table 2 show that there is a significant decrease in the blood glucose level of the test animals starting at the 15.84 mg/kg dose. Thus, the approximate effective dose is between 3.98 to 15.84mg/kg.

TABLE 2. Determination of Approximate Effective Dose (AED) of *Crescentia cujete* Fruit Decoction in Alloxan-induced Hyperglycemic Rabbits

RABBIT NO.	Dosage	Volume in ml (Calabash decoction)	Pretest	Post-induction	Post-test	Difference	Remarks
M17	1 mg/kg	0.005	113	253	248	5	-
F10		0.004	127	258	258	0	-
M19	3.98 mg/kg	0.039	127	257	249	8	-
F16		0.017	123	253	253	0	-
M6	15.84 mg/kg	0.01	127	257	191	66	+
F20		0.04	126	251	181	70	+
M8	63.10 mg/kg	0.039	122	252	221	31	+
F14		0.022	148	273	186	87	+
F1	251.20 mg/kg	0.15	134	259	238	21	+
M11		0.12	127	257	158	99	+
F19	1000 mg/kg	0.4	126	251	147	104	+
M20		0.5	134	259	219	40	+
F4	3981.07 mg/kg	1.5	132	277	206	71	+
M3		1.95	132	257	182	75	+
F15	15848.93 mg/kg	6.85	132	257	210	47	+
M12		6.98	134	259	215	44	+

Legend: (-) Negative; (+)Positive

Consequently, using the Probit Algebraic method, the ED_{50} was computed and determined at 9.88mg/kg or 10mg/kg. This means that 50 percent of the test population showed significant glucose lowering at this dose level.

Using the ED_{50} result of 10mg/kg, an experimental *in vivo* bioassay was done which revealed the following results, as summarized in Table 3.

TABLE 3. The Mean Measurements of Blood Glucose Level (mg/dl) across Time

Time	NSS	Metformin	Calabash	Total Mean
Baseline	284.1	290.3	274.6	283.0
3 rd hour	283.8	248.8	253.0	261.9
6 th hour	284.3	208.8	231.3	241.4

The data showed the comparable results of blood glucose level for the three groups. Figure 1 below charts the comparison:

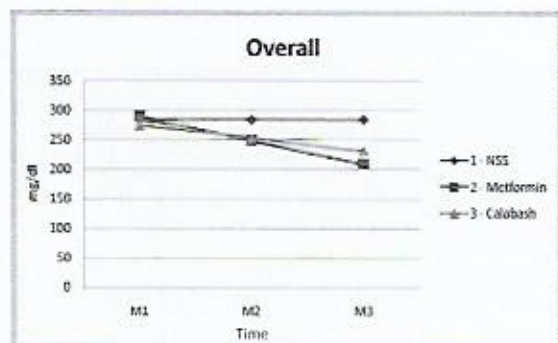


FIGURE 1. The Mean Measurement of Blood Glucose Level among Three Groups across Time (M1:Baseline; M2:3hrs; M3:6hrs post-alloxanization)

The blood glucose level in the NSS group (Negative Control) was constant across time, while glucose measurements in Metformin and Calabash groups were significantly decreasing across time. Evaluation using Post Hoc Pair-wise test with a p value of 0.05 demonstrated that Metformin and calabash have no significant difference in their glucose lowering effect.

DISCUSSION

Calabash (*Crescentia cujete*) fruit decoction is noted to have a significant blood glucose lowering effect comparable with Metformin, the standard drug used in the study. The blood glucose lowering effect may be explained by the phytochemical substances contained in calabash which include, alkaloids, citric acid, cyanhydric acid, malic acid, pectins, peptides (insulin), proteins (bixine), sterols, triterpenes, and essential oil (allicine, nerolidol) (Koffi et al., as cited in Abbey et al., 2009). Koffi et al. postulated that cyanhydric acid stimulates insulin release and its alkaloids were involved in glycogenogenesis due to an increase in the activity of glycogen synthetase. Similarly, Gomathy (1990) noted that pectin at a dose of 20mg/100g body weight administered to alloxan-induced hyperglycemic rats resulted to an increase in the hepatic glycogen and a decrease in the blood sugar level. Thus, the blood glucose lowering effect of the calabash fruit decoction may particularly be attributed to the presence of cyanhydric acid, alkaloids, and pectin.

In conclusion, this study showed that the calabash (*Crescentia cujete*) fruit decoction is non-toxic and is effective in lowering the blood glucose levels of alloxan-induced hyperglycemic rabbits at a dose of 10mg/kg. Its hypoglycemic effect is comparable to Metformin.

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Doctor-Patient Relationship: How Do Patients Perceive It?

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ABSTRACT: The patient-doctor relationship is one of the most important aspects of health and illness as it can facilitate the implementation of a medical plan of curing, caring, and rehabilitation. Conducted in a local private hospital among patients admitted from June to July 2011, the study sought to describe the patients' perception of doctor-patient relationship in terms of their definition and experiences. In particular, the interpersonal skills of the doctor were described with emphasis on certain aspects, such as the amount of contact, comprehensiveness, patient participation, trust, and intensity. Study participants were delimited to twelve purposively selected patients whose ages ranged from 18 to 70. Results obtained from a guided interview tool revealed that the majority of the patients perceived the relationship as a responsibility of the doctor and was influenced not only by the time the doctor would spend in the patient's room, but also in terms of comprehensiveness conveyed through good communication skills. Implications on the need of medical education curriculum to be supplemented with training in other fields were discussed. The findings emphasize the importance of inculcating of reflective thought and critical analysis for a more holistic medical education.

KEYWORDS: *doctor-patient relationship, patient's perception, alphabiography*

INTRODUCTION

Traditional doctor-patient relationship has undergone so many changes across time. The advances in biomedical technology have added a new facet in the relationship between the doctor and the patient. The availability of these medical resources have improved the care of patient and even prolonged the average life span of the human race. However, the use of new technology and algorithms in diagnosis seemingly makes doctors more of technicians instead of healers (Baker, 2008).

Broadly speaking, doctor-patient relationship can be viewed as either a process or an outcome. For Ridd and Shaw (2009), it is a process developed and maintained by longitudinal care and consultation experiences. Seeing the same doctor, or longitudinal care, was identified as a key process central to many accounts of personal care as experienced by patients. James Hughes (1991) proposed that Doctor-Patient relationship (DPR) can be broken down into the following discrete components: amount of contact; comprehensiveness of the relationship; patient participation, information and locus of control; affective relationship; and intensity.

In the Philippine setting, will Hughes' DPR components be applicable? If so, which one would be the most important? Will a certain component be able to compensate for deficits in another?

Medical education transmits not only knowledge, language, mathematics, and science, but also the cultural heritage of a nation. While teaching aims to lead to behavioral change in the students, the attitudes, values, and norms of society are learned by imitation and inculcation (Palispis, 2007). Instructors and preceptors in clinical education therefore have the challenging task of transmitting to the next generation the desirable traits, knowledge, and skills that will be useful in their students' adaptation to the changing world. Resident doctors will in the future be responsible to adjust health care

measures according to the problems and needs to be served.

This study was conceived to improve the doctor's understanding of how his/her patients feel towards the doctor-patient relationship, health, and illness which could facilitate the implementation of a medical plan of curing, caring, and rehabilitation. Such can start with teaching medical students appropriate communication skills that contribute to a healthy therapeutic interaction between the doctor and the patient.

METHODOLOGY

This retrospective study used a qualitative research design to describe discernible patterns that exist in doctor-patient relationship. The patients' perception regarding the relationship was determined using in-depth interviews for data collection. An alphabiographical format was used to analyze data. The study area is a tertiary hospital that is one of the teaching arms of the Davao Medical School College of Medicine. The hospital was chosen due to its convenient location and the diverse socio-economic distribution of the patients it caters.

Participants included patients admitted from June 1 to July 31, 2011 using the following inclusion criteria: 1. Admission at the ward or semi-private and private rooms as medical house cases, including the investigator's patients; 2. Ages ranging from 18 to 70 years old, male or female; 3. Treatment for acute and chronic cases; and 4. Ability and willingness to be interviewed.

The study used purposive sampling of patients. The in-depth interview selected twelve patients who were individually interviewed in their homes at their most convenient time. The first step of the procedure was to send a letter of permission for the medical director, ethics committee chairpersons (of the school and the hospital), and the ancillary director of the hospital. After the respective ethics committees granted permission, the cases were chosen by

the researcher from the list of participants from the records section that fulfilled the inclusion criteria. The next step was to pretest the interview guide. Meanwhile, the patients' and the doctors' consent forms were secured and an interview with each was scheduled at their most convenient time.

The data collection was done by a research assistant. The interviews were conducted from October to November 2011 in the homes or workplaces of the patients. The interview was recorded using an audio recorder, while the research assistant took notes. The researcher used a guide questionnaire with open-ended questions. A consent form was given and read to the research participants before the actual interview. They were allowed to ask questions and clarifications. Probing questions were designed to elicit elaboration on certain aspects of the doctor-patient relationship, as perceived by the interviewee.

The data were collected and, since some of the results were in the native language of the interviewee, these were further transcribed and translated. The results described the patients' perception of Doctor-Patient Relationship. In the interest of confidentiality, the identities of the patients were duly fictionalized. The analysis of data was obtained from the responses the patients gave during the interview. A qualitative analysis using an alphabiography emphasized the patient's perception of experiences with their doctors and brought out experiences they had in common with others which may or may not be tied to the author.

As a methodological note, alphabiography explores the significance of events in the life of the author as well as her experiences with her patients. As used in this paper, alphabiography was anchored on exploring how decision, actions, and feelings associated with each letter of the alphabet made an impact on the DPR perception of patients. Like a memoir, an alphabiography provides narratives about

the author's experience or on other people's experience. No real names were used and the author had to choose in what parts of her and her patients she wanted to write about (see Table 1).

The data of the in-depth interview transcript were organized and categorized into general themes according to the letter that were discussed in response to each question. Direct quotations were preserved to illustrate these themes or topics. The author gave insights into how the decisions, actions, feelings, or thoughts associated with that particular letter made an impact on the patient's perception of the doctor-patient relationship.

RESULTS AND IMPLICATIONS

Patients' Definition of Doctor-Patient Relationship

Most of the patients defined the doctor and patient relationship as that relationship governed by the responsibility of the doctor to act in the best interest of the patient. The next definition was in terms of behaviors that were expected of a doctor. Foremost among the patients' expectation of a good doctor is that of one who keeps communication lines open—where both the patient and the doctor can freely ask any questions, even personal ones. There were also some patients who defined the relationship in terms of professionalism. Professionalism is defined by Cruess (2009) as a vocation where the members are governed by a code of ethics and profess a commitment to competence, integrity and morality, altruism, and the promotion of the public good within their domain. This definition would encompass the other definitions for which certain behaviors are expected of a doctor. These constructs are the basis of certain expectations in terms of behavior, thereby making them very important and necessary for integration in the curriculum.

Patients' Perception of Patient-Doctor Relationship

Amount of Contact

All the patients that were interviewed were previous admissions as medical house cases. As such, the amount of doctor-patient contact would be limited to the amount of time the doctor would spend inside the patients' room during daily rounds. Majority of the doctors usually visit their patients once a day. There were few doctors who saw their patients more than once in a day. The respondents recalled that their doctors stayed in their room anywhere from less than five minutes to an hour, more frequently between five to 10 minutes and between 20 to 25 minutes.

The amount of time the doctor spends inside the patient's room is often dictated by the degree of seriousness of the case. It was found during the interviews that the patients perceived the time spent by the attending physician to be adequate and that, indeed, it was determined by the degree of severity of their illness. However, it was also revealed that the doctor can stay for almost one hour with the patient and talk about other things aside from the disease. This could probably happen when the doctor's patient load is not heavy. The patients perceive that they receive better care when the time spent by the physician is more, whether in terms of more number of visits or more minutes spent during each visit (Ridd & Shaw, 2009).

Relationships in sociology are termed social interactions (Palispis, 2007). Social interactions are influenced by the end goals that it is intended to achieve. For the doctor and the patient, the goal of their social interaction is to make the patient better. By spending time with the patient, the doctor makes the latter perceive that he is getting better care.

Comprehensiveness of the Relationship

One of the best measures of comprehensiveness is communication. As reported by the patients, the ability to stay calm, speak in a clear or audible voice, establish and maintain eye contact, use simple and easy to understand language, clarify patient's ideas, and use of facilitative silence were all demonstrated by the patients' attending physicians. This is indeed a surprise considering that the curriculum of medical students has very few lectures on communication. Education for comprehensive communication is probably incorporated in the hidden curriculum (Marsella, 2006) of subjects, such as physical diagnosis and medical ethics. Communication can indeed be improved further, not only through instructional lectures, but also through role playing and by having standardized patients.

