SOCIAL INNOVATIONS Journal

Vol. 9 (2021): Health Equity to improve Impact on People's Health

https://socialinnovationsjournal.com/index.php/sij/issue/view/80

TeleHealth Education and Consultation as an Innovative Health Shield for Elderlies At Risk to Coronavirus Disease (COVID-19) Infection in Selected Barangays of Zamboanga City, Philippines

Authors: Cristobal, Fortunato MD,MPH, MHPed, FPPS; Arciaga, Rosemarie MD, MSEpi, FPPS, FPSMID; Arnuco, Floro Dave MD, MPH; Durias, Mary Germeyn MD,MPH; Guingona, Monserrat. MD, MPH; Punzalan, Jaime Kristoffer MD,MPH; and Mandi, Rowayne

ABSTRACT

Studies show elderly populations with comorbidities contribute 50-80% to the overall mortality rate of the coronavirus (COVID-19). The Community Health Education, Monitoring, and Prevention System (CHEMPS) aimed at determining the effects of telehealth consultation and education in providing a "health shield" to high-risk individuals from COVID-19 infection in the southern Philippines. Health shield is defined as the use of protective knowledge empowering skills to community-based elderlies with comorbidities rendered via virtual platform for telehealth consultations and education. A before and after intervention study was done in selected barangays of Zamboanga City. Voice calls were used to deliver a telehealth consultation, education, and collect monitoring and evaluation data. A total of 114 high-risk individuals participated in the study. Most respondents were aged 60–69 (57%) and female (93%), with 79% previously diagnosed with hypertensive cardiovascular disease (HCVD) and type-2 Diabetes mellitus (T2DM). Throughout the study, no participant contracted COVID-19. In addition, a statistically significant decrease ($p<0.01$) in the number of participants experiencing surrogate symptoms for hypertension and diabetes was reported. An increase in positive home management practices (e.g., medication compliance), and a decrease of negative home management practices (e.g., poor diet choices) were also noted ($p<0.01$). The health shield appears to have empowered high-risk elderly participants to improve their self-care management, leading to better control of their underlying comorbidities. In conclusion, the CHEMPS program is appropriate and practical to use as a platform to provide health shield to high-risk individuals in the context of a low-resource setting amidst the COVID-19 pandemic crisis.

KEYWORDS: COVID-19 health shield for elderlies at risk; COVID-19; Health shield; Telehealth education; Telehealth consultation; High-risk individuals

Introduction

Coronavirus (COVID-19) began in Hubei Province of China last December 2019 and then spread globally. As of February 22, 2021, the Philippines had a total of 563,456 COVID-19 cases with a death toll of 12,094, while Zamboanga City has had 4,315 confirmed cases of COVID-19 and 151 deaths. Population-level approaches taken by government authorities to contain and mitigate the spread of the infection primarily involve the lockdown of the communities, cities, and countries, while at the individual level, governments have instituted physical distancing, use of face masks and face shields, and promotion of hand hygiene. So far, preventative actions in Philippine communities have been mainly focused on implementing home quarantines and identifying Persons Under Monitoring (PUMs) and Persons Under Investigation (PUIs), while specific interventions to address high-risk elderly populations are minimal.

The concept of providing "health shields" to elderly high-risk populations has not been well explored. A health shield is to provide knowledge-empowering skills to the elderly to protect them from the COVID-19 infection. This is done by providing them with access to a virtual platform for consultation and monitoring, while also mentoring them on how to maintain any underlying chronic illnesses. Maintenance in the control of hypertensive cardiovascular disease (HCVD) and type 2 diabetes mellitus (T2DM) among these high-risk individuals may also diminish the probability of having a poor outcome if they contract COVID-19. In addition, proactively preventing these high-risk individuals from unnecessary exposure will decrease their chance of contracting COVID-19 which has been calculated to avert severe illness and death by 40-50%.[1]

A project entitled Community Health Education, Monitoring, and Preventive System (CHEMPS) was developed in Zamboanga City, southern Philippines, to provide the elderly with a protective health shield from the COVID-19 infection. In compliance with the community quarantine policy implemented by the city government, the CHEMPS project focused on educating, teaching, guiding, supporting, and monitoring these high-risk individuals in home quarantine via telehealth voice calls using mobile phones. This study determines if medical and health information can be effectively delivered to high-risk populations in the community while eliminating face-to-face contact with its associated risk to COVID-19 exposure and transmission. Specifically, the CHEMPS intervention study used a telehealth consultation with education for elderly individuals at severe risk for COVID-19 in selected barangays in Zamboanga City to: better control participants' underlying HCVD or T2DM conditions; prevent them developing COVID-19, and promote correct home quarantine practices.

Methodology

Study Design

This 2020 study used a pre- and post-test study design to evaluate the outcomes of the CHEMPS telehealth consultation and education implemented by postgraduate year 1 (PG1) medical staff in selected barangays of Zamboanga City. Qualitative interviews were gathered with the aim of providing the perceived benefit of the program to the stakeholders as well as to provide insights on how the program can be further improved. The consultation, education, and collection of data occurred solely via telehealth communication, with no face-to-face contact of the medical staff with patients. This CHEMPS project was linked with the COVID Center of the Zamboanga City Medical Center (ZCMC) for cases where further referral of the patient was required.

