Community Health Workers' Concept and Understanding of Diabetes: A Qualitative Study

Mary Ann J. Ladia, PhD,[1,2] Olivia T. Sison, MSPH, ScM,[1,2,3] Nina T. Castillo-Carandang, PhD,[2,3]
Rody G. Sy, MD,[3,4] Felix Eduardo R. Punzalan, MD, MSc,[3,4] Elmer Jasper B. Llanes, MD,[3,4]
Paul Ferdinand M. Reganit, MD, MPH,[3,4] Felicidad V. Velandria, RND[3] and Wilbert Allan G. Gumatay, MD[3]

[1]*Institute of Clinical Epidemiology, National Institutes of Health, University of the Philippines Manila*
[2]*Department of Clinical Epidemiology, College of Medicine, University of the Philippines Manila*
[3]*LIFE course study in CARdiovascular disease Epidemiology (LIFECARE) Philippine Study Group, Lipid Research Unit, Philippine General Hospital, University of the Philippines Manila*
[4]*Department of Medicine, Philippine General Hospital, University of the Philippines Manila*

ABSTRACT

Objectives. Community health workers (CHWs) fill in the insufficiency of health professionals in low-income countries. The CHWs' roles include health education of their constituents whose health they likewise take care. This study aimed to describe the concept and understanding of diabetes among CHWs in the Philippines.

Methods. Fifty female CHWs currently working in rural and urban areas participated in six focus group discussions with guidance from Kleinman's eight questions. With the written informed consent of the participants, discussions were recorded and transcribed by the Research Assistant. A multi-disciplinary team manually analyzed the data. Disagreements were discussed among them and the physicians provided clinical analyses and explanations on the results. Quotations of an important point of view were also presented. Pseudonyms were utilized to uphold anonymity.

Results. CHWs were aged 32 to 72 years; older participants reside in rural areas. Majority were married, housekeepers, and high school graduates. Some CHWs and their family were suffering from diabetes or *dyabetis*, the disease of the rich according to them. Its causes were food and lifestyle, and believed to be hereditary. Complications lead to death. Amputation was feared the most. Diabetes is incurable. Persons with diabetes should take maintenance medicines, and seek physicians' and family's help. Together with the patient, the family must decide on its management. Balanced diet, healthy lifestyle, maintenance medicines, food supplements, and herbal plants were perceived treatments. The internist should lower blood sugar level as well as prolong life span. Proper diet and regular check-up prevent diabetes.

Conclusions. CHWs' concept and understanding of diabetes reflect some of the biomedical causes, effects, treatment, and prevention of diabetes as well as its social determinants. The efficacy and safety of herbal plants in the treatment of diabetes, however, should be further studied. Training on diabetes care should be provided to address their fears of amputation, insulin injection, and complications.

Keywords: diabetes, community health workers, Philippines

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Corresponding author: Mary Ann J. Ladia, PhD
Institute of Clinical Epidemiology
National Institutes of Health
University of the Philippines Manila
623 Pedro Gil Street, Ermita, Manila 1000, Philippines
Email: mjladia1@up.edu.ph
ORCiD: https://orcid.org/0000-0003-4757-8072

INTRODUCTION

Community health workers or CHWs fill the shortage of health professionals in many low-income countries including the Philippines.[1] The number of health workers in a community is set by the Philippine Department of Health (DOH); they should not exceed one percent of the total population they serve.[2] Sison et al. described the many functions of CHWs as health educators and health care providers.[3] Hence, it is important to study CHWs' concept and understanding of the disease as their role in the community includes health education to their constituents whose health they take care. Yet, they themselves may not

have comprehensive knowledge about the diseases like diabetes mellitus (DM) which is expected to reach 300 million by 2025[4] or 642 million by 2040.[5] Worse, they themselves may be sick of diabetes which may limit their participation and performance as CHWs. They may also generalize their health condition although speaking from experience makes one an effective peer educator.

According to Aikins et al., lay knowledge on the causes and complications of diabetes is uncomprehensive.[6] The source of information is usually the health workers whose "knowledge about inpatients diabetes care is mediocre."[4]

This study aimed to describe the concept and understanding of diabetes among CHWs in selected rural and urban *barangays* or villages in the Philippines. It is the first study of CHWs concept and understanding of diabetes in the country; it forms part of the research on healthy health workers which is a sub-study of the LIFEcourse study in CARdiovascular disease Epidemiology (LIFECARE).[7] Complementing this paper is the article entitled, "Prevalence of metabolic syndrome and cardiovascular risk factors among CHWs in selected villages in the Philippines.". It estimated the prevalence of cardiovascular risk factors and metabolic syndrome as well as determined the association of urbanization and socio-demographic characteristics with hypertension, DM, and metabolic syndrome among CHWs.[3]

METHODS

Study design and setting

This is a qualitative study using phenomenology as its approach. As mentioned earlier, this paper forms part of the healthy health workers research project.[3] The sub-study was conducted in urban and rural *barangays* or villages in Central and Southern Luzon, specifically the provinces of Batangas, Bulacan, Rizal, and Quezon. These were the same research sites of LIFECARE.