Effective communication should be included in the core competencies of any medical student. Students can be guided once any deficiencies in communication can be identified. Role modeling can be an effective strategy to teach communication.

Though all the doctors of the patients that were interviewed had excellent communication skills, there was mention of one doctor who was also treating the patient's terminally ill mother who apparently had difficulty conveying information that would ease the family's confusion and distress. This problem is mainly because terminal illness is one of the areas that students find difficult to communicate with patients and their families. Hafferty (1991) mentioned that many clinicians avoid talking about death because of their own discomfort and anxiety. Therefore, there is a growing need to emphasize in health care education how to handle extreme situations related to death and dying.

Participation of Control

During the interview, the patients were allowed to express their views with regards to the quality of the patient experience of admission, diagnosis, and sought for care.

From the findings from the study, it comes up with the following: The patients' perception of the quality of the care would allow them to seek for care that they want to participate in the management of their disease.

Affective Relationship

Affective relationship is the quality of the relationship between a person and another person. All the patients said that they were either by non-verbal communication or defined affective relationship such as when the doctor shows order for them to be treated.

Intensity: Pain, Invasive Procedures

Intensity of pain intervenes directly on the psyche and body in managing death. Patients who have been admitted to the hospital are deemed very serious. They did not have any other options. The intensity of the amount of time

Participation, Information, and Locus of Control

During the interview, all of the doctors allowed the patients to participate in the decision with regards to diagnostics and therapeutics. The patient experienced participation from the time of admission when the doctor asked his opinion and sought his agreement with the diagnosis.

From the patient's history of illness and the findings from physical examination, the doctor comes up with a diagnosis. There are numerous diagnostics used to confirm each illness. The patients' opinion regarding what tests they would allow themselves to be subjected to was sought. Most of the patients remembered that they were also asked by their physician to participate in decisions regarding treatment of their disease.

Affective Relationship

Affection is defined as a fondness, or the quality of tender feelings which are manifested in overt behaviors that express warmth directed at a person. All the patients who were interviewed said that their doctor showed affection, either by non-verbal indicators or by verbal communication. There were some patients who defined affection in terms of communication, such as when the doctor finds time to explain in order for them to better understand their illness.

Intensity: Pain, Lethality, and the Use of Invasive Procedure

Intensity is the degree the physician intervenes directly on the state of the patients' psyche and body, causing and relieving pain and managing death (Pellerino, 1988). The former patients who were included in this study had been admitted due to illnesses that were not deemed very serious or life-threatening. They did not have any grave diseases such as cancer. The intensity of the illness determined the amount of time and the comprehensiveness of

the doctor-patient relationship. The willingness to see the family and to explain the patient's condition contributed to the affective bond. The intensity does not depend or happen only with heart surgeons, but also in all cases, especially those that promise to proceed to the inevitable resolution. The patients perceive a very good relationship when there is more intensity.

For doctors, however, the attachment to the patient's family is detrimental. Doctors feel physical pain every time a patient receives the final verdict. Is this the reason then why some doctors seem to be perfunctory and callous? Tiongco (2008) declared that any doctor or medical worker cannot survive in the clinic without professional detachment. Could detachment be the solution to the emotional evisceration one feels every time a patient dies? We would like to think that there exists a balance between detachment and attachment, and that the medical curriculum has to prepare the student for this.

Evidences of a Good Doctor-Patient Relationship and Its Importance

Communication

Most patients perceive communication as an evidence of a good relationship. In sociological terms, any social relation can be analyzed through different ways, and one of which is by processes (Palispis, 2007). Social processes are forms of interactions which include the behavior between two or more people. Assimilation is a social process of interpenetration in which persons and groups acquire the attitudes of other persons by sharing their experience. A successful assimilation would lead to accomplishment of the goal for which the interaction was created. For a successful assimilation, communication is essential.

Letter	Theme	Message	Implications
A	Alphabiography	Format	Experiences
B	Behavior	Perception of patients	Innovation in curriculum
C	Comprehensiveness	Communication is important	Strategies of teaching
D	Death	Intensity	Methods of communication
E	Empathy	Conveyed by affection	DPR is improved by affectionate behavior
F	Frequency	Contact affects perception	Dependent on type of cases
G	Guidance	Participation	Important to compliance
H	Hippocratic oath	Code of ethics	Reflective practice
I	Integrity	Behavioral expectations	Code of ethics inculcation
J	Judgment	Bias can be conveyed	Gender sensitivity
K	Katherine	Blind obedience	Patient participation is important
L	Lorenzo	Physical attraction is possible	Reflective practice
M	Marie	Family dynamics is important	Importance of support
N	Nick	Decisions are affected by experience	Collegial advice and support is important
O	Obedience	Moral responsibility	Reflective in practice
P	Professionalism	Mastery of knowledge	Patients expect excellence
Q	Quality	Quality of care	Perceived by behavior to patients
R	Ronnie	Excellence	Commitment to learning
S	Satisfaction	Evidence of good DPR	Improve outcomes
T	Trust	Evidence of good DPR	Important to patients healing
U	Unique	Changing characteristics	Curricular changes should be implemented
V	Virtue	Perception affected by characteristics	Reflective practice
W	Wounded healer	Hardships creates venues for improvement	Importance of initiative
XY	XYX Syndrome	Nature of nurture issue	Curriculum innovations
Z	Zeal	Devotion	Role modeling

Trust

Trust is an essential component of the patient relationship. This trust is developed over time as the doctor would like to

Satisfaction

In the whole, the importance of the relationship can be a goal of prevention become a success. The relationship are satisfied.

Alphabiography

In this study, we define the physical terms of physical certain behavior. The professionalism, different studies to be altruistic. The components of comprehensiveness communication contributed to the. The communication during discussing from the time he noted the ability of calm and to speak establish and maintain and easy to understand ideas, and use facts.

The amount initially thought by Hughes seemed by effective communication that was also perceived intensity of the physician's display when shown in detail.

Trust

Trust is another evidence of a good doctor-patient relationship, as noted by the patients. This trust is demonstrated when the patient seeks out the same doctor in the belief that this doctor would make her or him well.

Satisfaction

In the whole scheme of medical practice, the importance of a good doctor-patient relationship can not be overemphasized. The goal of prevention and treatment would only become a successful interaction if the patients are satisfied in terms of all the aspects of the relationship.

Alphabiographical Analysis

In this study, it was found that the patients define the physician-patient relationship in terms of physician behavior. They expect certain behaviors from doctors which embody professionalism. They elaborated in their different stories that they expected their doctors to be altruistic and accountable. Among the components of the interpersonal interaction, comprehensiveness of good and effective communication was perceived to have contributed to the patient's sense of well being. The communication behaviors of the physician during discussing with patients were observed from the time he first introduced himself. They noted the ability of most of their doctors to stay calm and to speak in a clear or audible voice, establish and maintain eye contact, use simple and easy to understand language, clarify patient's ideas, and use facilitative silence.

The amount of contact which were initially thought to be of utmost importance by Hughes seemed to have been compensated by effective communication. The component that was also perceived to be important was intensity of the relationship, flagged by the physician's display of empathy, especially when shown in difficult situations.

The findings of this study suggest the need to inculcate certain humanities aspect into the medical curriculum. The results encourage physicians to be reflective in practice and strive to be worthy of their patients' trust and satisfaction. These findings are however, limited to this specific setting. Therefore, studies covering a wider scope of patients and including government hospitals would be more reflective of the Philippine setting.

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Acute Toxicity Dose of Chayote (*Sechium edule*) Leaf Extract in Mice and Effective Dose (ED₅₀) in Lowering Serum Uric Acid Level in Pyrazinamide-Induced Hyperuricemia in Rabbits

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ABSTRACT: Gout is an often painful and distressing disease that results from a high concentration of uric acid in the body. Conventional medicines are available for the lowering uric acid levels. Recently, however, there began a search for cheaper and more readily available treatments options for gout. This study was focused on Chayote (*Sechium edule*) leaf extract as a serum uric acid lowering agent. The study aimed to determine acute toxicity dose, approximate effective dose (AED) and effective dose (ED₅₀) of Chayote leaf extract. The extract was given to mice to test toxicity, while the AED and ED₅₀ were determined in pyrazinamide-induced hyperuricemic rabbits. It was found that AED ranged from 63.10 mg/kg to 251.19 mg/kg, while ED₅₀ Probit analysis of the leaf extract was 155.30 mg/kg. Results from the toxicity test lead to the leaf extract's classification as Category 5 of the Global Harmonized System of Classification and Labeling Chemicals, rendering it as non-toxic.

KEYWORDS: *Sechium edule*, gout, hyperuricemic agent, toxicity dose, alternative medicine

INTRODUCTION

Background of the Study

Gout is a highly disabling and a potentially stressful ailment. It develops secondary to hyperuricemia, a condition of an abnormally high serum uric acid level due to excess purine catabolism or the impaired excretion of urate. Hyperuricemia has also been highly correlated to the incidences of urolithiasis, renal dysfunction, and cardiovascular disease (Fauci et al., 2008). In the Philippines, recent studies by Osio-Salido et al. (2008) and Fantilanan-Soldevilla et al. (2009) have found a prevalence rate of gout to be 16.3% and 13.2%, respectively. Furthermore, studies showed that the prevalence of hyperuricemia was 31.7% in men and 17.3% in women (Li Yu, 2008).

Hyperuricemia and gouty arthritis are currently controlled with allopurinol, a substrate analog of hypoxanthine and a potent inhibitor of the enzyme xanthine oxidase (xo) (Fauci et al., 2008). However, the effective hypouricemic effect of allopurinol is sometimes overshadowed by its adverse effects, such as hypersensitive reactions and acute inflammation, gastrointestinal, hepatic and renal distress, eosinophilia, and vasculitis (Brunton et al., 2007). Safety among children and pregnant women has not been established (Monson & Schoenstadt, 2008). Moreover, this drug is costly and needs to be taken chronically as maintenance therapy. Therefore, the search for safer alternatives to allopurinol is compelled by these ill factors.

Flavonoids are a class phenolic compounds of low molecular weight that are widely distributed in the plant kingdom and are found in all plant parts. Recently, they have been studied for their hypouricemic capacity. Flavonoids in herbal extracts (An et al., 2010) and orange juice (Haidari et al., 2009) have been found to significantly lower serum urate levels via inhibition of xo and xanthine dehydrogenase, the enzymes responsible for urate production. Chemical analyses of 15

common (Mo et al., 2007) and 100 known (Omar et al., 2007) plant flavonoids have shown their potent hypouricemic activity.

Chayote (*Sechium edule*), locally known as Sayote, is a member of the *Cucurbitaceae* family mostly found in tropical regions of the world with limited presence in subtropical to temperate regions (Jackson & Daydon, 1928). They are annual vines that have large white to yellow flowers, hairy and pentangular stems, and tendrils that are perpendicularly-situated at the nodes of leaf petioles (Renner et al., 2007).

Chayote has been shown to have a wide number of active flavonoids in its leaves and fruits (Siciliano et al., 2004). This was the basis of a study by Luy et al. (2008) which noted the significant decrease of serum urate levels in hyperuricemia-induced rats after moderate doses of *S. edule* leaf extracts. To further these findings, this research performed additional tests to determine the acute toxicity dose of *S. edule* leaf extract in female albino mice. This study also aimed to define the effective dose (ED_{50}) of *S. edule* on rabbits that have pyrazinamide-induced hyperuricemia. The acute toxicity dose is the lowest concentration at which a single death is observed, whereas the effective dose is the concentration at which the drug is effective in 50% of the population. Since preliminary evidence has been provided on the efficacy of *S. edule* in lowering serum urate levels, it would be apt to define the acute toxicity dose and ED_{50} of *S. edule* to facilitate preclinical testing of this proposed hypouricemic agent as a step towards the future human testing phase of drug development.

Statement of the Problem

This study aimed to determine the acute toxicity dose *Sechium edule* (Chayote) leaf extract in mice and the effective dose (ED_{50}) of the leaf extract in lowering uric acid in pyrazinamide-induced hyperuricemia in rabbits. Specifically, this study had the following

aims: 1. To determine the acute toxicity of *S. edule*—the toxicity from a single dose that will result in death in experimental animals. To determine the effective dose of *S. edule* leaf extract in lowering serum uric acid levels in pyrazinamide-induced hyperuricemia in rabbits. 2. To determine the effective dose (ED_{50}) of *S. edule* leaf extract in lowering serum uric acid levels in pyrazinamide-induced hyperuricemia in rabbits.