Contact details of potential high-risk elderly people were obtained from a concurrent project (CHAPP), and these were verified by the Barangay Health Emergency Response team during regular monitoring visits in the community. When contacted, elderly individuals had the CHEMPS project explained to them, and their consent for participations was also elicited. The recruited elderly were enrolled as recipients of the CHEMPS education and telehealth consultation intervention. The contact details of participants were then randomly distributed to the PG1s as their assigned patients for the telehealth consultation and education sessions. This program was submitted to and approved by the Ateneo de Zamboanga University Research Ethics Committee for ethical clearance.

Participants

The participants in this program were aged 50 years and older and previously diagnosed with hypertensive cardiovascular disease (HCVD) and/or type 2 diabetes mellitus (T2DM), or 60 years old and above with or without HCVD and/or T2DM as previously identified and diagnosed through

the CHAPP program and not tagged as PUI or a confirmed case of COVID-19. Qualitative data were gathered from 84 individuals (44 PG1 Medical Staff, 40 participants).

TeleHealth education and consultation

TeleHealth education through voice call by mobile phones is an innovative but practical approach of delivering health education to individuals at risk for severe COVID-19. The flow of knowledge information is primarily from the health provider to the participant. The CHEMPS health education delivered by the PG1s focused on home quarantine practices, coronavirus disease's signs, symptoms, and mode of transmission, and the need to maintain and control comorbidities (HCVD and T2DM). Prior to implementations, the PGIs were provided with virtual training and rehearsal on cell phone etiquettes, and a script was written for communicating with patients including skills for how to open and sustain a dialogue with patients.

TeleHealth consultation involves extending medical consultation and assistance to patients through voice call. The flow of information is primarily from the patient to the medical staff to attend and address their concerns. Thus, for this project, the PGIs may need to relay participant concerns to the assigned health provider should there be a need for further assessment and disposition. The purpose of this approach is to lessen the elderly's participants' health center, emergency room, or hospital visits which may lead to unnecessary COVID-19 exposure.

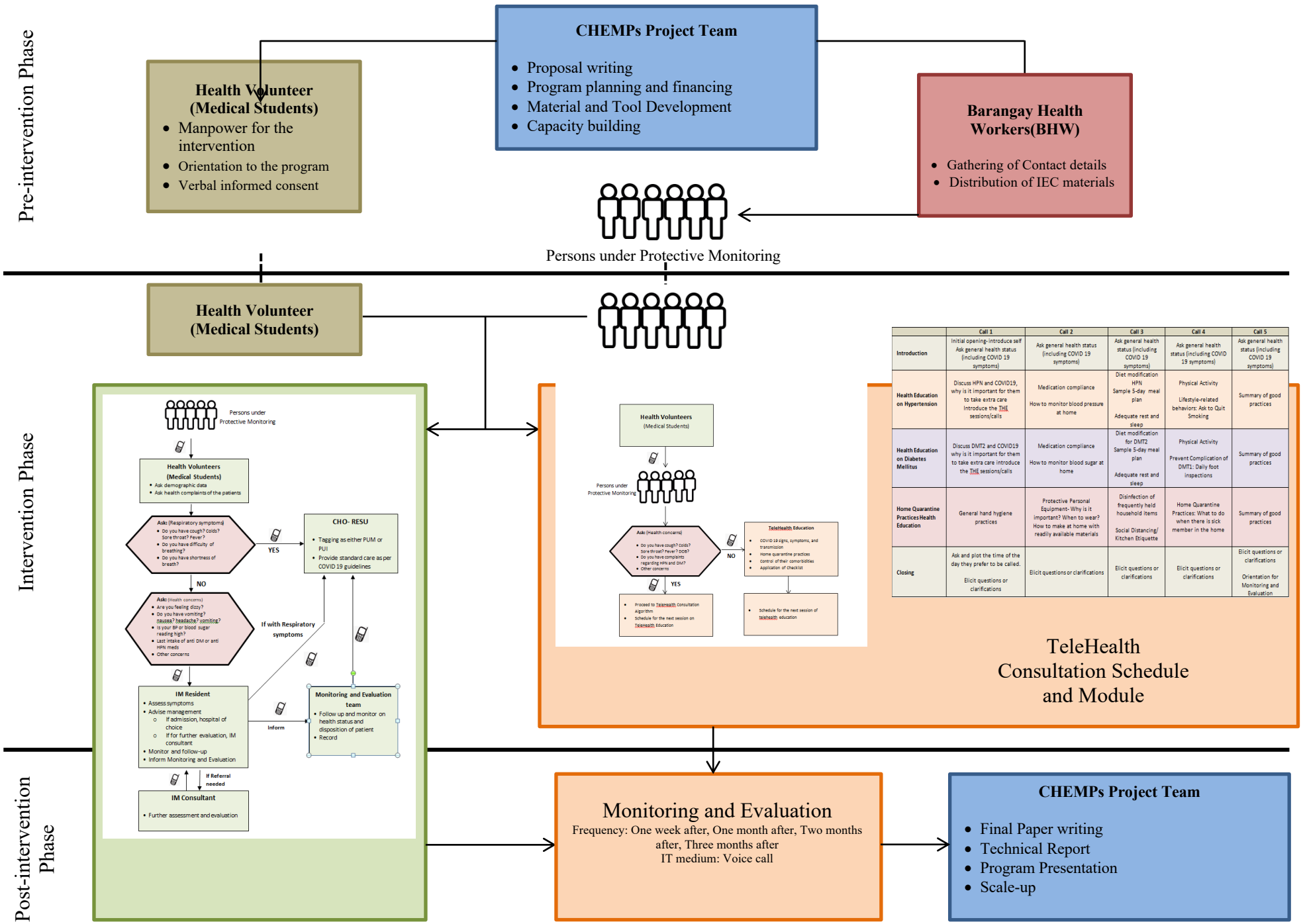
As the connections by the PGIs with the elderly is through voice call, the consultation will rely on the patients relaying their perceived symptoms (surrogate symptoms) and self-reporting their home self-care management practices. Thus, the CHEMPS project did not involve apparatus or tests to confirm BP or blood glucose levels, as these were unavailable in participants' home environment.