Data collection

Focus group discussions (FGDs) were conducted in three rural municipalities (Sariaya and Tiaong in Quezon province; Laurel in Batangas province) and in three urban municipalities (Angono in Rizal province; Sta. Maria and Pandi in Bulacan province).

Recruitment of participants was done by the Field Coordinator who was with LIFECARE since its inception and is more familiar with the place and people. She invited the current CHWs in the area regardless of their number of years of service.

A total of fifty female CHWs participated in six FGDs conducted in a private setting. Participants were asked what they considered to be the top five health problems in their communities. Across all FGDs, diabetes was mentioned adding that their families or themselves has had the disease. Partly guided by the eight questions by Kleinman[8], the CHWs' concept and understanding of diabetes was determined in the two-hour discussions or when saturation was reached. They were asked the local term of the disease and discussed the causes, effects, severity, or the natural course of illness including that which is feared most about it. They likewise narrated health-seeking, treatments, and expectations, as well as decision-making for the disease management. Last, the CHWs' ideas about diabetes prevention were likewise revealed.

Data processing and analysis

The Research Assistant (RA) trained in qualitative methods transcribed the audio-taped discussions which was analyzed manually and thematically by a multi-disciplinary team composed of medical anthropologist, health social scientist, cardiologists, and a biostatistician. With the supervision of ML, the RA tabulated the responses; both served as analysts. The former wrote the results of the study with assistance from the RA while NC and OS reviewed it. Discussions among investigators were conducted when there were disagreements. The physicians provided the clinical analyses and explanations of the findings. The authors and agencies have no relationship with the participants, community, or stakeholders. There is no potential source of influence on the conduct and conclusions of the research.

Common themes derived from the data were highlighted. To illustrate the theme, quotations of an important point of view were presented.

Ethical considerations

The University of the Philippines Manila Research Ethics Board (UPMREB 2008-027-01) approved the study. Informed written consent was obtained from the participants by the recruiter and notetaker prior to the conduct including recording of the discussions. Complete confidentiality could not be assured in FGDs due to the information exchange by a number of participants, however, they were requested not to talk about the proceedings with individuals outside their group. Pseudonyms were used to uphold anonymity of the participants.

Snacks were served after the FGDs. Transportation from the participants' residence to the venue and vice-versa were reimbursed.

RESULTS

Demographic profile of FGD participants

Median age of participants was 49.5 years ranging from 32-72 years (Table 1). CHWs from rural areas have a median age of 55.5 years while those from urban areas have a median age of 42.5 years. Majority were married and housekeepers aside from being community health volunteers. Thirty CHWs attained high school level of education while 15 had college level of education.

In selected urban *barangays* in Bulacan, some of the participants were designated as mother leaders (MLs) and

Table 1. Demographic Profile of FGD Participants according to Areas

	Rural area	Urban area	Total
Number of participants	24	26	50
Age			
Mean (SD)	53.3 (8.4)	45.3 (11.3)	49.2 (10.6)
Median	55.5	42.5	49.5
Range	34-65	32-72	32-72
Civil status			
Single, never married	1	3	4
Married	19	16	35
Widow/widower	2	3	5
Separated/annulled/divorced	1	2	3
Live-in	1	2	3
Education			
College	8	7	15
High School	14	16	30
Elementary	2	3	5
Activity aside from being CHW			
Housekeeper	19	19	38
Barangay Kagawad	1	0	1
Farmer	2	0	2
Massage therapist	1	1	2
Businesswoman/Secretary	1	1	2
Sari-sari store owner	0	1	1
Vendor	0	1	1
SSS Pensioner	0	1	1
Embroidery/Sewer	0	1	1
Hog raising	0	1	1
Barangay designation*			
BHW	23	13	36
Mother Leader	0	7	7
Barangay Nutrition Scholar	1	6	7
Barangay Sanitation Auxiliary	2	0	2
Nurse	1	0	1

**multiple response*

they were volunteer CHWs performing the functions of *Barangay* Health Workers (BHWs). In rural areas, some of the CHWs have other designations such as *barangay* nutrition scholars (BNSs) or *barangay* sanitation auxiliary (BSA).