Significance of the Study

This study was conducted to determine the acute toxicity of *S. edule* leaf extract to gout sufferers and to define the effective dose of *S. edule* leaf extract in lowering serum uric acid level. The study was conducted to determine the acute toxicity of *S. edule* leaf extract to gout sufferers and to define the effective dose of *S. edule* leaf extract in lowering serum uric acid level. The study was conducted to determine the acute toxicity of *S. edule* leaf extract to gout sufferers and to define the effective dose of *S. edule* leaf extract in lowering serum uric acid level. This could also serve as a basis for future efforts at developing a safer alternative treatment for gout from the compounds found in *S. edule*. This could also serve as a basis for future efforts at developing a safer alternative treatment for gout from the compounds found in *S. edule*. This could also serve as a basis for future efforts at developing a safer alternative treatment for gout from the compounds found in *S. edule*.

Independence

Sechium edule

FIGURE 1. Relation

aims: 1. To determine the acute toxicity dose of *S. edule*—the dose that provides relative toxicity from a single exposure, observed by death in experimental mice (*Mus musculus*); 2. To determine the approximate effective dose of *S. edule* leaf extract that will significantly lower serum uric acid levels among pyrazinamide-induced hyperuricemic rabbits (*Oryctolagus cuniculus*); and 3. To determine the effective dose (ED_{50}) of *S. edule* leaf extract—the dose that will significantly lower serum uric acid levels in half of the test population among experimental, pyrazinamide-induced, hyperuricemic rabbits (*O. cuniculus*).

Significance of the Study

This study will provide valuable information to gout sufferers seeking cheaper but effective alternative treatment for lowering serum uric acid level. The findings could also inform pharmaceutical companies to inspire their efforts at development of novel drugs extracted from the components of the *S. edule* leaf extract. This could also guide the Department of Health on future efforts at thoroughly investigating the potential of *S. edule* leaf extract's uric acid level lowering ability and in considering its potential preventive or therapeutic use for the safer management of hyperuricemia and associated diseases. Future researchers could likewise expand the knowledge pool for related clinical studies.

Scope and Limitations of the Study

The study only tested the acute toxicity dose and effective dose (ED_{50}) of *S. edule* leaf extract. Chayote plants were verified by a plant taxonomist. Processing of raw plant material for acquisition of Chayote leaf extract were done at the Ateneo de Davao University (ADDU) using a Rotary Evaporator. Dose adjustments of the Chayote leaf extracts were performed by the proponents of this study.

The experimental animals used were captive-bred rabbits of a determined weight and sex for the determination of ED_{50} and BFAD-acquired female albino mice for the determination of acute toxicity dose. Only female mice were employed in the study since, according to the Organization for Economic Cooperation and Development (OECD) guidelines, females are generally slightly more sensitive to closely-variable drug doses. The animals underwent certification from a veterinarian to assess fitness for study. Aspects such as but not limited to animal containment, treatment during study, and carcass disposal conformed to OECD Guidelines for Animal Testing.

Conceptual Framework

This study identifies the toxicity of *S. edule* leaf extract in mice and its serum uric acid lowering effects when given orally to the experimental rabbits. The range for its safe dosage and optimum dosage for optimum efficacy was determined by measuring serum uric acid thereafter on the experimental animals.

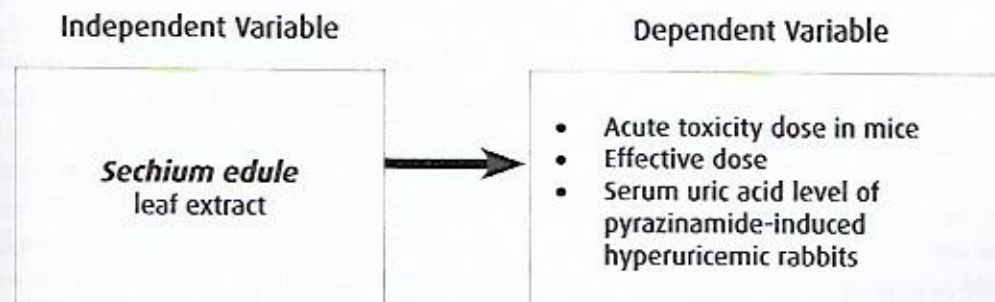


FIGURE 1. Relationship between *Sechium edule* leaf extract, and acute toxicity dose and effective dose.

Theoretical Framework

In this study, the acute toxicity dose of *S. edule* leaf extract was determined. Consequently, the approximate effective dose of Chayote leaf extract was determined. The plant contains flavonoids that were shown to have a hypouricemic effect. In determining the approximate effective dose, the baseline serum uric acid level of each rabbit was measured before inducing hyperuricemia using pyrazinamide. After induction, serum uric acid was measured again. Then, Chayote leaf extract was given in eight different doses to a specific rabbit. After treatment with Chayote, the serum uric acid level was measured again one day after the last treatment. After the approximate effective dose (AED) was determined, the effective dose (ED_{50}) was determined based on AED.

REVIEW OF LITERATURE

Chayote

Chayote is also known as *chuchu*, *sayote*, *tayota*, *choko*, *chocho*, *chow-chow*, *christophene*, *mirliton*, vegetable pear, *starpreciente*, *citrayota* or *citrayote* (Ecuador and Colombia) and pear squash. Chayote has medicinal uses. Infusions of the leaves are used to dissolve kidney stones and to assist in the treatment of arteriosclerosis and hypertension. Infusions of the fruit are used to alleviate urine retention. The cardiovascular properties of the infusions of leaves have been tested in modern studies, while their great effectiveness in curing kidney diseases has been known since colonial times on the Yucatan peninsula, where these ailments are very common (Saade, 2006).

In other studies, Gordon et al. (2000) showed that *S. edule* had hypotensive effect, while Ordoñez et al. showed that Chayote can also lower serum uric acid. This study observed that there was a significant decrease of serum urate levels in hyperuricemia-induced rats after moderate doses of *S. edule* leaf extracts.

Flavonoids

Flavonoids are phenolic compounds composed of fifteen carbons that are found in land plants. There are five major types of flavonoids: anthocyanins, flavones, flavonols, isoflavonoids, and proanthocyanidins (Bohm et al., 1998). Foods that contain flavonoids include tea, red wine, fruits, vegetables, and legumes. The bioavailability of flavonoids is relatively low, because of limited absorption and rapid elimination. Flavonoids scavenge free radicals in the test tube, but even with high flavonoid intakes, concentrations in humans probably 100 to 1,000 times lower than concentrations of other antioxidants.

Many *in vitro* and animal model studies suggest flavonoids influence important cellular and molecular mechanisms related to carcinogenesis. It is still unclear, however, how flavonoid intake can help prevent cancer in humans.

A flavonoid study utilized Morin, which is a chemical from the twig of *Morus alba* (white mulberry) tree. Morin has been used in Chinese medicine to treat gout and was found to have both XO inhibiting and urate reabsorption effects (AOR, 2009).

Uric Acid

Uric acid is a chemical created in the body when purines, which are nucleoprotein derivatives, break down (Joy, 2011). Naturally, purines are contained in the body and are found in most of foods from living cells, from plant foods (vegetables, fruits, nuts), or animals (meat, fish, mussels). Purine also resulted from destruction of cells, that may occur normally or because of certain conditions or diseases. Uric acid is a white, odorless, and tasteless crystalline substance which is the product of the xanthine oxidase-catalyzed conversion of xanthine and hypoxanthine, which in turn are produced from purine (n.a., 2011). Uric acid is a very weak organic acid. The critical physical property of

uric acid in the d...
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Hyperuricemia

Hyperuricemia...
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Pyrazinamide

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Pyrazinamide...
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(Brunton et al., 2...

METHODOLOGY

The study ut...
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Bangkal, Davao...
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uric acid in the clinical setting is solubility. Uric acid is less soluble than urate; thus, an acidic environment decreases solubility.

Hyperuricemia

Hyperuricemia exist when there is abnormal elevation blood level of uric acid. Patients with primary overproduction or underexcretion of uric acid usually have an idiopathic defect. There are some exceptions to this, however, such as some well studied primary causes of overproduction of urate, including phosphoribosyl pyrophosphate (PRPP) synthetase overactivity and hypoxanthine-guanine phosphoribosyltransferase (HGPRT) deficiency. The imbalance between urate production and elimination, which results in hyperuricemia, is most often the result of impaired elimination of uric acid (Schumacher, 2005).

Pyrazinamide

Pyrazinamide is well known to be one of the leading treatments for tuberculosis due to its bactericidal activity. It is the synthetic analog of nicotinamide. The daily dose for adults is 15 to 30 mg/kg orally, given as a single dose. This drug is toxic to the liver and is not given to individuals with any degree of hepatic dysfunction.

Pyrazinamide inhibits the excretion of urate, resulting to hyperuricemia in nearly all patients and with acute episodes of gout. Other side effects would include arthralgias, anorexia, nausea and vomiting, dysuria, malaise, and fever (Brunton et al., 2007)

METHODOLOGY

The study utilized the experimental pretest-posttest design. The study was performed in Bangkal, Davao City. Mice were used as the unit of analysis for the determination of the acute toxicity dose of *S. edule*. For the determination of the approximate effective dose (AED) and effective dose (ED_{50}), rabbits were used, and

their blood samples were analyzed for the serum uric acid level.

In determining the acute toxicity dose, the dose of Chayote leaf extract is the independent variable and the acute toxicity dose is the dependent variable.

In determining the approximate effective dose (AED) and effective dose (ED_{50}), the dose of *Sechium edule* leaf extract is the independent variable and the AED and ED_{50} are the dependent variables.

Handling of the Animals

Healthy animals were used for this study. Mice were acquired from the Bureau of Food and Drugs (BFAD) in Manila. Rabbits were bought from a breeder in Panabo City, Davao del Norte. A veterinarian confirmed that these animals were healthy. Established guidelines were followed for the proper handling, care, transport, and disposal of the animals. The animals were treated humanely. After acquisition of the animals, a five-day acclimatization period was given prior to conduct of the experiment.

Preparation of Chayote leaf extract

The leaves of *Sechium edule* (Chayote) were obtained at Ladian, Davao City. The plants to be used in the study were identified correctly as *S. edule* by a certified plant taxonomist.

The leaves of Chayote were washed with water. The leaves were then chopped and weighed. Afterwards, the leaves were soaked in 95% ethanol for 48 hours, after which the mixture was filtered. The liquid extract was processed using a rotary evaporator. After the extract was obtained, it was stored at 0-5 °C.

Determination of Acute Toxicity Dose

Mice were used in determining the acute toxicity dose. Despite little difference in the sensitivity between the sexes, in those cases where differences are observed, females are generally slightly more sensitive (OECD 425,

2006); thus only female mice were used in this study. The mice were eight to twelve weeks old, were nulliparous, and non-pregnant at the time of the study. The weights of each mouse were measured before they were given the leaf extract.

The procedure in determining the acute toxicity dose was based on the OECD guidelines (OECD 425, 2006). Three mice were used for each dose. The leaf extract was given to the mouse orally. After each dose, the mice were observed for 14 days. During that observation period, their weight, activity, and feeding behavior were recorded daily. If the animals survived, the second group of animals were to receive a higher dose. If the first animal dies or appears moribund, the second group will receive a lower dose. Dosing was initiated at 2,000 mg/kg based on OECD guidelines (OECD 425, 2006).

Determination of Approximate Effective Dose

Sixteen rabbits, composed of eight males and eight females, were used to determine the approximate effective dose (AED). All of the rabbits were at least two months old. Eight doses were tested and a male-female pair was used for each dose. The weight of each rabbit was measured (Martinez et al., 2005). Baseline

serum uric acid levels of each rabbit were obtained before pyrazinamide was given. Blood samples were obtained via the external jugular vein by a veterinarian. After the baseline serum uric acid levels were obtained, each rabbit received pyrazinamide orally at 30 mg/kg/day, once a day for two weeks, to induce hyperuricemia. After two weeks, the serum uric acid level was measured again.

The first group received the first dose orally at 1 mg/kg. The first dose was increased logarithmically by 0.6 log interval, using the formula:

$$\text{Log } 10 + 0.6 = x$$

$$\text{Next dose} = \text{antilog } x$$

The second dose was given to the second group. The second dose was increased logarithmically, using the same formula, to obtain the third dose. The same formula applied to the succeeding doses. Eight doses were utilized to accurately determine the approximate effective dose (AED).

The Chayote leaf extract was administered for nine consecutive days. The serum uric acid levels of the rabbits were measured one day after treatment. The data was analyzed to determine the AED of the Chayote leaf extract (Beldia et al., 2005).