Data Collection

Participants' self-reported practices regarding control of their HCVD and T2DM, and protective household quarantine measures were gathered before the intervention, one week after, one month after, two months after, and three months after. For the control of HCVD and T2DM, self-reported data regarding compliance to medications, adherence to their proper diet, presence of surrogate symptoms, and physical exercise were monitored over each of these five time periods. Qualitative data were gathered at end of the program through phone interview and an open-ended question feedback form. In-depth interviews via phone call was conducted among the participants while all PG1 medical staff were asked to answer the open-ended question feedback form. Interview and feedback questions explored perceived benefits of the program, perceived factors contributing to the success of the program, and perceived barriers to the implementation of the program that could be addressed to further improve the program. All data gathered were digitally recorded, transcribed, and saved using Microsoft Excel. All participation was voluntary and personal identifiable information was replaced with codes to assure participant confidentiality and anonymity. To enhance trustworthiness, preliminary data analysis was presented for validation.

In addition, verification whether participants were tagged as PUI or as a confirmed COVID-19 case were done through the Zamboanga City Health Office and Regional Epidemiological Surveillance Unit. Attendance of participants in telehealth education was recorded to establish the number of sessions each participant attended, and a record of each telehealth consultation was collected to determine the number of consultations made by each participant.

Figure 1. Flow of CHEMPS project activities



	Call 1	Call 2	Call 3	Call 4	Call 5
Introduction	Initial opening-introduce self Ask general health status (including COVID 19 symptoms)	Ask general health status (including COVID 19 symptoms)	Ask general health status (including COVID 19 symptoms)	Ask general health status (including COVID 19 symptoms)	Ask general health status (including COVID 19 symptoms)
Health Education on Hypertension	Discuss HPN and COVID19, why is it important for them to take extra care Introduce the THE sessions/calls	Medication compliance How to monitor blood pressure at home	Diet modification HPN Sample 5-day meal plan Adequate rest and sleep	Physical Activity Lifestyle-related behaviors: Ask to Quit Smoking	Summary of good practices
Health Education on Diabetes Mellitus	Discuss DMT2 and COVID19 why is it important for them to take extra care introduce the THE sessions/calls	Medication compliance How to monitor blood sugar at home	Diet modification for DMT2 Sample 5-day meal plan Adequate rest and sleep	Physical Activity Prevent Complication of DMT1: Daily foot inspections	Summary of good practices
Home Quarantine Practices Health Education	General hand hygiene practices	Protective Personal Equipment- Why is it important? When to wear? How to make at home with readily available materials	Disinfection of frequently held household items Social Distancing/ Kitchen Etiquette	Home Quarantine Practices: What to do when there is sick member in the home	Summary of good practices
Closing	Ask and plot the time of the day they prefer to be called. Elicit questions or clarifications	Elicit questions or clarifications	Elicit questions or clarifications	Elicit questions or clarifications	Elicit questions or clarifications Orientation for Monitoring and Evaluation

Data analysis

Outcomes measured to determine the effect of the CHEMPS telehealth education and telehealth consultation intervention on high-risk individuals during the COVID-19 crisis included the proportion of individuals at risk for severe COVID-19 whom:

- maintained better control of their HCVD and T2DM
- did not have COVID-like respiratory symptoms
- did not become a PUI or a confirmed COVID-19 case
- maintained proper practice of protective household quarantine measures

In addition, chi-square tests were used to analyze the statistical significance of the change in participants' surrogate symptoms from pre-intervention to the post-intervention, while paired T-tests were used to analyze the statistical significance of the changes in the self-reported practices of the participants from pre-intervention to the post-intervention.

Qualitative data analysis was conducted using the inductive approach. All transcriptions were repeatedly read and manually coded and categorized into recurrent themes.

Results

A total of 114 respondents participated in the pre-intervention and all four post-intervention surveys. Females accounted for 106 (93%) of the participants, while the age distribution of participants was: 16 (14%) aged 50-59, 65 (57%) aged 60-69 years old, and 33 (29%) aged 70 years old and older. For ethnicity, 73 (65%) participants were Zamboangueno, 23 (20%) participants were Bisaya, and 18 (15%) of the participants were from a non-dominant ethnicity in the locality.