Local term for diabetes

CHWs in all urban areas called the disease, diabetes, the same as the biomedical term. Sometimes, they used "*dyabetis,"* the Tagalog language. Those in two rural areas such as Tiaong and Laurel referred to it as *"mataas ang sugar* (level)*"* or high sugar (level). CHWs in Laurel also described someone with diabetes as somebody with low insulin or *"mababa ang insulin."*

CHWs also described the persons with diabetes in terms of their characteristics. While sugar is sweet, a person with diabetes was described as somebody who is not sweet because some were observed to be ill-tempered. Marie said in Tagalog, *"Hindi sweet ang may diabetes kasi masungit.* (A person with diabetes is not sweet because he is ill-tempered.)*"* Some may be ill-tempered due to their illness. Emily explains, *"Siguro yung iba masungit dahil naiisip niya yung kanyang sakit.* (Maybe some are ill-tempered because they are thinking of their disease.)"

According to the CHWs in Laurel, diabetes means having unhealed wound and blurred vision; being obese, and always thirsty as well as very tired; having sticky perspiration; and having wrinkled, dry, and scale-like skin.

Angie: *"Sugat na hindi gumagaling"*
(Wound that does not heal)

Grace: *"Lumalabo ang mata"*
(Vision gets blurred)

Marie: *"Sobrang taba at laging nauuhaw"*
(Obese and always thirsty)

Emily: *"Pagod na pagod po siya lagi"*
(Always very tired)

Sheila: *"Pinagpapawisan ng malagkit"*
(Sticky sweats)

Sheila: *"Kulubot na dry* [skin] *na parang may scales"*
(Wrinkled, dry, and scale-like skin)

In short, persons with diabetes were also described in terms of their emotional state, sensory ability, physical characteristics, and others.

Member of the family who has diabetes

In general, the CHWs' fathers and/or mothers have diabetes. A CHW said that her father had diabetes; his vision was impaired and suffered from stroke. Other family members of CHWs such as their husbands, and other relatives like uncles, nieces, and nephews have diabetes. Olga of Pandi revealed that she has 13 uncles with diabetes, as well as her mom and her father. All of them were amputated except her mom.

Aside from family members, a *barangay* captain in one of the urban sites was also named as somebody with diabetes and hypertension. A CHW from Sariaya disclosed that she was once diabetic due to drinking "soft drinks" or soda and coffee, and eating sweet foods.

Causes of diabetes

In general, sweet foods intake and heredity are the perceived causes of diabetes. Sweets such as cake, ice cream, chocolates, and coco jam were enumerated across sites, both rural and urban areas. Drinking "soft drinks" or any sweet drinks are likewise mentioned except in Sta. Maria, an urban area. Eating plenty of rice or carbohydrates was also perceived as a cause of diabetes in all areas except in Sariaya, a rural area.

In Tiaong, the CHWs mentioned a lot of rice, sweet foods, and drinks as causes of diabetes:

"Sa mga kinakain. Pagkain ng madaming kanin at matamis na pagkain at inumin."

([Diabetes is caused by] foods we eat. Eating plenty of rice as well as sweet foods and drinks.) – Sharon and Fely

Other CHWs were confused why some family members eat a lot of sweets yet they are not diagnosed with diabetes:

"Parang hindi naman kasi yung asawa ko sobrang takaw sa matamis pero wala namang diabetes."

(It does not seem so because my husband eats sweets voraciously yet he does not have diabetes.) – Isabel from Sariaya

"Ang mister ko minsan asukal ang ulam, nilagay sa kanin pero wala naman blood sugar *pero akong hindi nagkakakain ng matamis eh bakit ako may* blood sugar?"

(My husband sometimes eats sugar as viand but he does not have blood sugar [his blood sugar is low]; while I am not fond of sweets yet I have [high] blood sugar [level].) – Emily from Laurel

Aside from foods and drinks, heredity was also perceived as a cause of diabetes by CHWs in all areas. Mina and Sharon of Tiaong said, *"namamana rin"* (it is likewise inherited). CHWs of Sariaya observed and asked question regarding heredity.

Cristy: *"Namamana, ito siguro and unang-unang dahilan kasi sa pamilya namin, lahat mayroon, ang asawa ko din ganun."*

(Hereditary, maybe this is the prime cause because in our family, all have it, and so is my husband's [family].)

Liza: "*Tanong ko lang, kapag ba ang* both parents *ay may diabetes, talaga bang magkakaroon din ang anak?*"

(If I may ask, when both parents have diabetes, will their children have it as well?)

In Sta. Maria, Cleofe shared what she heard about the disease:

"Sabi nila, 'pag yung magulang mo … may diabetes, namamana daw. Kasi, konti na daw kinakain niyang kanin, bakit may diabetes siya?

(According to them, when your parents have diabetes, it is said to be inherited. Because, she already eats a small amount of rice, yet why does she have diabetes?)

CHWs mentioned or surmised heredity as one of the perceived causes of diabetes.

Effects of diabetes on the individual

CHWs across sites said that organs of individuals with diabetes are affected particularly the eyes, kidney, liver, and feet. The first organ affected is the heart as claimed by a CHW in Sariaya, a rural area. Liza said:

"Ang unang tinatamaan ay ang puso niya. Nababara o lumalaki ang puso."