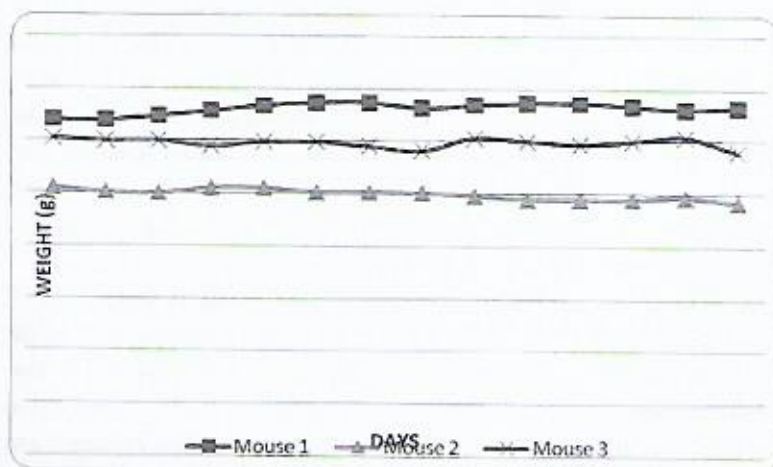


FIGURE 1. Body weights of female mice dosed with 2,000 mg/kg *Sechium edule* leaf extract.

Determination of Effective Dose

The effective dose was determined after the AED was determined for the induction of toxicity. The doses that were used in the study were the upper limit of the dose range. The doses were used in the study. The doses of rabbits. The doses of determination was (Beldia, et al., 2005).

Data Analysis

The research was analyzed by Analysis of Variance (ANOVA) to determine the effective dose of leaf extract in pyrazinamide rabbits.

TABLE 1. Mean body weights of female mice dosed with *Sechium edule* leaf extract.

Mouse
1
2
3

There were no significant differences in behavior, feeding, and appearance of the mice during the period of observation. All mice survived the 14-day observation period. The mice were given 2,000 mg/kg dose. Hence, the effective dose determination was 2,000 mg/kg, which was administered to three female mice.

TABLE 2. Mean body weights of female mice dosed with *Sechium edule* leaf extract.

Mouse
1
2
3

Determination of Effective Dose (ED₅₀)

The effective dose (ED₅₀) was determined after the AED was known. The same procedure for the induction of hyperuricemia was used. The doses that were the lower limit and the upper limit of the AED, and the AED itself were used in determining ED₅₀. Ten rabbits were used. There were five male-female pairs of rabbits. The same procedure used for AED determination was used for obtaining the ED₅₀ (Beldia, et al., 2005).

Data Analysis

The researchers utilized the Probit Analysis to determine the effective dose of *S. edule* leaf extract in lowering serum uric acid in pyrazinamide-induced hyperuricemia in rabbits.

RESULTS AND DISCUSSION

Acute Toxicity Dose

Determination of the acute toxicity dose of *Sechium edule* leaf extract was done prior to the determination of the effective dose. Acute toxicity doses of 2,000 mg/kg and 5,000 mg/kg were tested on mice. Three female mice were used for each dose. The body weights of the mice of both groups were monitored for 14 days after they received a single oral dose of Chayote leaf extract. The behavior, feeding, drinking, and physical appearance of the mice were also observed during the 14-day period. Figure 2 shows the body weights of mice dosed at 2,000 mg/kg *Sechium edule* leaf extract over time.

As can be seen from Figure 2, the weights of the mice did not vary much. Table 1 shows the mean body weights and cumulative weight gains of mice dosed with 2,000mg/kg of *Sechium edule* leaf extract on the 14th day.

TABLE 1. Mean body weights and cumulative weight gains of female mice given with 2,000 mg/kg *Sechium edule* leaf extract on the 14th day.

Mouse	Mean Weight	Cumulative Weight Gain
1	33.14 g	4.06% increase
2	24.94 g	5.10% decrease
3	29.82 g	3.97% decrease

There were no significant changes in the behavior, feeding, drinking, and physical appearance of the mice during the 14-day period of observation. All of them survived the 2,000 mg/kg dose. Hence, the test dose for acute toxicity dose determination was increased to 5,000 mg/kg, which was administered to another group of three female mice. Figure 3 below shows the

body weights of female mice dosed at 5,000mg/kg *Sechium edule* leaf extract over time.

The change in weight still did not vary much and remained relatively constant throughout the experimentation period. Table 2 below shows the mean body weights and cumulative weight gains of mice dosed with 5,000mg/kg of *S. edule* leaf extract on the 14th day.

TABLE 2. Mean body weights and cumulative weight gains of female mice given with 5,000 mg/kg *Sechium edule* leaf extract on the 14th day.

Mouse	Mean Weight	Cumulative Weight Gain
1	27.09 g	4.26% decrease
2	29.80 g	2.30% decrease
3	32.29 g	3.44% increase

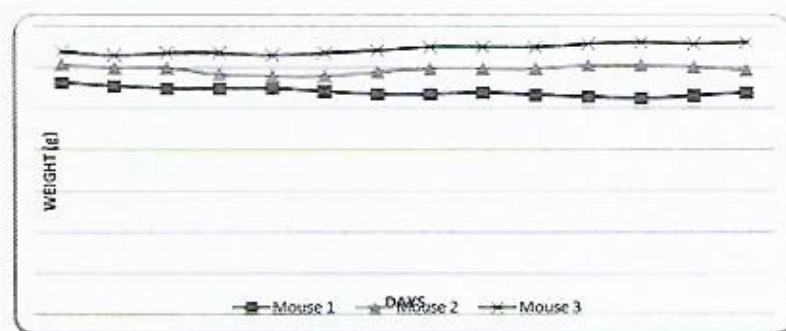


FIGURE 2. Body weights of female mice dosed with 5,000 mg/kg *Sechium edule* leaf extract.

There were no significant changes in the behavior, feeding, drinking, and physical appearance of the mice during the 14-day period of observation. All of them also survived the 5,000 mg/kg dose.

The 2,000 and 5,000 mg/kg doses are the limit tests for acute oral toxicity set by the OECD guidelines (OECD 425, 2006). At these doses of *Sechium edule* leaf extract, neither produced death nor toxicity in female mice. Hence, *S. edule* leaf extract can be considered non-toxic.

Approximate Effective Dose (AED)

Sixteen rabbits, making up eight male-female pairs, were used in the determination of the Approximate Effective Dose (AED). Eight doses of *Sechium edule* leaf extract were tested, starting at 1 mg/kg up to 15,848.93 mg/kg. A pair of rabbits was utilized for each dose. The test doses were given after their serum uric acid levels increased. Their responses were determined if their serum uric acid level decreased significantly after receiving the test doses. Table 3 shows the response of the rabbits to the different doses of *S. edule* leaf extract.

TABLE 3. Responses of rabbits to different doses of *Sechium edule* leaf extract in approximate effective dose (AED) determination.

Rabbit	Dose (mg/kg)	Response (-) no decrease in uric acid (+) decrease in uric acid
1 (Male)	1	(-)
1 (Female)	1	(-)
2 (Male)	3.98	(-)
2 (Female)	3.98	(-)
3 (Male)	15.85	(-)
3 (Female)	15.85	(-)
4 (Male)	63.10	(-)
4 (Female)	63.10	(-)
5 (Male)	251.19	(+)
5 (Female)	251.19	(+)
6 (Male)	1,000	(+)
6 (Female)	1,000	(+)
7 (Male)	3,981.10	(+)
7 (Female)	3,981.10	(+)
8 (Male)	15,848.93	(+)
8 (Female)	15,848.93	(+)

The rabbits
mg/kg dose of
the AED is be
mg/kg.

Effective Dose

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of five male-fem

TABLE 4. Responses of rabbits to different doses of *Sechium edule* leaf extract in approximate effective dose (AED) determination.

Dose (mg/kg)
100.72
138.34
175.96
213.58
251.20

A 40% resp
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noted in the
Therefore, the
and 175.96 mg
ED₅₀ to be 155.

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The rabbits started to respond to the 251.19 mg/kg dose of *S. edule* leaf extract. Therefore, the AED is between 63.10 mg/kg and 251.19 mg/kg.

Effective Dose (ED₅₀)

After obtaining the AED, the effective dose (ED₅₀) was determined. Ten rabbits, composed of five male-female pairs, were used. Five doses

were tested, starting at 100.72 mg/kg up to 251.20 mg/kg. A pair of rabbits was utilized for each dose. The test doses for ED₅₀ were given after serum uric acid levels increased. Their responses were determined if their serum uric acid level decreased significantly after receiving the test doses. Table 4 shows the response of the rabbits to the different doses of *S. edule* leaf extract.

TABLE 4. Responses of rabbits to the different doses of *Sechium edule* leaf extract in effective dose determination (ED₅₀).

Dose (mg/kg)	Observed responses	Percentage (%)	Expected responses	Residual	Probability
100.72	2/10	20	1.739	0.261	0.174
138.34	4/10	40	3.890	0.110	0.389
175.96	6/10	60	6.462	-0.462	0.646
213.58	8/10	80	8.490	-0.490	0.849
251.20	10/10	100	9.544	0.456	0.954

A 40% response was noted in the second dose, at 138.34 mg/kg. A 60% response was noted in the third dose, at 175.96 mg/kg. Therefore, the ED₅₀ lies between 138.34 mg/kg and 175.96 mg/kg. Probit analysis revealed the ED₅₀ to be 155.30 mg/kg.

The response of the rabbits increases linearly with the increasing dose of Chayote leaf extract, starting with the 100.72 mg/kg dose. The graph shows that the ED₅₀ is between 138.34 mg/kg and 175.96 mg/kg.

The experimentation done on female mice to test toxicity of Chayote leaf extract produced no signs of toxic reactions during the 14-day observation period, at maximum dosage of 2000 and 5000 mg/kg, respectively (OECD 423). This indicates that the Chayote leaf extract may be classified as non-toxic. Also, the experiment on rabbit population yielded the result of approximate effective dose between 63.10 mg/kg and 251.19 mg/kg to achieve a significant effect of lowering serum uric acid in the blood. The AED became the basis in getting the effective dose of the plant extract, found to be at the level of 155.30 mg/kg.

Chayote (*Sechium edule*) is one of the promising herbal medicine that people can utilize in the near future that has potential benefits on human health. Thus, this study focuses on the ability of the plant extract to lower serum uric acid at a significant level.

The hypouricemic effect of *S. edule* can be attributed to a group of chemicals, known as flavonoids. Some of its members, such as quercetin, puerarin, myricetin, morin, and kaempferol can significantly reduce uric acid level mainly by inhibiting XO activity (Mo et al., 2007).

CONCLUSION

Acute Toxicity testing of *Sechium edule* leaf extract categorized it as belonging to Category of the Global Harmonized System of Classification and Labelling of Chemicals, thus it is non-toxic. Approximate Effective Dose (AED) ranged from 63.10mg/kg to 257.19mg/kg in lowering serum uric acid in Pyrazinamide induced hyperuricemia rabbits while ED₅₀ Probit analysis of the leaf extract was determined at 155.30 mg/kg.

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A Prospective Controlled Study of *Centella asiatica* Cream in the Treatment of Acute and Chronic Ulcers of the Lower Extremities in Southern

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San Juan, PhD, M.D.

ABSTRACT: Treatment of acute and chronic ulcers of the lower extremities with the effect of *Centella asiatica* cream + Miconazole cream. The study was conducted at the Center (SPMC) for the treatment of ulcers in this double-blind, randomized, controlled trial. The *Centella asiatica* cream + Miconazole cream and post-treatment with Miconazole cream. Results showed no significant difference between experimental and control groups in terms of area reduction between 0 and 4 weeks. It was noted on the two groups that the *Centella asiatica* cream had a potential favorable effect on the ulcers. Further testing on a larger scale is needed.

KEYWORDS: *Centella asiatica*, ulcers, wound healing, Miconazole cream.

A Prospective Randomized Double-Blind Controlled Trial of the Effect of *Centella asiatica* Cream and Silver Sulfadiazine on Acute Superficial Wounds of Patients at Southern Philippines Medical Center

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ABSTRACT: Treatment by *Centella asiatica* cream on acute superficial wounds was compared with the effect of silver sulfadiazine, the standard drug used by Southern Philippines Medical Center (SPMC) for treatment of superficial wounds. Twenty in-patients at SPMC participated in this double-blind controlled trial, randomly distributed into experimental group (*Centella asiatica* cream + NSS, n=10) and control group (Silver Sulfadiazine + NSS, n=10). Baseline and post-treatment measures were obtained for bacterial colony count and wound area. Results showed no significant difference of mean bacterial colony count reduction between the experimental and controlled groups ($p = 0.16$) and no significant difference of mean wound area reduction between the two groups ($p = 0.49$). No local and systemic side effects were also noted on the two groups. This initial small-scale study suggests that *Centella asiatica* has a potential favorable effect on acute superficial wounds comparable to that of silver sulfadiazine. Further testing on a bigger sample is recommended.