Of the 114 participants, 69 (61%) participants were diagnosed with hypertension alone, 4 (4%) participants were diagnosed with diabetes mellitus alone, 21 (18%) participants were diagnosed with both diabetes mellitus and hypertension, and 20 (17%) had neither diabetes mellitus nor hypertension. Of the 90 participants diagnosed with hypertension, 6 (9%) were experiencing symptoms of probable elevated blood pressure, while 16 (64%) out of the 25 participants diagnosed with diabetes mellitus were experiencing surrogate abnormal glycemic levels. Of the total participants, 14 (12%) were experiencing COVID-like symptoms at baseline.

Table 1. Frequency of home management practices related to hypertension, diabetes mellitus, and home quarantine among the respondents

	PREINTERVENTION MEAN*	POSTINTERVENTION (3 MONTHS LATER) MEAN*	P - VALUE
A. Hypertension Management Practices (n=90)			
HCVD Medication compliance	2.67	2.91	<0.01
Blood pressure monitoring	2.12	2.37	<0.01
High salt and fat diet[#]	2.38	2.15	<0.01
Adding salt at table[#]	2.53	2.20	<0.01
B. Diabetes Management Practices (n=25)			
T2DM Medication compliance	2.72	2.88	<0.01
High sugar diet[#]	2.60	2.36	<0.01
Blood sugar monitoring	1.84	2.08	<0.01
Feet inspection	2.44	2.68	<0.01
Dental hygiene	2.60	2.76	<0.01
C. Home Quarantine Practices (n=114)			

Proper face mask use	2.31	2.84	<0.01
Observation of physical distancing	2.57	2.82	<0.01
Disinfection of frequently held items	2.47	2.76	<0.01
Proper hand hygiene	2.79	2.91	<0.01

#negative management practice
* Most of the times = 3; Sometimes = 2; Never = 1

Control of Hypertensive Cardiovascular Disease
The frequency of participants who experienced symptoms of surrogate (probable) elevated blood pressure among hypertensive individuals was six out of 90 respondents in the pre-intervention survey, compared to two out of 90 respondents who had elevated blood pressure symptoms by the 4th post-intervention survey, showing a statistically insignificant decrease in HCVD symptoms after intervention (chi-square test).

Hypertension Management Practices
In addition, Table 1-A shows the mean scores of the respondents between the pre- and 4th post-intervention survey for hypertension home management practices. For the medication compliance, there was a significant increase (pre vs $post_{1-4}$, p-value <0.01) in the number of participants who were compliant to their anti-hypertensive medications. For the blood pressure monitoring, there was also a continuous increase in the number of participants who monitored their blood pressure. As to their diet practices, both food choice and salt intake reduction significantly improved but it was only observed at the 3rd month of the intervention.

The two positive HCVD management practices had statistically significant increase (p-value<0.01; paired t-test), while the negative hypertension management practices also had a statistically significant decrease (p-value<0.01; paired t-test), indicating the respondents had better hypertension management practices post-intervention.

Control of Type 2 Diabetes Mellitus
There were 16 out of 25 respondents who had DM symptoms in the pre-intervention survey compared to four out of 25 respondents who had DM symptoms in the 3rd month of the post-intervention, which showed a statistically significant decrease in the frequency of participants who experienced DM symptoms after intervention (p<0.01; chi-square test).

Diabetes Management Practices
Table 1-B shows the mean scores of the respondents in the pre- and 4th post-intervention surveys for diabetes management practices. For the medication compliance, there were a sustained number of participants who increased their compliance to their medication. However, a statistically significant increase in the number of participants who were compliant to their anti-diabetic medications was noted only at the third month of the post-intervention. For their diet practices, most of the diabetic participants were able to maintain their low sugar diet.

For the blood sugar monitoring, there was also an increased number of participants who monitored their blood sugar; however, it was only a statistically significant increase at the third month of the post-intervention, which coincided with the relaxation of the quarantine restriction. Practices on

checking for diabetic complications such as inspection of feet and good oral hygiene were also maintained throughout the course of the study.

All the preventative diabetes management practices had statistically significant increases from pre- to post-intervention (p-value <0.01; paired t-test), while all the negative diabetes management practices had statistically significant decreases (p-value <0.01; paired t-test); indicating better diabetes management practices after intervention.

COVID Presenting Symptoms and Home Quarantine Practices

Only a few participants reported COVID-like symptoms from the pre-intervention phase to the last post-intervention survey, and almost all of the participants were COVID-19 symptom-free throughout the course of this study, providing insufficient sample size for statistical analysis.

COVID-19 home quarantine practices were monitored for all of the 114 participants' home quarantine practices across the following parameters: wearing of face mask properly, observing social distancing, disinfecting frequently handheld items, and frequency of hand washing. As shown in table 1-C, the respondents generally improved their home quarantine practices, with each home quarantine practice showing a statistically significant increase (p-value <0.01; paired t-test); indicating better home quarantine practices after intervention.