(The first affected [organ] is the heart. It is obstructed or enlarged.)

According to her, diabetes is like cancer because it affects all organs. In Tagalog, "*Parang* cancer *ang* diabetes *kasi lahat ng* organs *apektado.*" Perceived effect of diabetes on one's eyes were blurring of vision or loss of eyesight. Effects on one's organs are generally termed as complications. A CHW in Sariaya relates his husband's condition:

"Pala-kaibigan siya, nananawag ang sakit na diabetes. Sabi kasi ng doktor namin na kapag nagka-diabetes ka, asahan na yung mga komplikasyon, sa bato at nagkakaroon ng alta presyon. Ang asawa ko po, ang unang komplikasyon niya ay alta presyon tapos nagkaroon ng kidney stones at nagkaroon din siya ng sakit sa baga noon pero hindi naman siya naninigarilyo at umiinom."

(He is friendly, diabetes is a disease of calling. According to our doctor, once you have diabetes, expect complications, in the kidney and onset of high blood pressure. My husband's first complication was high blood then he had kidney stones as well as lung disease even if he neither smokes nor drinks.) – Cristy

Amputation was one of the perceived effects of diabetes. It is due to unhealed wounds, usually the inner part of the wound, according to the CHW in Agono:

"Kapag nasugatan ay matagal gumaling. Once *po na nagka-sugat… yun, hindi naman po niya nakita… sa labas ay magaling pero… akala niya po magaling na, yung loob naman po ang dinadale."*

(When wounded, it does not easily heal. Once wounded… there, he/she does not see it… the outer part is healed but … he/she thinks it is healed, the inner part is being destroyed).

A similar observation was noted in Sta. Maria. The CHWs said that when diabetics are wounded, healing takes time until the foot is amputated. Amputation of the feet, hands, or nails are for the severe cases only according to a CHW in Angono:

"Maaring maputulan siya ng paa o ng kamay o kuko [daliri]… Para lang yun sa malala…"

(He/she may be amputated on the feet, hands, or nails [fingers]. That is only for severe ones.)

Body malaise was a perceived effect of diabetes except in Pandi, an urban area. Thus, work is affected because they cannot function as much as they want to. Among CHWs

in rural areas, stress and weight loss were likewise observed effects; these were not mentioned at all in urban areas.

Severity of diabetes

Diabetes was perceived as an incurable disease which lasts a lifetime. It was also compared to stroke and high blood pressure in Tiaong.

> *"Ang sabi naman ng iba na mas mabuti na daw ma-stroke kesa magka-diabetes, dahil ang stroke ay pwede pa magpa-therapy at gumaling samantalang ang diabetes ay pang-habang buhay na."*
>
> (Others say that it is better to undergo stroke rather than have diabetes, because therapy may be done in stroke [patients] while diabetes is for a lifetime.) – Mina

> "*Sa tingin ko, ito* [diabetes] *ay mas malubha kaysa sa* high blood [pressure] *dahil sa mahirap ang mga nararamdaman ng isang may karamdaman. Delikado din dahilan sa mga komplikasyon. Kapag sobrang baba din naman ng* sugar [level] *ay delikado.*"
>
> (I think that, this [diabetes] is more severe than high blood [pressure] because it is difficult for those with illness. It is also dangerous for those with complications. When sugar level is too low, it is also dangerous.) – Joy

It is also considered a serious disease because, as mentioned earlier, it affects the different organs and body parts according to the CHWs in Sariaya, Laurel, and Pandi. It may also lead to complications as noted in Tiaong, Laurel, and Pandi, and even amputation according to the CHWs in Angono and Pandi.

CHWs in Tiaong, Angono, and Sta. Maria were worried about injecting insulin. A CHW in Tiaong, a rural area, described the suffering of a person with diabetes:

> *"Kapag nag-insulin ay mahirap kasi araw-araw ka magtuturok at kung saang-saan parte ng katawan magtuturok."*
>
> (When using insulin, it is difficult because you have to inject every day and in different parts of the body.) – Mina

CHWs in Tiaong stated that persons with diabetes are not ashamed of their disease. They seem proud to have diabetes because it is considered a disease of the rich or classy.

Mina: "*Hindi naman po ikinahihiya ang sakit na diabetes.*"
(Diabetes is not a disease to be ashamed of.)

Joy: "*Parang* proud *pa nga sila sa diabetes kasi ito daw ay sosyal na sakit.*"
(They [patients] seem proud to have diabetes because it is considered a classy disease according to them.)