KEYWORDS: *Centella asiatica*, acute superficial wounds, bacterial colony count reduction, wound area reduction

INTRODUCTION

Vehicular accidents account for a significant percentage of hospital admissions worldwide (WHO, 2011). More often than not, vehicular accidents result to open wounds that require medical treatment. Minor traumatic wounds are the most prevalent forms of open wounds (Pieper et al., 1999). They require immediate attention for dressing and antibiotic treatment in order to prevent infection and delay wound healing (Dow et al., 1999; Laato et al., 1988).

In Southern Philippines Medical Center where treatment of vehicular accident cases is seemingly routine, the minimum standard care set for acute superficial wound is cleansing using Normal Saline Solution (NSS) to remove devitalized tissues and exudates. This is followed by topical application of antibiotic cream such as silver sulfadiazine, found to be effective against both gram positive and negative bacteria (Goodis et al., 2010; Bowler et al., 2004; Jones et al., 2004). Silver sulfadiazine also decreases formation of exudates (Demling & DeSanti, 2001). However, it does not hasten epithelialization rate (Kjolseth et al., 1994). Locally available as topical cream application, Davao City pharmacies sell it at about PhP 3,400.00 per 500g. This is quite expensive and not easily affordable to the typical clientele that SPMC caters.

Centella asiatica, an herb locally known as *takip-kohol* (or *gotu kola*), is frequently spotted in gardens throughout the Philippines. The entire plant is generally utilized in preparation of drugs and medicine. The therapeutic effects of *Centella asiatica* on various skin problems have been supported by different animal and human studies. *Centella asiatica* is a mild adaptogen proven effective against bacteria and viruses. It has been found to lessen inflammation, is anti-ulcerogenic, and acts as stimulant of the circulation (Winston & Maimes, 2007; Bradwejn et al., 2007). In a study conducted in India, the antibacterial effects of *Centella asiatica* extract against common bacteria such

as *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* had been empirically proven (Mamtha et al., 2004).

Centella asiatica contains triterpenoid saponins, namely; asiaticoside and asiatic acid, which are associated with hastening the rate of wound healing. Asiaticoside has antibacterial properties, while madecassoside is a potent anti-inflammatory phytochemical. The bioactivity of *Centella asiatica* was proven in an *in vitro* study on the wound healing effect on human fibroblast cells of triterpenoid compounds extracted from the plant (Coldren et al., 2003).

Several studies had been made in the past that support the possible wound healing effect of *Centella asiatica*. In a study conducted on Wistar albino rat, *Centella asiatica* notably increased the wound breaking strength, epithelialized the wound quicker, and increased the rate of wound contraction (Somashekar-Shetty et al., 2006). Topical application of asiaticoside to guinea pig wounds resulted in increased tensile strength, collagen content, and epithelialization, thereby promoting wound healing (Shukla et al., 1999).

The anti-inflammatory property of asiaticoside content of *Centella asiatica* had been indicated by the findings of a study done in Hong Kong. Asiaticoside reduces ulcer size by inhibiting the effect of nitric oxide synthase, thereby resulting to decreased level of nitric oxide and thus favoring ulcer healing by its anti-inflammatory property (Guo et al., 2004). Moreover, the triterpenes stimulate production of peptidic hydroxyproline, facilitating the remodeling of collagen in wound (Maquart et al., 1999). This finding is supported by another study on human dermal fibroblast cells stating that synthesis of Type I collagen, the primary component of dermis, is induced by asiaticoside (Lee et al., 2006). Another related study provides additional support to the effect of asiaticoside to wound healing by promoting proliferation of fibroblasts and synthesis of extracellular matrix in human dermis (Lu et al., 2004).

Triterpenoids have been proven to aid in wound healing of the skin, increase wound healing, and reduce wound healing through increased collagen synthesis (1999). In a clinical study, *Centella asiatica* was found to minimize inflammation, scar maturity, and wound healing (Widgerow et al., 2003).

Despite several studies, the wound healing effect of *Centella asiatica* has not been fully established. The triterpenoid compounds in *Centella asiatica* have been shown to hasten wound healing and reduce wound formation. However, the expression levels of these compounds are still partially unknown. Moreover, the mechanism of inducing synthesis of collagen remains unclear (Widgerow et al., 2006). In a study, *Centella asiatica* had given oral dose to pregnant women in studies in animal models to the developing fetus. *Centella asiatica* is not yet fully established and lactating women. *Centella asiatica* is a very well known herb (Hausen, 1993). The mutagenicity against *Centella asiatica* (Yen et al., 2000) is not yet known. The effect of *Centella asiatica* to normal human symptoms to rats is not yet known (dosage (Babu et al., 2003)).

Due to the burden caused by the disease, patients and their families find alternative medicine readily available, and the use of its ready availability (*Centella asiatica* or *gotu kola*) shows promise in the prevention of ugly

Triterpenoids of *Centella asiatica* has been proven to aid in wound healing by strengthening the skin, increasing the anti-oxidant present in wounds, and replenishing the damaged tissues through increased blood concentration (Pierce, 1999). In a clinical trial, topical application of *Centella asiatica* proves to relieve symptoms and minimize inflammation. Moreover, it improves scar maturity, thus lessening scar formation (Widgerow et al., 2000).

Despite several clinical trials and studies done on animals, the exact mechanism by which *Centella asiatica* aids wound healing is yet to be established. These studies have found several compounds in this plant to be associated with hastening wound healing and reducing scar formation. However, the molecular and genetic expression levels of the precise mechanism are still partially understood (Lu et al., 2004). Moreover, the mechanism of asiaticoside in inducing synthesis of type I collagen still remains unclear at the molecular level (Lee et al., 2006). Although some physicians had given oral dosage of *Centella asiatica* to pregnant women (Basellini et al., 1985) and studies in animals suggest no harmful effects to the developing fetus (Bosse, 1989), *Centella asiatica* is not yet proven safe for pregnant and lactating women. Furthermore, *Centella asiatica* is a very weak sensitizer of skin allergies (Hausen, 1993). It lacks cytotoxicity and mutagenicity against *Salmonella typhimurium* (Yen et al., 2001) and has no cytotoxicity to normal human lymphocytes. No toxic symptoms to rats were also observed with oral dosage (Babu et al., 1995).

Due to the high incidence and financial burden caused by acute superficial wounds to patients and their families, there is a need to find alternative medicine that should be cheap, readily available, and easy to prepare. Because of its ready availability, *Centella asiatica* (gotu kola) shows prospect as a potential alternative medicine in the treatment of wound and prevention of ugly scar formation. Once proven,

this will offer the public a natural, readily available, and a lot cheaper treatment for acute superficial wound.

Objectives of the Study

This study aimed to compare the effect of Normal Saline Solution (NSS) + Silver Sulfadiazine, and NSS + *Centella asiatica* Cream on acute superficial wounds of patients in Southern Philippines Medical Center after one week of treatment. Specifically, this study aimed to determine the: 1. Baseline and post-treatment bacterial colony count of acute superficial wounds under positive control and experimental groups; 2. Baseline and post-treatment area measurement of acute superficial wounds under the two treatment arms; 3. Mean bacterial colony count reduction under the two treatment arms; 4. Significant difference in the percentage mean bacterial colony count reduction between the two treatment arms; 5. Mean wound area reduction under the two treatment arms; 6. Significant difference in the percentage mean wound area reduction between the two treatment arms; and 7. Possible side effects of the two treatment arms.

The research hypotheses are stated thus:

- Ha1 There is a significant difference in the mean bacterial colony count reduction between the two treatment arms.
- Ha2 There is a significant difference in the mean wound area reduction between the two treatment arms.

Scope and Limitation

This study had been limited to the effect of *Centella asiatica* as an alternative means to expedite the re-epithelialization process and thus improve the rate of healing of acute superficial wounds. Only male and female patients within the age bracket of 18 to 65 years old who had contracted acute superficial wounds were considered subjects in the study.

This study only compare the rate of wound healing between *Centella asiatica* and the current medical standard, Silver Sulfadiazine, as adjunct treatment for acute superficial wounds. The rate of wound healing was measured and a baseline and post-treatment measurements were conducted to quantify wound area and the bacterial colony count of each group. Moreover, isolated bacterial colonies were stained using Gram staining method to characterize bacteria morphologically. This study no longer included the identification of the specific bacteria present in the bacterial culture of the wound and was therefore limited to distinguishing morphology. Possible side effects of both treatment arms were noted.

Significance of the Study

The research study was designed to explore the possibility of identifying a cheaper and more accessible alternative for the treatment of acute superficial wound. The findings would be beneficial to the Department of Health in its promotion of cheaper herbal alternatives to expensive pharmaceuticals, especially for the medical needs of the economically

disadvantaged sectors of the Philippine population. For the Davao Medical School Foundation, this study would serve as proof of the vibrant research culture that contributes to new knowledge on locally available treatment options for superficial wounds. This could further supply substantial information to other researchers who would desire to follow up on the recommendations of this study or to engage in a similar study in the future.

Theoretical Framework

Centella asiatica contains triterpenoid saponins; namely, asiaticosid and asiatic acid. These compounds hasten the rate of wound healing by increasing wound breaking strength, epithelizing the wound quicker, increasing the anti-oxidants present in the wound, promoting proliferation of fibroblasts and synthesis of extracellular matrix, and inhibiting the growth of common bacteria infecting chronic wound. Moreover, these triterpenoid saponins inhibit the production of excessive collagen in the wound, thereby reducing scar formation.

The variables under study are presumed to be related as in the figure below:

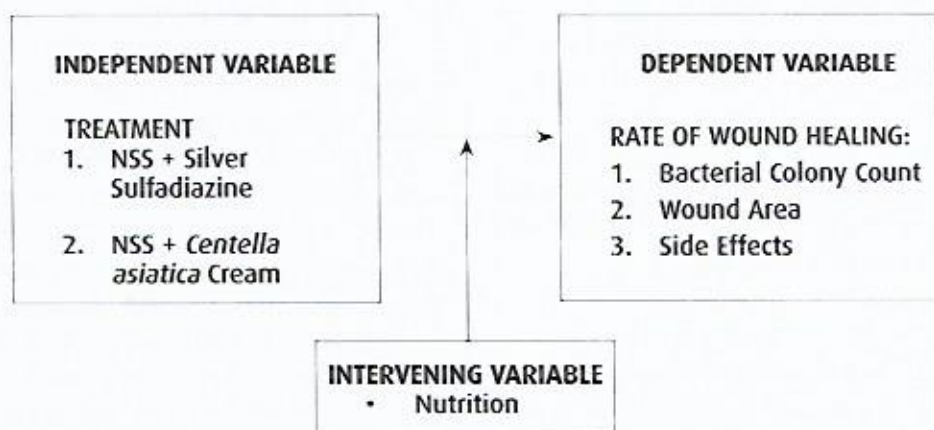


FIGURE 1. Conceptual Framework of the Study

Operational Definition

To be able to use the following terminologies:

Acute Superficial Wound involving the epidermis and dermis.

Bacterial Colony Count colonies of bacteria on blood agar plate.

Bacterial Colony Count of the parameter of wound healing which can be calculated using the formula: (pre-test bacterial colony count - test bacterial colony count) * 100.

Levine Technique involving a swab with an area of 1 cm² seconds with a fluid. It has been the most accurate technique in comparison for isolating specific bacteria. This technique used for the isolation of specimen.

Rate of Wound Healing is the process of wound healing to the skin and the rate of wound healing will be used by the Silver Sulfadiazine includes bacterial colony count, wound area reduction.

Wound Area Reduction parameters in determining wound healing which can be derived from the formula: (pre-test wound area - post-test wound area) * 100.

Operational Definition of Terms

To be able to understand this research, terminologies used in this study are defined as follows:

Acute Superficial Wounds. These are wounds involving the epidermis and top layer of dermis.

Bacterial Colony Count. This is the number of colonies of bacteria growing on the surface of blood agar plate.

Bacterial Colony Count Reduction. This is one of the parameters in determining rate of wound healing which can be derived by using the formula: $(\text{pre-test bacterial colony count} - \text{post-test bacterial colony count} / \text{pre-test bacterial colony count}) * 100$.

Levine Technique. It is a collection technique involving a swab rotated over a wound tissue with an area of one square centimeter for five seconds with adequate pressure to extract fluid. It has been found out that this is the most accurate and most sensitive collection technique in comparison with wound exudate for isolating specific pathogens. This is the technique used for the swabbing and collection of specimen.