Progression of home management practices

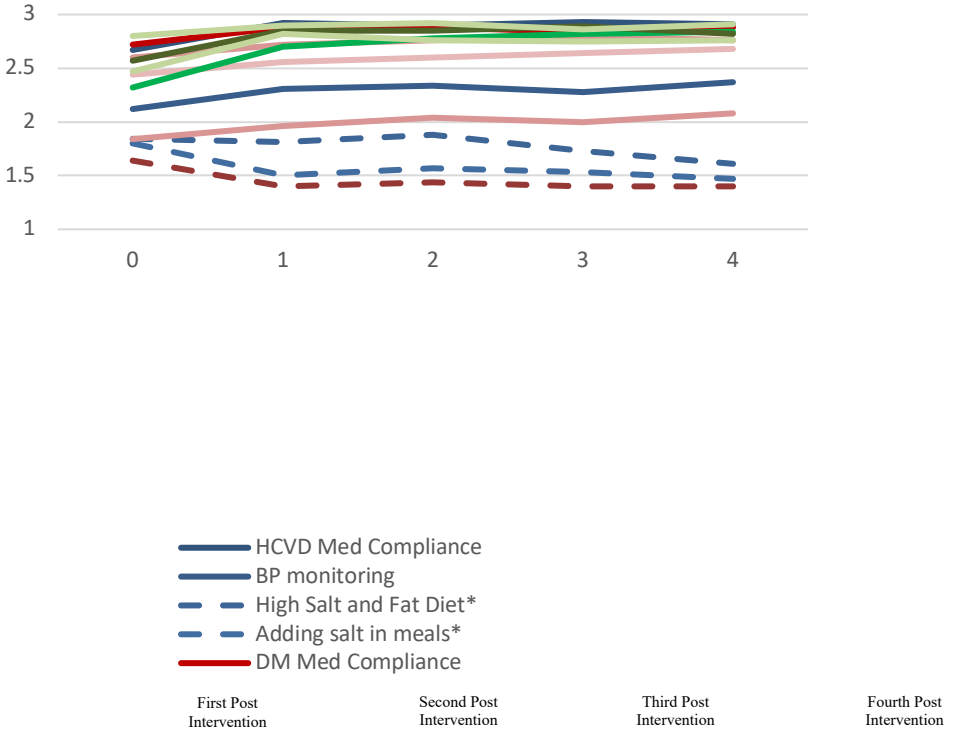


Figure 2. Frequency of management practices among respondents from pre-intervention period until third month post-intervention

*** - negative home management practice**

In addition, Figure 2 show comparability of the variables from pre-intervention and then across all four post-intervention surveys. These line graphs represent the progression of their mean scores on knowledge assessment and their home management practices related to their existing co-morbidities such as hypertensive cardiovascular disease (HCVD) and/or Type 2 diabetes mellitus (T2DM), including COVID-19 protective practices. The general trends appear to be consistently improving for both their knowledge and practices. For positive home management practices such as medication compliance, blood pressure monitoring, and blood sugar monitoring, an increasing trend can be observed, while for negative home management practices like poor diet choices and salt supplementation in meals, a decreasing trend can be observed.

Qualitative findings

Qualitative findings were also gathered from the different stakeholders of the intervention to provide more "richness" to the quantitative findings, and insights on how the telehealth program could be improved. Stakeholders expressed the beneficial effects of this intervention.

Table 2. Thematic analysis of 40 participants' response to the open-ended question 'If there are any, what benefits did you gain from the program?'

Perceived benefits of the participants from the program	**Participant direct quotation**	**Number of participants who reported benefit (with % of participant responding to this question)**
Gained knowledge on control of Hypertension, Diabetes and COVID prevention	*"I learned a lot from the health teaching, I am Diabetic and they taught me a lot about my condition. They also taught me how to prevent COVID."* **Participant 20** *"I am thankful for the program that I was part of. I have learned a lot from the teaching. I actually had a close relative who lives nearby who contracted the COVID virus, by God's grace all of us turned out negative. I kept reminding them the protective practices I learned through the calls"* **Participant 10**	*33 (83%)*
Learned self-management Skills	*"Because of the health teaching and advice given to me, I was once again encouraged to exercise. I now make sure that I do some form of exercise".* **Participant 2** *"Because of the knowledge I learned from the health teachings, I am now more confident to manage my symptoms. This encouraged me to buy a BP apparatus for my entire family. So far, our blood pressures are controlled"* **Participant 10** *"The health teaching and advice from the health care provider taught me a lot. In the past, when I feel bad, I right away rush to the hospital because I was not sure of*	*18 (45%)*

	what I was feeling. Now, I am calmer because I better understand what I feel and able to manage it on my own effectively." **Participant 8**	
Improved access to health services with minimum risk	*"The TeleHealth Program allowed me to receive health care without having to go through COVID protocols in the hospitals".* **Participant 7**	*11 (28%)*
Provided psychosocial support/ Relieved anxiety	*"The Telehealth program was very helpful, it really alleviated my anxieties"* **Participant 16** *"The calls made me feel good, I felt like someone cares for me. Especially for us Senior Citizens, it feels good to know that someone cares."* **Participant 14** *"I feel less anxious and worried because I get assurance from a doctor."* **Participant 19**	*6 (15%)*

Table 3. Thematic analysis of 40 participants' response to the open-ended question 'What were the factors that contributed to the success in implementation of the program?'