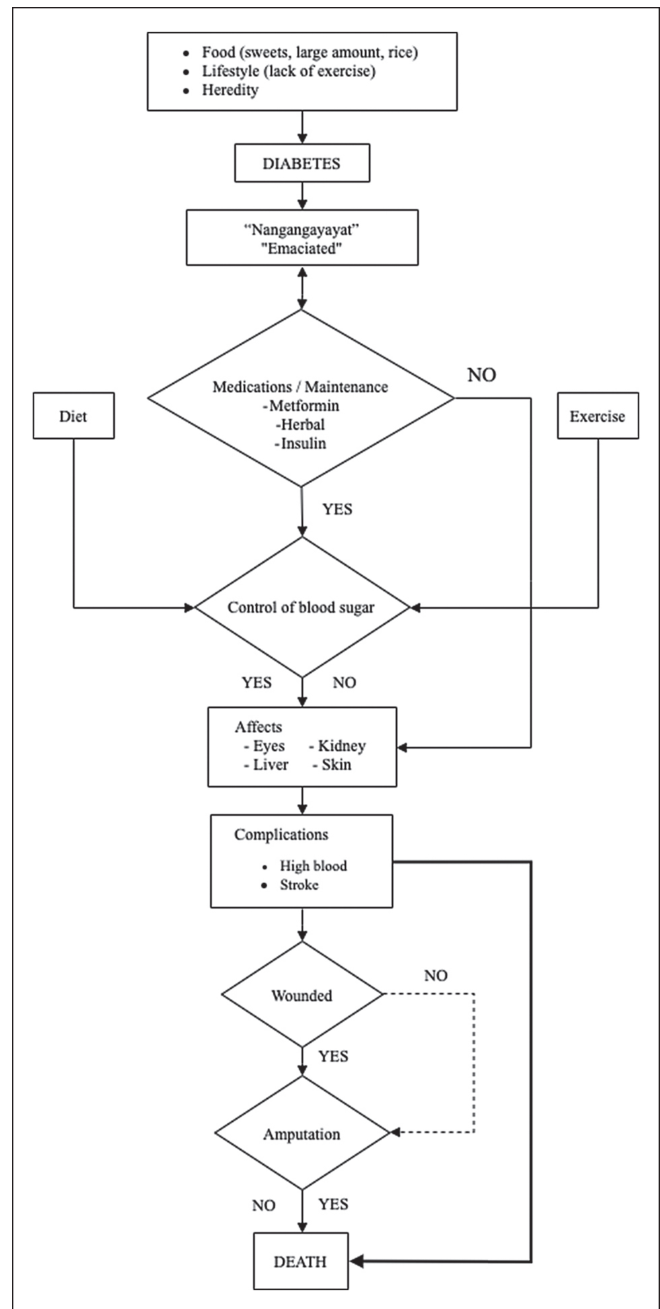

Figure 1. Natural course of diabetes.

Janice: "*Oo nga, sakit ng mayaman.*"
(Yes, it is a disease of the rich.)

Natural course of illness

Based on the six FGDs, the natural course of illness is shown on Figure 1. Diabetes was believed to be caused by eating sweet foods, and large amounts of foods including rice. Also, lifestyle, that which lack exercise as well as heredity were factors that cause diabetes. Persons with diabetes become thin. As they drink their medications and maintenance drugs, they also become thinner. Maintenance drugs, proper

diet, and regular exercise, usually in combination, may control blood sugar level. CHWs believed that diabetes will be controlled when diet and/or exercise is combined with medications. Even when sugar level of persons with diabetes are controlled, the disease still affects body organs such as the eyes, liver, and kidney including the skin; the same effect as when they do not drink maintenance medicines like metformin. Once body organs are affected, this will then lead to complications such as high blood pressure or stroke which may cause death.

Under complicated conditions, a person with diabetes should avoid being wounded as this will cause amputation and, eventually, death. It was not so clear to the CHWs whether amputation may ensue regardless of presence of wounds. However, it was very clear to them that amputation will certainly lead to death.

Fears about diabetes

There was a myriad of fears about diabetes. It ranged from unhealed wound, usually in the feet, to death. CHWs in both rural and urban areas feared amputation. Teresa of Pandi narrated that amputation due to diabetes leads to death:

> *"Matagal [gumaling ang dyabetis] lalo na kung may sugat ka, para po yung sa tatay… wala po yung ano, yung career niya, tapos naputol yung paa dahil po sa dyabetis. Yun po ang sanhi ng pagkamatay niya. Tapos sumunod naman po yung mother niya na unti-unting ano, una yung hinlalaki dun sa paa, hanggang sa naubos na magkabi-kabila, sanhi ng pagkamatay."*
>
> (It takes a long time to cure diabetes especially if you have a wound, like that of father…his career was lost, then his feet were amputated because of diabetes. That is the reason for his death. Then his mother followed suit who [was amputated] slowly, first her toe on one foot, until all toes on both feet were gone, a reason for her death.)

CHWs likewise feared the effects of diabetes to one's eyes, kidney, liver, and other organs including complications as well as its lifetime effects. In Sariaya, they believed that diabetes cannot be cured.

> "*Bumabalik po lagi at hindi talaga nagagamot.*
> (It always comes back and is not cured.)"