Rate of Wound Healing. Wound healing is the process of repair that follows injury to the skin and other soft tissues. The rate of wound healing is the measurement that will be used by the researchers in comparing Silver Sulfadiazine and *Centella asiatica* which includes bacterial colony count reduction and wound area reduction.

Wound Area Reduction. This is one of the parameters in determining rate of wound healing which can be derived by using the formula: $(\text{pre-test wound area} - \text{post-test wound area} / \text{pre-test wound area}) * 100$.

METHODOLOGY

Research Design

The conduct of this study followed a prospective randomized double-blind controlled experimental design. The subjects' acute superficial wounds were examined initially by noting the wound area and bacterial colony counting. After one week interval of treatment, acute superficial wounds were reexamined by taking the same parameters above. The researchers who measured the area and performed bacterial colony counting were blinded regarding the study group of the wounds they were examining. Any side effects of both treatment arms were also noted.

Setting

This study was conducted at the Southern Philippines Medical Center (SPMC), the biggest government hospital in the region where most vehicular accident victims are brought. Specifically, the in-patients included in this study were recruited from the Surgery and Orthopedic Departments.

Unit of Analysis

The researchers measured the subjects' rate of healing of their acute superficial wounds.

Sampling Method

All victims of vehicular accident with acute superficial wounds admitted at Southern Philippines Medical Center for the month of January 2011 were considered as subjects of the study. To qualify for participation, the following inclusion criteria were established: 1. Both male and female with fresh acute superficial wounds; 2. Aged 18 to 65 years old; 3. All patients should receive oral Cloxacillin; and 4. Admitted at SPMC. Excluded were those patients who could not give their consent, were treated with other topical treatment, had hypersensitivity to sulfa drugs and derivatives, were pregnant or lactating, had diabetes mellitus, or were admitted in the Critical Care Unit.

Subjects

There were 23 subjects who passed the inclusion/exclusion criteria; 12 were assigned to the experimental groups and 11 for the control group. However, there were 2 dropouts from the experimental groups and 1 dropout from the control group, leaving both groups with 10 subjects each. In all, only 20 subjects completed their participation in the study.

Research Process

The researchers secured a permit from the Dean of College of Medicine of Davao Medical School Foundation to conduct a study on the effect of *Centella asiatica* and Silver sulfadiazine on the rate of wound healing of acute superficial wounds. The researchers also secured a permit from the Ethics Committee of DMSF before pursuing the study. After obtaining permission, the researchers submitted the proposal to the SPMC Chief of Hospital for approval.

The proposal was forwarded for the scrutiny of the Research and Ethics Committees of the SPMC. Upon the approval of these committees, the researchers proceeded to the SPMC Surgery and Orthopedic Departments for their recommendations. When pertinent recommendations by the two departments were met, the researchers proceeded to data collection.

Prospective subjects were interviewed and screened for participation based on the inclusion/exclusion criteria set. The nature of the study was disclosed to the subjects before they were asked to sign the consent form.

Data gathering was in the presence of a partner resident from SPMC. The subjects' acute superficial wounds were examined based on wound area and bacterial colony count. Photographs were taken of the all acute superficial wounds to serve as part of the pre-test data. The partner resident supervised and certified that the conduct of data gathering complied with standard operating procedures.

The partner resident also helped in recruiting subjects for the study.

After the collection of pre-test data, the test subjects were then equally distributed into two treatment arms: 1.) Normal Saline Solution + Silver sulfadiazine (Positive Control), and 2.) Normal Saline Solution + *Centella asiatica* Cream (Experimental Group). The treatment solutions were applied every day for one week. The partner resident supervised in dressing and application of treatment.

After one week of treatment, the subjects' acute superficial wounds were again examined for bacterial colony count and wound area, as well as possible side effects. The wounds were again photographed. The researchers who obtained the necessary data for baseline and post-treatment were blinded as to which study group they were examining.

All post-test findings were recorded and compared with the baseline data. The final results were subjected to statistical treatment.

Preparation of *Centella asiatica* Crude Extract.

followed steps used by Taemchuay (2008). Before the extraction, the plant was certified by a taxonomist as *Centella asiatica*. The area where the plant was grown was subjected for soil toxicology testing which yielded negative for toxic heavy metals. The researchers screened, trimmed, and cleaned the *Centella asiatica* leaves. These were then sundried for three days. When dried, the leaves were ground in a blender and moved to 1L beakers where the grounds were soaked in ethanol for 24 hours, with a ratio of 1 kilo of dried leaves for every liter of ethanol. The resulting macerate was filtered through cheese cloth. The mixture was subjected to rotary evaporator to concentrate it. Then, the pure extract was diluted to 1% using an oil-based cream obtained from a dermatology clinic in Davao City.

Cleaning and

Researchers who dressing of wound. This was done partner. The approval and starting. Wearing positioned that exposing the wound adhered to the basin was positive flushing the wound area were flushed a piece of sterile manner to remove exudates. Using a wound bed was or *Centella asiatica* covered. Finally sterile gauze and

Swabbing. *Call*
Counting. *Bar*

prior to random
treatment follow
(Gardner et al., 2000)

After preparation with NSS, a swab to swab the swab was rotated sufficient pressure immediately soaked Solution and was diluted by suspension to is 10-fold dilution from Tube 1 to a 100-fold dilution Tube 2 was transferred as 1000-fold Agar Plate was as 1/10, 1/100, respective bacteria to each quadrant plates were inverted.

Cleaning and Application of Treatment.

Researchers who were registered nurses performed dressing of wound and application of treatment. This was done in the presence of the resident partner. The researchers asked for the patient's approval and explained the procedure before starting. Wearing gloves and mask, the researchers positioned that the patient for his comfort before exposing the wound. Any dressings or objects that adhered to the subjects' wound were removed. A basin was positioned to catch the drainage from flushing the wound. Using the 50-cc syringe, the area were flushed with NSS and cleansed with a piece of sterile gauze in a very gentle, circular manner to remove any necrotic tissues and exudates. Using another piece of sterile gauze, the wound bed was swabbed with silver sulfadiazine or *Centella asiatica* cream until the entire area was covered. Finally, the wound was dressed using sterile gauze and bandage.

Swabbing, Culture, and Bacterial Colony Counting. Bacteriologic counts were taken prior to randomization and after one week of treatment following the Levine Technique (Gardner et al., 2006), as detailed below:

After preparing the wound bed by cleaning with NSS, a moistened sterile swab was used to swab the best area of the wound. The swab was rotated over an area of 1cm² with sufficient pressure. Once obtained, the swab was immediately soaked in 1ml sterile 0.9% Saline Solution and mixed. The bacterial suspension was diluted by transferring 0.1mL of the suspension to 0.9mL of NSS as Tube 1 which is 10-fold dilution. 0.1mL was transferred from Tube 1 to another 0.9ml NSS (Tube 2) as 100-fold dilution. Then, another 0.1mL from Tube 2 was transferred it to 0.9mL NSS (Tube 3) as 1000-fold dilution. The prepared Blood Agar Plate was divided into three quadrants as 1/10, 1/100, and 1/1000). 0.01mL of respective bacterial suspension was dropped to each quadrant from a height of 2.5cm. The plates were inverted after 20 minutes to allow

the dropped bacterial suspension to dry. The plates were incubated for 24 hours at 37 degrees Celsius. Colonies that grew were counted and the number of bacteria per 0.1 mL and colony count reduction were computed using the following formulae:

- $B = N \times D$ (colony/0.1mL)

B = number of bacteria

N = number of colonies
counted on a plate

D = dilution factor
(10, 100, 1000)

- Bacterial Colony Count

$$\text{Reduction} = \frac{(\text{Pre-Test} - \text{Post-Test})}{\text{Pre-test (100)}}$$

Gram staining of isolated colonies was also performed for morphological characterization. A smear of a bacterial colony from Blood agar was made on a clean glass slide. The dried smear was passed over a flame three times. Then, the smear was flooded with Crystal Violet for 5 minutes and rinsed with distilled water. Gram's Iodine was then applied for 1 minute before rinsing. Acetone alcohol was used to decolorize the smear for 5 seconds before rinsing again. Application of safranin for 20 minutes followed. Finally, the slide was rinsed, dried, and viewed under Oil Immersion Objective.

Measurement of Area of Acute Superficial Wound. In order to prevent any bias, the one who measured the area of acute superficial wound was blinded. The surface area of the wound was measured by using a two-dimensional linear wound technique basing on Architectural Civil Engineering principles of measuring surface areas. A centimeter ruler was placed near the top of the wound without touching its surface. Photograph of the acute superficial wounds with the centimeter ruler

was taken using Nikon™ D5000 DSLR with an 18-55 mm lens attachment. From a distance of 30 cm from the wound's surface, the zoom of the camera was set to its farthest. Using the photograph of the acute superficial wound, the surface area was calculated by means of computer software that could measure the irregular surface area (SketchUp). The researchers performed the above procedure three times: before treatment application, after a week, and after two weeks of treatment.

Qualitative Description of Side Effects.

A single subject received a single treatment (either experimental or control) and any side effects (rashes, itchiness, discoloration), adverse effects or complications (infections whether local or systemic, regression of healing) should be noted by the partner resident. The attribution whether such reaction occurred due to silver sulfadiazine or *Centella asiatica* cream should be promptly addressed.

Statistical Analysis

Using paired t-test, the mean bacterial colony count reduction of acute superficial wound treated with NSS + Silver sulfadiazine and NSS + *Centella asiatica* Cream were compared for any significant difference. Same statistical treatment was used to compare the mean wound area reduction between the two treatment arms. A *p*-value of 0.05 was considered in this study.

Ethical Considerations

The researchers submitted a protocol for review by the Research and Ethics Committee of both the Davao Medical School Foundation and the Southern Philippines Medical Center. After their approval was obtained, the Ethics Committee of SPMC Departments of Surgery and Orthopedics then reviewed and approved the protocol.

Before a patient who passed the inclusion/exclusion criteria was included in the study, his voluntary and informed consent was sought and obtained in the presence of their legal guardian, when necessary, together with a witness and a physician. The researchers made a thorough explanation of all the risks and benefits that went with participation in the study. The participants were assured of their rights to refuse, to withdraw from the study anytime, to receive the minimum standard care, to privacy, and, to confidentiality. All data obtained were to be kept for at least five years inside a locked cabinet of the research institute of Davao Medical School Foundation. Only the researchers can access the said cabinet. Furthermore, all data obtained for this study would only be used for the purposes as were explicitly stated in the objectives. After five years, all copies of data shall be destroyed or shredded.

At the culmination of the study, the researchers met each of the participants and explained to them the results of the study. Recommendations were given to provide knowledge on how to clean and treat acute superficial wounds.

FINDINGS AND

TABLE 1. Baseline and
(cm²) of Acute Superficial
Sulfadiazine (Pseudo)

Parameters
Mean Bacterial Colony (bacteria/0.01ml)
Mean Wound Area

Table 1 shows the mean bacterial colony count reduction of acute superficial wound treated with NSS + Silver sulfadiazine and NSS + *Centella asiatica* Cream. There was a reduction of bacterial colony count in both treatment arms. The reduction was more significant in the NSS + Silver sulfadiazine group.

TABLE 2. Percentage
Southern Philippines Medical Center
Centella asiatica Cream

Treatment
NSS + Silver sulfadiazine
NSS + <i>Centella asiatica</i> Cream

Table 2 compares the mean wound area reduction between the two treatment arms. The reduction was more significant in the NSS + Silver sulfadiazine group.

FINDINGS AND DISCUSSIONS

TABLE 1. Baseline and Post-Treatment Mean Bacterial Colony Count (bacteria/0.01mL) and Mean Wound Area (cm²) of Acute Superficial Wounds of Patients at Southern Philippines Medical Center Treated with NSS + Silver Sulfadiazine (Positive Control) and NSS + *Centella asiatica* Cream (Experimental) for One Week Period (n=20).

Parameters	NSS + Silver Sulfadiazine (Positive Control) (n=10)		NSS+ <i>Centella asiatica</i> Cream (Experimental) (n=10)	
	Baseline	Post-Treatment	Baseline	Post-Treatment
Mean Bacterial Colony Count (bacteria/0.01mL)	19,026,900	169,290	23,765,400	1,944
Mean Wound Area (cm ²)	8.908	1.202	4.532	0.363

Table 1 shows the baseline and post-treatment mean bacterial colony count (bacteria/0.01mL) and mean wound area (cm²) of acute superficial wounds under the two treatment arms. Under the control group, there was a reduction of mean bacterial colony count

from 19,026,900 to 169,290 bacteria/0.01mL. In the experimental group, there was also marked reduction of mean bacterial colony count from 23,765,400 down to 1,944 bacteria/0.01mL after one week treatment.