Source of facilitating factors to the success in the implementation of the program	**Facilitating Factors**	**Participant direct quotation**	**Number of participants who reported benefit (with % of participant responding to this question)**
Health Care Providers	Committed to provide service	*"The health care provider was kind, she had the patience to listen and answer all my questions, this made me look forward to answering her calls"* **Participant 16** *"I appreciate the dedication of the health care providers, they are willing to extend help to entertain not only my concerns but also the concerns of some members of my family".* **Participant 20** *"The health providers are very accommodating, they answer our calls when we call them."* **Participant 26**	*14 (35%)*
	Clear delivery of health teaching	*"I remember the health teaching taught to me because the health care provider was able to explain it to me clearly and with simplicity"* **Participant 22**	*9 (23%)*
Services Provided	Timely, clear, and relevant,	*"The length of the call as well as the interval was sufficient, the calls did not take much of my time at th same time, I was able to learn".* **Participant 24**	7 (18%)

	content of teaching material	*"We learned a lot because the health teachings were relevant, especially on COVID".* **Participant 37**	
	Provided free medications	*"The distribution of free medications was a big help, most especially during this time. Some of our family members lost their jobs, us seniors cannot go out because of the restriction. The distribution of medication was a great help. My blood pressure is controlled because I take the medicine regularly".* **Participant 2**	5 (13%)
	Convenience of Mobile Phone	*"I appreciate the use of mobile phone to deliver health services, most importantly during this time, Senior Citizens are not allowed to leave their homes and we are hesitant to go to the hospitals".* **Participant 19**	2 (5%)

Table 4. Thematic analysis of 44 PG1 Medical Staffs' response to the open-ended question 'What were the factors that contributed to the success in implementation of the program?'

Source of facilitating factors to the success in the implementation of the program	**Facilitating Factors**	**PG1 Medical Staff direct quotations**	**Number of participants who reported benefit (with % of participant responding to this question)**
Participants	Willingness and commitment to join	*"I think it was all due to the patient/respondent factor, even if I had called them a hundred times or texted them every day but if my respondents are not willing to listen then it was all for naught***". PG1 10** *"The factors that contributed to the success of the telehealth are their participation and willingness to learn***." PG1 14**	18 (41%)
	Established Rapport	*"Lastly a well-built rapport in the beginning would greatly affect the total outcome of the calls because once these respondents' trust is gained even through phone call, it would be easier for us to contact them and talk to them with ease even if we haven't met in person".* **PG1 15**	11 (25%)

Program Design and Service Provided	Capacity Building	*"Having a script greatly helped in achieving the goal of the program. Although there is a need for me to translate or edit it in a way that my participants would understand, it helped me be guided as to what I should say".* **PG1 13** *"Without the well laid plans, the schedule, the manuals and the script, we would have not been guided well in the intervention."* **PG1 27** *Another one is the well organized and detailed plan of the manual of operation, that even a script is given to us not just to guide us but also help us review our knowledge on the 2 NCD in our country in relation to covid 19 pandemic".* **PG1 45**	10 (23%)
	Content of teaching material are valid, reliable and manageable	*"Another factor would be the structure of the health education which was done gradually avoiding information overload to the respondent".* **PG1 10**	8 (18%)
	Provided load/wifi router	*"The initiative to provide wifi and load eases the burden from doctors/PGIs who do not have access to free internet".* **PG1 34**	3 (7%)
	Convenience of mobile phone	*"I think using mobile phones as means for health education is great. It is also very timely for the situation. We do what we can and since having a mobile phone is common, it makes sense to use it to our advantage. Almost everyone has it and it's easy to use so even senior citizens could be able to maneuver it".* **PG1 19**	2 (5%)

Table 5. Thematic analysis of 44 PG1 Medical Staff and 40 participants' responses to the open-ended question 'What were the barriers/limitations encountered during the implementation of the program?'

Source of barriers/limiting factors to the implementation of the program	**Barriers/Limiting Factors**	**Direct quotations**	**Number of participants who reported benefit (with % of participant responding to this question)**	**Recommendations**
Participant	Unavailability	*"One of my participants was not able to*	21 (25%)	Set a preferred/convenient

		participant in this study because he is working. Every time I call him, the recipient of the call tells me that the participant is away, working as a carpenter." **PG1 24**		schedule time with the participant
	Physical limitations/Disabilities	*"One of my respondents has hearing problems. I talked to his grandchild and let her repeat my health teachings to him until he understands the content."* **PG1 26** *"My mother can't speak on the phone because she is elderly and have a hard time hearing."* **Participant 9**	11 (13%)	Allow available significant others to assist with the calls
Health Care Providers	Language barrier	*"Not being fluent in Chavacano (local dialect) was a challenge for me since they seem to be more comfortable in their dialect. Although I try to speak to them in Chavacano as much as my capacity would allow me, there were still a few instances where this seemed to be a barrier."* **PG1 9**	9 (11%)	Provide translated teaching manuals
	Inability to assess non-verbal cues	*"Moreover, one can't really assess if the call receiver did really understand the lecture because you can't see the facial expression and body language."* **PG1 5** *"Other physical cues that aid in delivering the health education or*	5 (6%)	Use verbal communication skills such as validation

		confirmation of understanding by the patient other than verbal acknowledgement is not visible." **PG1 8**		
Technological Infrastructure	Poor Cellular Connectivity	*"The limitations of the telehealth education were of course, signal issues and the time that was allotted by the cellular service providers for one call, which interrupts the flow of the conversation*." **PG1 29**	17 (20%)	Set a preferred/convenient schedule time with the participant where and when cellular connectivity can be best obtained
	Mobile phone ownership	*"The respondent did not own a mobile phone, I would have to call her daughter who lives in another house to be able to speak to the participant"*. **PG1 15** *"I do not own a cellphone, I just use my daughters, I just inform the health provider to call me when my daughter is home."* **Participant 15**	11 (13%)	Allow available significant others to assist with the calls
	Limited minutes on calls	*"Because of the limited allotted minutes to a call our conversations are often interrupted."* **PG1 24**	1 (1%)	Inform participant ahead of time of the limitation