Emily of Laurel quoted a doctor,

> *"Ang sabi naman ng doktor na kapag ikaw ay nagkaroon ng diabetes ay habangbuhay nang merong diabetes, kahit daw bumaba pa yung blood sugar, nandiyan pa rin.*
>
> (According to a doctor, once you have diabetes, you will have it for a lifetime, even when blood sugar [level] goes down, it is still there.)"

Being a disease of a lifetime means the person with diabetes has to undergo life-long medication and that one's ability to work is likewise affected. Insulin injection in different parts of the body was likewise feared by CHWs in Tiaong and Sta. Maria.

Health-seeking behavior

Persons with diabetes seek medical help from doctors; they turn to internists for help. Still others go to other health workers like BHWs and midwives as stated in one of the rural areas, Sariaya. Others go to health centers to ask for medicines according to CHWs from Sariaya and Angono. In Pandi, an urban area, the CHWs said that sufferers also go to the hospital for help. In Sariaya and Tiaong, persons with diabetes also run to their families to seek help.

Treatment for diabetes

Across sites, the perceived treatment for diabetes included a balanced diet and healthy lifestyle, use of medicines such as metformin and insulin, as well as food supplements. Metformin, according to CHWs in Angono, is the maintenance drug for diabetes. Persons with diabetes usually get free medicines from the health center.

A balanced diet was also mentioned in four sites except in Tiaong and Angono. CHWs in Angono and the two other urban sites, namely, Sta. Maria and Pandi said that there should be less rice intake. In Angono, a CHW said that the doctor advised the patient to 1) refrain from eating cookies; 2) eat fried rice; 3) avoid plain sugar; and 4) use two sukaril tablets in a glass of milk.

> "*Ipinaiwasan ng doctor ang mga cookies, mga cookies, yung mga kanin isasangag, tapos yung sugar niya yung plain sugar pinaiwasan, sukaril ang pinagamit sa akin dalawang tabletas sa isang basong gatas, sukaril."*

CHWs in Sariaya believed that medicines should be complemented not only by food intake but also physical activity.

> "*Kailangan timplahan ang gamut, hindi lang kain, physical activity, hindi lang kain."*
>
> (There is a need to complement medicines, not simply food intake, physical activity [also], not just food intake.)

CHWs also used herbal medicines like *okra* (lady's finger or *Abelmoschus esculentus*), *ampalaya* (bitter gourd or *momordica charantia*) and *guyabano* (soursop or *Annona muricate*) leaves, and mahogany (*Swietenia macrophylla*) seeds. In Angono, CHWs said that their source of water is *okra* concoction which they drink in the morning and evening. The CHWs in Sta. Maria narrated how they prepare it, that is, by soaking overnight a sliced fresh *okra* in a glass of water. The extract was drunk and was believed to lower sugar level.

> "…p*inakatubig ko… yung okra* [concoction]… *Yun yung iniinom ko tuwing umaga saka gabi parang tsaa na nakababad din yung mga dahon, binibigay lang sa akin pero pagkapait-pait…*"

(…my water source… is *okra* [concoction]. It is what I drink in the morning and evening just like tea where the leaves are soaked as well, it is simply given to me but it is so bitter…) - Angono

"…o*kra, yung sariwa… hihiwain,… ibabad po sa isang basong may tubig magdamag…yung katas ng tubig po ang iinumin, pampababa din daw ng* [blood] sugar [level]."

(Fresh lady's finger is sliced and soaked overnight in a glass of water. The extract is drunk; it lowers [blood] sugar [level]so they say.) - Sta. Maria

While it is drunk every day, *okra* is replenished every week according to CHWs.

In Pandi, *ampalaya* and *guyabano* leaves as well as mahogany seeds were likewise perceived as herbal treatments for diabetes. Seven leaves of *ampalaya* or *guyabano* are boiled for every liter of water.

CHWs noted that persons with diabetes came out in the open when DOH announced free medicines for them. However, there were no available medicines yet at that time. CHWs also shared that diabetes afflicts both men and women, young and old. Although, according to them, the young ones are easier to cure than the old.

Decision-making for the management of diabetes

For CHWs in both urban and rural areas, decision-making for management of diabetes rests on the doctor specifically the internist. Joy, a CHW from Tiaong said that a patient may seek a "regular doctor" first should they not directly visit an internist. CHWs in two rural sites namely Sariaya and Tiaong as well as Sta. Maria, an urban area also said that the family should decide on the management of the disease. Mina, a CHW from Tiaong explained why a family should decide on the management of diabetes.

"Pamilya din po sa akin kasi siyempre yung kakainin ng pasyente kailangan ang mga lulutuin ay yung pwede sa pasyente."

(It is also the family for me, because, of course the food to be prepared should be that which is appropriate for the patient.)