TABLE 2. Percentage Mean Bacterial Colony Count Reduction of Acute Superficial Wounds of Patients at Southern Philippines Medical Center Treated with NSS + Silver Sulfadiazine (Positive Control) and NSS + *Centella asiatica* Cream (Experimental) (n=20).

Treatment Arm	n	Mean (%)	p
NSS + Silver sulfadiazine (Positive Control)	10	98.77	0.16
NSS + <i>Centella asiatica</i> Cream (Experimental)	10	99.99	

Table 2 compares the percentage mean bacterial colony count reduction of acute superficial wounds between NSS + silver sulfadiazine as positive control and NSS + *Centella asiatica* Cream as experimental group.

It showed that the experimental group had higher mean bacterial colony count reduction of 99.99% compared to 98.77% of the positive control. However, the difference between the two was not statistically significant ($p = 0.16$).

TABLE 3. Percentage Mean Wound Area Reduction of Acute Superficial Wounds of Patients at Southern Philippines Medical Center Treated with NSS + Silver Sulfadiazine (Positive Control) and NSS + *Centella asiatica* Cream (Experimental) (n=20).

Treatment Arm	n	Mean (10%)	p
NSS + Silver sulfadiazine (Positive Control)	10	74.62	0.49
NSS + <i>Centella asiatica</i> Cream (Experimental Group)	10	87.33	

Table 3 compares the percentage mean wound area reduction of both treatment arms. The study yielded that the experimental group had greater percentage mean wound area reduction of 87.32% as against 74.62% for the control group. However, when computed statistically, there was no significant difference between the two treatment arms as far as mean wound area reduction is concerned ($p = 0.49$).

The above results clearly proved the anti-bacterial and faster wound healing rate properties of *Centella asiatica*. With a slightly higher but statistically not significant difference of mean bacterial colony count reduction of wound treated with *Centella asiatica* (99.99%) compared to 98.77% of silver sulfadiazine, it verified the efficacy of *Centella asiatica* as a topical anti-bacterial agent comparable to standard silver sulfadiazine.

In this study, most of the isolated microorganisms were the commonest bacteria found in wounds (Bowler et al., 2001), to include gram positive cocci in clusters and cocci in chains and gram negative coccobacilli and bacilli. The reduction of bacterial colony count of acute superficial wound after one week treatment of the experimental plant extract is consistent with the findings of studies that claim *Centella asiatica* to inhibit the growth of gram positive and gram negative bacteria and some fungal species (Ullah et al., 2009; Wei et al., 2008).

The mean wound area reduction of acute superficial wound when treated with

experimental treatment was measured at 87.33%, which is 12.71% greater than the 74.62% reduction in the control group. Although the difference between the two was not statistically significant, the result was still consistent with the result of previous studies that *Centella asiatica* hastens rate of wound healing, and potentially prevents formation of keloid and hypertrophic scars (Coldren et al., 2003; Widgerow et al., 2000).

There were no local and systemic side effects noted.

CONCLUSION

This study found *Centella asiatica* Cream to have comparable efficacy with Silver Sulfadiazine, the current standard treatment modality for acute superficial wounds. The results are comparable in terms of its anti-bacterial property and rate of wound area reduction.

RECOMMENDATIONS

To clarify the exact mechanism that makes *Centella asiatica* effective to facilitate wound healing, it is recommended for future researchers to devise better extraction method that will isolate asiaticoside and asiatic acid, suggested in some literature to be the anti-bacterial component in gotu kola. Other improvements on methodological procedures may be suggested, to include the use of tissue biopsy of the wound when grading rate of wound healing,

the identification of infecting the wound types of wound or burn wounds. duration of study scar could be in effectiveness. To results, a larger pop

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the identification of the specific microorganism infecting the wound, the consideration of other types of wound such as lacerations, surgical, or burn wounds, and the allotment of longer duration of study so that characterization of scar could be included in the comparison of effectiveness. To improve generalizability of results, a larger population may be considered.

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The Cut of the M

Sandra Kay H.

The Matigalong recognized for its practice and how this practice leaders, the in the highlands acted as an inner six mandibular are deemed The indigenous to keep the most teeth until the and straighten immediately pre recommended Further research the potential use

Keywords: Ma

ma

The Cut and Blackened Teeth of the *Matigsalug*

Sandra Kay H. Alojado, Joyce A. Abing, and Zohayra M. Montaner

ABSTRACT

The *Matigsalug* tribe is among the Lumads or the indigenous peoples of Mindanao that are recognized for their rich culture and tradition. In particular, the *Matigsalug* is distinguished for its practice of cutting and blackening of teeth. This descriptive study explored why and how this practice is done. Data were gathered through in-depth interviews of tribal leaders, the *manampod* (tribal parodontist), and some elders in a *Matigsalug* community in the highlands of Sitio Patag, Marilog District, Davao City. An educated *Matigsalug* acted as an interpreter. The study found that the tribe cut the six maxillary (upper) and six mandibular (lower) anterior teeth for aesthetic and preventive purposes. Cut teeth are deemed attractive and the *Matigsalug* believe that cut teeth prevents dental ailments. The indigenous practice involves a *manampod* making the subject bite a piece of wood to keep the mouth open. With the use of *tigkamaya* (a small saw), the *manampod* cuts teeth until the *utok* (pulp) is exposed. A *kamanga* (a coarse rock) is then used to smoothen and straighten the teeth. *Pungoy*, a twig which when burned produces a black sap, is immediately pressed onto the teeth to relieve pain and bleeding. *Kamulo* (a vine) is then recommended to be chewed for one week to strengthen and make the tooth stump shiny. Further research is needed on the extent of the practice on the population, as well as on the potential use of *pungoy* and *kamulo* for herbal medicament.

Keywords: *Matigsalug dentistry, Lumad dental practices, herbal medicine, indigenous dental aesthetics*

Pulmonary Function Test Results of First Year Medical Students Exposed to Formaldehyde

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ABSTRACT

First year medical students are constantly exposed to formaldehyde during cadaver dissection. This colorless substance, commonly used for preservation of cadavers, gives off a powerful pungent odor and has reportedly caused respiratory problems to students. This study determined the pulmonary function test (PFT) results of 44 healthy first year medical students of Davao Medical School Foundation Inc. SY 2012-2013 who had been exposed to formaldehyde. The PFT included were FVC, FEV1, and PEFR as measured by a digital spirometer. Using a cross-sectional study design, pre-test of pulmonary function was measured before exposure to the Gross Anatomy Laboratory for three hours, with an interval of one hour and thirty minutes between measurements. Analysis was done by Repeated Measures of Analysis of Variance (ANOVA), Independent T-Test, One-Way ANOVA, and Odds and Risk Ratio. The study revealed a statistically significant ($p < 0.01$) decrease in values of FVC, FEV1, and PEFR of the respondents after the third hour of exposure to formaldehyde. Furthermore, the decline of values was greater in males than females, but both values returned to pre-exposure levels after 24 hours. The changes in the PFT across time for both males and females can be attributed to the acute effects of formaldehyde to the pulmonary function test. Analysis using Odds and Risk Ratio noted that there was a strong association between hours of exposure to formaldehyde and the occurrence of respiratory restriction. Thus, strict implementation of continuous use of protective gears and appropriate ventilation must be implemented.

Keywords: *Pulmonary Function Test, formaldehyde, medical students, Davao Medical School Foundation, Inc.*

Phytochemical Analysis and Antimicrobial Activity of *Hibiscus rosasinensis* as a Natural Agent for

Katreena Galang, James Samson, Yap, Kethro Karl

Hibiscus rosasinensis is also known for its effect of gummed effect of growth, initiation through a combination of water as solvent commercially available agent. Both crude possible skin toxicity prior to observation observed. The results of both treatments producing the opposite as compared to 27 days for M promotion. Given to explore more

Keywords: *Hibiscus*

Phytochemical Screening, Acute Dermal Toxicity, and Approximate Effective Dose of *Hibiscus rosasinensis* linn Leaf Essential Oil as Topical Agent for Hair Growth on Male Albino Rabbits

Katreena Galang, Noelibeth Armilla, Cleoffe Gillensania, Meggia Camille Malinis, Rupinder Singh, James Samuel Velasco, Charmian Rose Villarosa, Christianne Bettine Yap, Sharlene Mae Yap, Kethro Karl Yu, Dr. Melinda C. Tagle, Dr. Genevieve D. Tupas, and Dr. Eva C. San Juan

ABSTRACT

Hibiscus rosasinensis linn, a tropical ornamental plant commonly known as *gumamela*, is also known for its medicinal properties. This study investigated the hair growth promoting effect of *gumamela* leaf essential oil in albino rabbits in terms of length of hair growth, rate of growth, initiation time, and completion time. Leaf essential oil sample was extracted through a combination of steam distillation and rotary evaporation. Steam distillation used water as solvent and hexane as distillant to extract the non-polar components. The commercially available therapeutic hair growth agent Minoxidil was used as the control agent. Both crude formulation and control agent were topically applied and observed for possible skin toxicities and adverse effects were. Approximation of effective dose was tested prior to observation of the formulation's effect on hair growth. No adverse effects were observed. The rabbits generally remained healthy and did not exhibit any irritation from both treatments. Positive effects on hair growth were observed, with the crude formulation producing the optimum for hair growth as manifested by an initiation time of three days, as compared to six days for Minoxidil and a completion time of 24 days, as compared to 27 days for Minoxidil. The results indicate the potential of *gumamela* for hair growth promotion. Given its wide distribution in the Philippines, further investigation is suggested to explore more fully the pharmacological values and cultivars of *H. rosasinensis* linn.

Keywords: *Hibiscus rosasinensis*, *gumamela*, tropical agent, hair growth

From Birthing Facility to Home: The Story of Three Mothers

*Angeli Dominique Tupas, Christopher Uy, Shair Uy Choa Khao, Susana Vega and
Amanda Wonosantoso*

ABSTRACT

The World Health Organization in 2008 revealed that 358,000 women die every day due to pregnancy and childbirth-related complications. In the Philippines, 62% of Filipina women give birth at home with the assistance of a traditional birth attendant or a midwife. Meanwhile, a local survey conducted in Davao City village in 2012 found that 55% of the mothers interviewed delivered at home. While the Philippines has committed to meeting the Millenium Development Goals (MDG), existing UNICEF data show that the country is least likely to achieve the MDG on the reduction of maternal mortality by 2015. This research was done to provide baseline information on why women in the lower socioeconomic bracket still prefer to deliver at home after they would have experienced hospital or clinic delivery. Using a qualitative research design, three women were interviewed for their childbirth-related experiences. It was found that their preference for home delivery was due to economic practicality, precipitous labor, lack of access to health services, perceived need for traditional birth attendants, need for autonomy, care, comfort and convenience, continuity of care, and faith in God. It is recommended that the community role of traditional birth attendants be reconsidered by health officials for the possibility of including them in extensive training programs that are usually exclusive for local midwives and physicians.

Keywords: *Pregnancy and childbirth complications, home birthing, maternal mortality, traditional birth attendants*

Burnout Davao M

*Justin Issa Yu, J
Jabonero, M. L.*

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Keywords: *Burnout*

Burnout among Medical Students in Davao Medical School Foundation, Inc.

Justin Issa Yu, J. Soria, C. Asuncion, C. Caballes, C. Collado, C. Enobio, I. Fuentes, I. Jabonero, M. Lim, V. Porras, B. Sabdullah, and E. Valdevieso

ABSTRACT

In the Philippines, there has been very little research done on burnout among students who are subject to the high stress conditions of medical training. Burnout is a higher form of stress which can affect mental, psychological, and physical health, often observable along subjective measures of emotional exhaustion, cynicism, and professional efficacy. This descriptive cross-sectional study used the Maslach Burnout Inventory – Student Survey (MBI-SS) to determine the levels of burnout among of 457 medical students of Davao Medical School Foundation, Inc. (DMSFI) across year levels. Findings revealed that close to 65% of the total respondents were burned out. Across year levels, the burnout rate was highest among first year students (70%) and lowest among second year students (57%). Females had a higher burnout rate (61%) than males (39%).