Discussion

The concept of providing protective and preventive measures to high-risk elderly patients was the focus for this CHEMPS project. The intervention helped bridge their isolation gap while simultaneously providing a platform for consultations and monitoring, while mentoring them to maintain appropriate self-care for the control of any underlying chronic illness and informing them of best practices to reduce the transmission of COVID-19. Most of the participants may have been continuously exposed with information about COVID 19 and home quarantine practices from different media platform. However, information on HCVD and T2DM from these media sources were to a minimum at most.

Because of the availability of the telehealth consultation, participants in the intervention were still able to access health care services. Participants in the interviews reported the most common benefit from the intervention being the health teachings received through the telehealth education (Table 2). The interviews suggested participants were able to learn a lot from home management of their HCVD and T2DM, as well as prevention of COVID-19 infections. Furthermore, the conduct and the delivery of the CHEMPS intervention was appropriate during a pandemic, as the remote capabilities of the telehealth program provided health care access to participants in home quarantine, as well as support the control and management of their comorbidities from the comfort of their homes (Table 2,3).

Perhaps the most compelling contribution of the CHEMPS telehealth consultation and education project is improving patient compliance with self-care. The telehealth education component of this project was more personal and intensive in both its content and practice. In one of the telehealth education sessions, the importance of being compliant to their medication was emphasized. Moreover, the availability and easy access of their medications in the respective health centers reinforced the knowledge on medication compliance taught to them during the telehealth education sessions (Table 2). Thus, the improvement in the diabetic management practices of the participants supports that this model is achievable through telehealth education.

Facilitating factors that contributed to the successful implementation of the program include the willingness and commitment of both the participants and PG1 medical staff to participate in the program (Table 3,4). A common barrier/limiting factor to the program's implementation is the participants' availability, this was addressed by setting a time before the calls to ensure that participants are free to take the calls. Furthermore, since the program involved elderly individuals, hearing difficulty was one barrier that was encountered, however, this was addressed by asking a willing significant other to assist the participant (Table 5).

The CHEMPS telehealth consultation and education intervention may also have contributed to the surrogate symptom-free status of participants by making the respondents more responsive to self-care health management due to the personal mentoring and follow-up that this intervention provided. The use of surrogate symptoms may also serve to investigate the status of patients' control of their underlying chronic conditions.

Limitations

One major limitation of this study was the use of surrogate symptoms to identify control and self-management of participants' underlying HCVD and T2DM conditions. Surrogate symptoms were required given the constraints caused by the COVID community lockdowns, which limited the patients' access to health professionals and measurement devices. The utilization of surrogate symptoms is a reasonable option to use in managing primary care patients during the current setting created by the COVID crisis where medical consultations and patient education had to shift from in-person patient-physician encounters to a virtual mode. Likewise, performing physical examinations and using laboratory tests for confirmation had to shift to a "syndromic" approach, relying on surrogate symptoms as perceived and relayed by the patients. A study by Andres, Meyer, and Zulfiqar [2] showed that in primary health care delivery via teleconsultation, measuring frequency of surrogate symptoms can be useful in guiding medical health advice on the management of diabetic patients. In addition, several other studies have relied on symptoms such as polyuria, polydipsia,

weight loss and easy fatigability as secondary outcome indicators for poor glycemic control. [3,4] Moreover, a study on HCVD-attributed symptoms has shown conclusive results in relating symptoms of dizziness and headache to inadequate blood pressure control. [5] These studies affirm that surrogate symptoms can be justifiably used as a health outcome measure in settings lacking procedures and apparatus for validating HCVD/T2DM via blood pressure measurements or blood sugar tests. Furthermore, another significant limitation of this study is the participants' health practices were only self-reported; however, the improved practices identified in the quantitative findings were also observed by the health workers in the qualitative findings.

Conclusion and Recommendations

These findings suggest telehealth consultations with education is practical, feasible, and applicable for use in settings with restrictions imposed by low-resource settings like the Philippines and/or in a crisis such as the COVID-19 pandemic. The CHEMPS intervention can also be used as an effective platform to provide a "health shield" to marginalized, high-risk elderlies against COVID-19 infection.

The findings show no participant contracted the COVID-19 infection to date, despite the presence of COVID-19 positive individuals in their immediate respective communities. This CHEMPS telehealth education and consultation intervention likely shielded them from COVID-19. In addition, the CHEMPS telehealth education and consultation intervention empowered them to improve their self-care management, resulting in the better control of their surrogate symptoms of underlying chronic disease. Use of surrogate symptoms may also serve as the basis to make presumptive diagnoses and provide legitimate advice to the medical management of elderlies with underlying comorbidities in a primary care setting.