The CHWs in Sariaya and Laurel, both rural sites, said that the patient should decide for the management of his/her disease. In Sariaya, three CHWs said that both the family and patient should decide on the management of the disease.

Expectations from treatment of diabetes

The most important result one hopes to receive from treatment is to be well again. CHWs in Sariaya and Sta. Maria said that blood sugar level should decrease. Florence of Sta. Maria said, *"Mapababa po ang* [blood sugar level] *kasi hindi na talaga siya matatanggal eh* (Blood sugar level should decrease because diabetes cannot be cured anymore)." CHWs in Tiaong said that sugar in the blood should be controlled to avoid complications, in Tagalog, *"makontrol sana and pagtaas ng asukal sa dugo para maiwasan ang complications."* CHWs in Laurel, a rural area, revealed that they hope to have normal sugar level from treatment of diabetes. CHWs in Tiaong and Laurel articulated that they expect to prevent complications. *"Humaba pa ang buhay"* or a longer life span was also expected as important result of treatment among the CHWs of Laurel.

Prevention of diabetes

When CHWs were asked how to prevent diabetes, the common themes in five sites were diet or the selection of food intake, that which is not sweet; and regular check-up. CHWs in Laurel, a rural area, mentioned that drinking soft drinks or soda, and coffee as well as eating sweet foods should be avoided. In Sariaya, they believed that those aged 40 years and above should undergo a regular check-up even when they are not yet ill. Aside from healthy diet and regular check-up, CHWs in Sariaya likewise stated that exercise, lifestyle, and knowledge of the disease prevent acquiring it. A CHW in Sariaya believed that continuous information dissemination about diabetes may prevent acquisition of the disease. They declared that flyers are available at the rural health centers but they neither attended a seminar nor watched an advertisement on television.

In contrast to those who said that diabetes can be prevented, Sheila from Laurel opined that there is no means to prevent diabetes. She asserted:

"*Wala pong paraan. Kaya lang ho natin mapipigilan sa bandang huli kapag nalaman na nating may sakit na.*"

(There is no means [to prevent diabetes]. We are able to prevent in the end when we already know he/she is ill.)

Some CHWs in Laurel stated that they learned they have diabetes when they were sick with other diseases, not simply diabetes.

DISCUSSION

CHWs' age ranged from 32 to 72 years. Residents in the rural areas were older than those living in the urban areas. Majority of them were married, housekeepers, and high school graduates. Education, an indicator of lifetime socio-economic status has been positively associated with better health.[9] Some CHWs perform the functions of BHWs. They were also designated as MLs, BNSs or BSA. These functions and designations require the understanding of the scientific explanations of diabetes through training to fully explain to the community members the prevention, cause, and treatment of the disease from a biomedical perspective. At the same time, their explanatory model that is similar to the community members they serve may be harmonized,

reinforced, or debunked accordingly. During the COViD-19 pandemic where enhanced community quarantine was enforced, Facebook served as a source of information on COViD-19 and diabetes, dietary advice, medications, and self-care in the country.[10] Since Facebook is most commonly used by Filipinos, directing CHWs to credible FB posts and support groups may lead to better care.

Foremost, CHWs' health conditions must be addressed for a quality performance in the delivery of health information and services. Incentives such as free maintenance medicines or regular laboratory examinations, and benefits particularly health insurance such as PhilHealth must also be provided. Programs focusing on lifestyle checks and advices may improve the health conditions of both the CHWs and their communities.

Diabetes or *dyabetis* in Tagalog was one of the top health problems in their respective communities. Some of the CHWs and their family members were also suffering from "high sugar level" or "low insulin." The prevalence of diabetes is higher among CHWs in selected villages compared to the national estimate of the 8th National Nutrition Survey among the general adult population in the Philippines. Forty-nine percent of the CHWs are categorized as pre-diabetic while almost 14 percent are diabetic.[3] Older CHWs, living in urban areas, and who spend at least five hours in sedentary activities were more likely to have diabetes.[3,11,12] Younger ages and semi-urban residency in Cameroon were independently associated with a lower level of knowledge on DM.[5] The activities of CHWs aside from performing their roles as health workers are mostly housekeeping, a rather not-so-physically active task.

Persons with diabetes were described as those with high sugar level or with low insulin. In terms of characteristics, they are considered obese with sticky perspiration and wrinkled, dry and scale-like skin; and are usually *masungit* or ill-tempered which may be a result of their illness according to the CHWs themselves. Diabetes-related emotional distress was likewise found among young and obese Filipinos with type 2 DM in a private hospital.[13]

Higher rate of obesity may explain the high prevalence of diabetes; the rising rates of obesity had been implicated as a major factor contributing to the current diabetes epidemic.[14] Other descriptions include having unhealed wound and blurred vision, as well as always thirsty and tired. Nansseu et al. likewise found that obesity, slow wound healing, and intense tiredness or fatigue are the signs of diabetes according to the adults in Cameroon.[5]