Keywords: *Burnout, emotional exhaustion, cynicism, professional efficacy, stress, medical Students*

Practices on Solid Waste Disposal

Felipa Digamon, Arceli Estacion, and Nonita Gato

ABSTRACT

Solid waste disposal has become a major environmental problem in the Philippines such that laws and ordinances have been recently promulgated in the national as well as local levels. Households contribute to a significant portion of the solid waste. It is therefore important to examine the impact of household practices to be able to help villages design appropriate plans for solid waste disposal. Following a descriptive research design, this study aimed to determine and assess the practices of mothers on solid waste disposal in Purok 3, Barangay Buda, Marilog District, Davao City. Primary data were collected through face to face interview using a structured questionnaire. The result showed that most of the waste generated in the area was biodegradable such as paper, carton, and kitchen leavings. In the disposal of these, the majority of the respondents did not comply with the solid waste disposal standards set by Republic Act 9003, opting to indiscriminately burn or haphazardly bury the waste. The households also did not have a habit of covering the trashcans in the homes. Education on recycling is advised in order to reduce the volume of wastes to be discarded by households.

Keywords: *Solid waste disposal, solid waste management, pollution, household waste*

Analysis of Water from Binugao Creek, Toril District, Davao City

Maria Joy Arca, Daniel Asis, Leonardo Aya-ay, Jr., and Jeannette Beniga

ABSTRACT

Water pollution has become a perennial problem all over the world. During the community diagnosis conducted in August 2012 in Sitio, Sta. Cruz and Sitio Northern, Barangay Binugao, Toril, Davao City where poultry dressing plants are present, many cases of asthma and water-related skin diseases were noted. A study was conducted to determine the water quality of Binugao Creek from three sampling station (upstream, midstream, and downstream) in terms of pH, turbidity, dissolved oxygen (DO), temperature, zinc, and copper. A qualitative analysis of the presence of coliform bacteria using PHC bottle was also done. Results revealed that pH levels in the three stations were within normal limits. Temperature and turbidity were highest while DO was lowest in the midstream, implying the vulnerability of fishes and other aquatic life to disease. Zinc concentration in all three stations was within normal range, while concentration of copper was highest midstream. Furthermore, PHC bottle revealed positive results after 24 hours of incubation which signified the presence of coliform bacteria. Hence, this study recommends the conduct of chemical and bacteriological analysis to confirm water safety. Community awareness and possible promulgation of local resolution are major concerns that should be done to address the issue concerning pollution in Binugao Creek.

Keywords: *Water quality, chemical analysis, bacteriological analysis, water pollution*

Compliance of Schistosoma Agusan

Joey Albert R. Pao

The National elimination of Schistosoma and arguably the especially in Indonesia is pegged at 85 percent by 2015. It is a 5-year annual target. It is an obstacle for the elimination of Schistosoma. More than 20 percent of the population in the treatment could not be remedied. In an interview with the knowledge, attitudes of its implementation not distinctly related to the study participants' performance. It is a well-disseminated information that should be made. There is

Keywords: *Schistosoma*

Compliance to Mass Treatment for Schistosomiasis among Adults in Bunawan, Agusan del Sur

Joey Albert R. Pinili, RN, MCH

ABSTRACT

The National Objectives for Health (NOH) Philippines 2005-2010 aim for the elimination of Schistosomiasis in the country. One of the main thrusts in achieving this goal, and arguably the most important, is to conduct mass chemotherapy utilizing Praziquantel especially in identified areas where Schistosomiasis is endemic. Success rate for mass treatment is pegged at 85 percent treatment coverage of the populace. As the program is intended to be a 5-year annual mass chemotherapy, effectively sustaining treatment coverage presents to be an obstacle for the program. In the Municipality of Bunawan, mass treatment coverage for Schistosomiasis fell sharply from more than 85 percent in the initial year to roughly less than 20 percent in the second year of program implementation. Non-compliance to mass treatment could possibly defeat the purpose of the program itself and if this decline could not be remedied soon, eradicating the disease would continue to be out of reach. Utilizing an interview schedule questionnaire to obtain information on the demographic profile, knowledge, attitude and perception towards Schistosomiasis mass treatment after two years of its implementation in the locale, this descriptive study revealed that noncompliance was not distinctly related to poor knowledge (high score=83%) and that more than half (54.3%) of the study participants believed that taking Praziquantel leads to discomfort and low work performance. It is also indicated that information on the holding of mass treatment was not well-disseminated. Modifications on the strategy to implement mass chemotherapy should be made. There is a need for repeat mass treatment in low coverage areas.

Keywords: *Schistosomiasis, Mass Treatment, Praziquantel*

Quality Prenatal Care Intervention Plan for Pregnant Women in the Municipality of Pantukan

Ma. Corazon S. Mendez, RN, MCH

ABSTRACT

Despite efforts to avert maternal and child morbidity and mortality, pregnancy and childbirth continue to pose risks to the lives of mothers and their newborns. The Maternal Mortality Ratio in Pantukan in 2010 was still high at 106/100,000 livebirths while the Infant Mortality Rate was 13.5/1,000 livebirths. This study used a descriptive evaluative design and was conducted to ascertain the quality prenatal care for pregnant women as basis in the formulation of an intervention plan. Collection of data was done through records review, key informant interview (KII) and a planning workshop on an intervention plan. Results showed that a total of 1,346 women who delivered from January to December 2010 as per records in the Target Client List (TCL) did not receive quality prenatal care due to inadequate laboratory reagents, lack of ferrous sulfate capsules, no prenatal care flow system, pregnant women's lack of knowledge on oral health and no barangay visits done by the medical technologist and doctor of the Rural Health Unit (RHU). The intervention plan formulated included the development of standard procedures in prenatal care, procurement of laboratory supplies, barangay visit by a prenatal care team composed of the doctor, dentist and medical technologist, pregnancy tracking, dental health information dissemination, partnership with banana plantation clinics and regular maternal health program review in the health center.

Keywords: *Quality Prenatal Care, Intervention Plan, Pregnant Women*

Dietary Employee Science

Jury Lyn P. ...

Hypertension in Davao Oriental personnel of the Mati. The study characteristics, and medication restrictions, den Energy Nutrition each of the selected in the study. The personal interview cases were medical history of hypertension, drunk alcohol, total energy requirement essential Ca (27 than the present dietary restriction a dietitian was

Keywords: *Hypertension, Recommended Dietary Potassium (K), Sodium*

Dietary Assessment of Selected Hypertensive Employees of Davao Oriental State College of Science and Technology: A Case Study Series

Juvy Lyn P. Torreno, RND, MCH

ABSTRACT

Hypertension is a public health problem worldwide and the second leading cause of deaths in Davao Oriental. This case series aimed to assess the dietary practices of the hypertensive personnel of the Davao Oriental State College of Science and Technology (DOSCST) in Mati. The study aimed to: describe the personnel's health profile in terms of anthropometric characteristics, vital signs, lifestyle, physical activity, family history of hypertension, illnesses and medication; assess their dietary profile in terms of Total Energy Requirement and dietary restrictions; determine their daily caloric and nutrient intake compared against the Required Energy Nutrient Intake (RENI); and formulate an individualized dietary prescription for each of the selected hypertensive personnel. Five cases were purposively selected to participate in the study. Data on the dietary intake of calories, Ca, K and Na were determined through personal interview using a 24-hour dietary recall form and interview schedule. The five cases were middle aged, sedentary and overweight. All had stage 2 hypertension, had family history of hypertension, and were on maintenance medication. One of them smoked and drunk alcohol. None had other diagnosed illness. Three cases consumed less than their daily total energy requirement (TER) while one consumed more. The average daily intake of the essential Ca (276.20 mg), K (1,155.40 mg) and Na (787.60 mg) by the cases was lower than the prescribed RENI of 500, 2000 and 5000 mg, respectively due to self-imposed dietary restrictions. This indicated that they mismanaged their health condition. Referral to a dietitian was recommended.

Keywords: *Hypertension, Recommended Energy Requirement (RER), FNRI-DOST, Recommended Energy and Nutrient Intakes (RENI), Dietary Assessment, Calcium (Ca), Potassium (K), Sodium (Na)*

Impressions of Barangay Health Workers in Region XII on Kalusugan Pangkalahatan

Venancio B. Ang, MD, MCH

ABSTRACT

Under the Aquino administration, the "Universal Health Care" or "Kalusugan Pangkalahatan (KP)" is the adopted strategic thrust of the Department of Health (DOH). KP has three major components: Financial Risk Protection (FPR); Quality Health Care and Facilities; and Millennium Development Goals (MDG) Attainment. Each component carries its own corresponding package of health services. FPR deals with the National Health Insurance Program (NHIP) through PhilHealth with the aim of enrolling all Filipino for equitable service assistance through sponsorship of identified poor households. Quality Health Care and Facilities involves upgrading, erecting new facilities, provision of necessary medical equipment, and COMPAK for functional facility-based quality health services. The MDG attainment focuses more on MDG Goals no. 4, 5, and 6 to improve infant health, reduce maternal deaths, and manage emerging diseases. The Community Health Team (CHT) Mobilization Approach is the means in which the above activities are to be carried out. The CHT, composed of participating community-based health volunteers, rely heavily on the Barangay Health Workers (BHW) for the implementation of the KP. The target priority population of CHT are those placed by the DSWD under the National Household Targeting System for Poverty Reduction (NHTS PR), especially those listed under the Conditional Cash Transfer (CCT)/4 Ps. Given the multiple activities foreseen for BHWs, one may wonder if they are up to the task of successfully implementing the KP. This qualitative study used focus group discussions (FGDs) to generate impressions among Region XII BHWs on KP Strategy. Results revealed that the BHWs were not thoroughly prepared for this activity. While they expressed the willingness and desire to help, they need financial and technical assistance. Republic Act No. 7883, known as the BHW Act, should be re-visited to evaluate whether it is still attuned to current reality.

Keywords: *Kalusugan Pangkalahatan, Barangay Health Workers, Impressions*

Utilization of Health Services by the Poblacion

Elena D. L...

Although the Development Goals complications and This study was an of all pregnant women 128 women of the schedule and the health care issues of pregnant women during the first and family planning of prenatal care. less likely to have getting pregnant need for prenatal

Keywords: *Pregnancy*

Utilization of Prenatal Care Services in Poblacion Magpet, Cotabato

Elena D. Laus, RN, MCH

ABSTRACT

Although the reduction of maternal mortality levels is one of the key Millennium Development Goals, community-based evidence on utilization of prenatal care and obstetric complications and maternal care-seeking behavior remains limited in low resource countries. This study was aimed to determine the factors that affect the utilization of prenatal care services of all pregnant women in Poblacion Magpet, Cotabato on April 6 to May 6, 2011. A total of 128 women of reproductive age who gave birth in 2010 were interviewed using an interview schedule and focus group discussion guide. Low attendance at prenatal visits brought this health care issue to the forefront of the province and to the municipality. Several characteristics of pregnant women were found to influence the delayed use of prenatal care services especially during the first trimester. Of all the factors identified, the distance from the health facility and family planning practices were found to be significantly associated with the utilization of prenatal care. Women who stayed less than one kilometer away from the health center are less likely to have quality prenatal care and women who used family planning methods before getting pregnant are more likely to have quality prenatal care. These findings emphasized the need for promotion of prenatal care services among women of reproductive age.

Keywords: *Prenatal Care Services, Pregnancy, Pregnant Women*

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The manuscript submitted should be double-spaced all throughout, left-justified, with 1-inch margin on every side, and printed using Arial 12 points on 8 1/2 x 11 inch bond paper.

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Every research article must have all the following four major parts: (1) Title Page, (2) Abstract, (3) Body of the Report, and (4) References. Each part begins on a new page.

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- The author(s) and affiliation(s), centered on the line.

Abstract

The one-page Abstract should contain < 300 words in a single unindented paragraph, must mention the research problem, sample, method, findings, and conclusion (or even implication).

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Three to ten key words that reflect the content of the manuscript should be provided.

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The Badjao Concepts of Health and Health Service Utilization
Jessievilita C. Fabian, MD, MCH

Acute Toxicity Dose in Mice, Approximate Effective Dose, Effective Dose (ED₅₀)
and Bioassay of Calabash (*Crescentia cujete*) Fruit Decoction as a Hypoglycemic
Agent in Alloxan-induced Hyperglycemic Rabbits
Sittie Jebnailyn S. Amilhasan, et al.

Doctor-Patient Relationship: How Do Patients Perceive It?
Sheila Marie Quiachon-Hernandez, MD, FPCR, MHPed

Acute Toxicity Dose of Chayote (*Sechium edule*) Leaf Extract in Mice and Effective
Dose (ED₅₀) In Lowering Serum Uric Acid Level in Pyrazinamide-Induced
Hyperuricemia in Rabbits
Francis Gerwin U. Jalipa, et al.

A Prospective Randomized Double-Blind Controlled Trial of the Effect of
Centella asiatica Cream and Silver Sulfadiazine on Acute Superficial Wounds
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