The findings of this study recommend the use of "health shields", delivered via repeated telehealth consultations and telehealth education with significant mentoring and monitoring, to provide safe and effective primary health care to elderlies with underlying chronic illness in low-resource settings and/or at risk of contracting the COVID-19 infection.

Acknowledgements

We wish to express our sincerest gratitude to the following people who gave their full support and encouragement for the completion of this project. To the United Laboratories Foundation, Inc. represented by Dr Miguel Dorotan and assisted by Ms Kathleen Emnas for their encouragement, advices, and support to implement this program. Their logistical support had been overwhelming and timely despite the constraints brought about by the pandemic. To the COME PGI students (Batch 2019-20) of the ADZU-SOM who had been the main manpower of this project as they took time to care and help protect the high risk elders in Zamboanga, thru mentoring and monitoring by voice calls while connecting any of the participant's with their concerns to appropriate channels.

Abdulhari, Sheela
Abdulkadil, Amira
Abubakar, Edienburg
Abubakar, Fatiya
Bejerano, Meileen
Calualhatian, Mara
Chiong, Sophia
Claveria, Princes
Coronel, Cheslyn
Covarrubias, Hanna
Cua Ricmar
Dayrit, Percy
Ensanah, Sherwinda
Garcia, Jayvalika
Gonzales, Christine Joy
Gumansing, Genisa
Hadjiula, Nihma
Hamis, Rashid-Ali
Hassan, Abdulghani
Hibionada, Rhea Pearl
Ibbang, Darwana
Ibe, Ma. Eda Cecille
Ilano, Krizha
Indanan, Bryle
Ingkoh, Ayessa
Jainal, Rasheena
Juaton, Christine
Karay, Aizhar
Lim, Denzel
Macasantos, Juneth
Magadan, Ariene
Majid, Aminkadra
Muluk, Sahar
Musad, Jaro
Muyargas, Vanessa Jacqueline
Oyales, Odessa Kates
Pansoy, Riza Joy
Sahiddin, Fatima Hafza
Sebastian, Marie Elaine
Sinon, Danica Alexis
Solaiman, Amina
Sta. Elena, Kervin Dondi
Tabbu, Honey Faye
Tahsin, Sulaiman
Torino, Nikka Lorence
Ty, Singson
Villar, Lovely
Wata, Ahmad Ameenkar

To the Barangay health workers, community nurses and midwives of Barangays Mampang, Tetuan, and San Roque for their full support and collaboration to achieve the goals of this project. To the CHAP-P Team who helped us coordinate with the community health team at the ground level. To Dr. Mark Alvin Tan who helped secure from donors for the needed PPE for our arangay health workers who initially contacted the elderlies to get their contact details. To Fr. Karel San Juan, SJ, president of ADZU for connecting us with the people to expedite the release of the ethical clearances needed to implement this project. To Dr Afdal Kunting, Dr. Elgie Gregorio of the ZCMC Public Health Office who assisted us to carefully plan the teleconsultation aspect of this project. To Dr. Dulce Miravite the City Health Officer with her staff for granting us the clearance and permission to work with the Health workers assigned in these three Barangays. Lastly, to our God Almighty who is sovereign and in control, for apart from Him, this project would not have been completed.

Works Cited

1. Dahab M, van Zandvoort K, Flasche S, Warsame A, Ratnayake R, Favas C, et al. COVID-19 control in low-income settings and displaced populations: what can realistically be done? *Confl Health* [Internet]. 2020 [cited 2020 Oct];14(54). Available from: https://globalhandwashing.org/wp-content/uploads/2020/03/COVID19-control-in-low-income-settings-and-displaced-populations-what-can-realistically-be-done.pdf/ URL doi: https://doi.org/10.1186/s13031-020-00296-8
2. Andres E, Meyer L, Zulfiqar AA, Hajjam M, Talha S, Bahougne T, et al. Telemonitoring in diabetes: evolution of concepts and technologies, with a focus on results of the more recent studies. *J Med Life* [Internet]. 2019 [cited 2020 Oct];12(3): 203-214. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6814890/ URL doi: 10.25122/jml-2019-0006
3. Drivsholm T, de Fine Olivarius N, Nielsen AB, Siersma V. Symptoms, signs and complications in newly diagnosed type 2 diabetic patients, and their relationship to glycaemia, blood pressure and weight. *Diabetologia* [Internet]. 2005(cited 2020 Oct);48(2):210-214. Available from: https://pubmed.ncbi.nlm.nih.gov/15650820/ URL doi: 10.1007/s00125-004-1625-y
4. Clark N, Fox K, Grandy S. Symptoms of diabetes and their association with the risk and presence of diabetes. *Diabetes Care* [Internet]. 2007(cited 2020 Oct); 30(11):2868-2873. Available from: https://care.diabetesjournals.org/content/30/11/2868 URL doi: 10.2337/dc07-0816
5. Middeke M, Lemmer B, Schaaf B, Eckes L. Prevalence of hypertension-attributed symptoms in routine clinical practice: a general practitioners-based study. *J Hum Hypertens [*Internet]. 2008(cited 2020 Oct); 22(4):252-8. Available from: https://pubmed.ncbi.nlm.nih.gov/18007681/ URL doi: 10.1038/sj.jhh.1002305