According to the CHWs, the causes of diabetes, the so-called disease of the rich and *sosyal* or classy were food or diet, and lifestyle (i.e., smoking, physical inactivity). Diet and lifestyle can be modified with proper health intervention. Everett had the same results in Oaxaca, Mexico. The patients emphasized dietary factors in their "explanatory model" while doctors highlighted both diet and lifestyle.[15] Foods rich in sugar or fats were identified by adults in Cameroon as risk factors of diabetes.[5] In the Philippines, social and pro-active eating behaviors were identified as specific among Filipinos with type 2 DM.[16]

The notion that diabetes is a disease of the rich maybe attributed to the food they eat in terms of amount and kind as well as the lifestyle of people with diabetes relative to those who have less in life who, in general, eat less and do hard work. Compared to the poor, the rich or *sosyal* with sweet food intake and sedentary lifestyle usually suffer from diabetes as a result. CHWs then may be highlighting nutritional inequality when describing diabetes as the disease of the rich or *sosyal*; it is to them something to be proud of as they obviously observe a context where poverty abounds. CHWs are referring to the "diseases of affluence" or "Western disease" paradigm[17] and are likewise aware of the social determinants of health in their own communities.

Diabetes is also believed to be hereditary, a perceived cause consistent with the biomedical model. In Mexico particularly in Oaxaca, genetic inheritance and family history did not play part in both the patients' and doctors' explanation of diabetes although these notions were strongly evident in government and public health discourses.[15] It was the study conducted among adults with type 2 diabetes in Accra, Ghana that associated diabetes and its complications with diet, lifestyle, and family history.[6]

Various complications of diabetes include: 1) stroke, 2) heart attack, 3) dysfunctions of organs; and 4) death. Wounded or not, CHWs also said that the person with diabetes may be amputated which all feared most aside from insulin injection. Chronic wound or amputation aside from cardiac arrest and sexual impotence were likewise revealed as diabetes complications in the study of Nansseu et al.[5] CHWs also considered diabetes as incurable or lifetime and deadly; there is a need to take in maintenance medicines like metformin which are available at the health centers. Among the herbal treatments mentioned (i.e., lady's finger water, bitter gourd, soursop leaves and mahogany seeds), only bitter gourd or *momordica charantia* is endorsed by the Philippine DOH as treatment of patients with diabetes who are non-insulin dependent.[18] Lady's finger (*Abelmoschus esculentus*) water, soursop (*Annona muricate*) leaves and mahogany *(Swietenia macrophylla)* seeds as treatments for diabetes need further studies. Lady's finger, commonly known as Ayurvedic food, is a vegetable that is definitely good for the health although it is a non-substitute for medicines.

CHWs discussed that a balanced diet, healthy lifestyle (exercise), maintenance medicines, food supplements, and herbal medicines may control blood sugar level. The causes of diabetes complications are micro- and macrovascular complications. Microvascular complications occur when small blood vessels are damaged affecting the eyes (retinopathy) leading to blindness; kidneys (nephropathy) leading to renal failure; and nerves (neuropathy) leading to impotence and diabetic foot disorders including severe infections leading to amputations.[6] Kidney complication and potential

need for dialysis was not mentioned by CHWs although they said that diabetes affects the kidney. Macrovascular complications usually occur when larger blood vessels are damaged. Complications include cardiovascular diseases such as heart attacks, strokes, and insufficient blood flow to the legs.[6] High blood pressure and stroke were mentioned as complications.

Metformin is a common treatment approach in the Philippines as well as in Ghana.[6] It is possibly the reason why CHWs know it well despite not having received any training on diabetes; their trainings were on primary health care, maternal and child health, child rights, family planning, and nutrition.[3]

Persons with diabetes should ask help from their physicians or other healthcare workers, and family members according to CHWs. Family members together with the patient must decide on the management of diabetes. It is the norm in the Philippines for family members to take care of their sick kin. Taking care of the sick is a role usually ascribed to women.

CHWs also believed that decision-making for the management of diabetes rests on the internist; they hoped for a lower blood sugar level as well as a longer life span for the patient. According to them, diabetes can be prevented by proper diet and regular check-up.

The rural and urban differences in the concept and understanding of the disease should be further studied. While both areas were represented, comparison was not done. It is also worthy to note that this qualitative research has limited generalizability.

CONCLUSIONS

In general, CHWs' concept and understanding of diabetes reflect some of the biomedical causes, effects, treatment, and prevention including health care providers or agencies to seek help in the management of the disease. Notably, they are aware of the social determinants of health in their locality specifically nutritional inequality which is attributed to diabetes. The use of herbal plants deserves special attention to ascertain their efficacy and safety. For the professional development of the CHWs, training for diabetes care should be provided to address their fear of amputation, insulin injection, and complications.

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Statement of Authorship

All authors have approved the final version submitted and certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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