Effect of a Lifestyle Medicine Program to Reduce the Risks of Cardiovascular Disease Among Young Male Adults in a Chosen Residential School in the Philippines

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ABSTRACT

Cardiovascular diseases (CVD) remain to be the leading cause of death worldwide. Studies show that men manifest symptoms ten years earlier than women and that men are less likely to seek healthy lifestyle behaviors compared to women. This study aimed to determine the effects of a lifestyle medicine program to reduce the risks of cardiovascular disease among males in a chosen residential school in the Philippines. A quasi-experimental, mixed method design was conducted among 32 young male adults, chosen through purposive sampling. The Transtheoretical Model guided this study. Data were gathered through pre and post quantitative and qualitative questionnaires, health assessments, in-depth interviews, and journals. The findings showed that young males have CVD risks of 66.7%, 100% of the participants have high blood pressure and 50% were overweight. The pre-intervention lifestyle risk factors gathered through qualitative data showed inadequate fruit intake, high intake of processed food, decreased physical activity, and sleeping late. An intervention program entitled "Young at Heart" was conducted for two months which consisted of lifestyle coaching, interactive lectures, actual demonstrations, focused-group discussion and personal journaling. Post intervention result showed decreased CVD risks, from 66.7% to 16.7%, decreased Blood Pressure from 100% to 33.4% and from 50% high Body Mass Index to 100% normal measurement. Moreover, qualitative data showed improved dietary habits, increased physical activity and improved sleeping habits. While the lifestyle program was successful it needs sustainability. It is recommended that this type of lifestyle medicine program be made available to students over a long period of time.

Keywords: Lifestyle medicine, Cardiovascular risks, Young adult male, Lifestyle behavior.

1. INTRODUCTION

Cardiovascular disease (CVD) remains to be the leading cause of death in the world for the last 20 years with an estimated 18 million deaths every year [1] It represents 31% of total deaths from all causes globally and is considered a pandemic [2]. Four out of five CVD deaths are due to ischemic heart disease (IHD) and stroke which are responsible for 85% of all CVD deaths. These are caused by a blockage that keeps the blood from flowing to the heart or brain. Ischemic heart disease and the world's biggest killer represent 16% of the world's total deaths while stroke represents around 11% of total deaths [3].

Considered to be the leading cause of death worldwide, it was reported that CVD affects not only the developed western countries but also the lower and upper middle-income countries with the biggest increase seen in the latter. [4] Some significant factors are socio-demographics such as relatively young populations who have high prevalence of risk factors (RF) and also urbanization. [5] Cardiovascular disease deaths increased by more than 2 million from 2000 to 2019 in which half of the increase were reported in the WHO of Western

Pacific region (WPR), particularly in the Asian countries under the above mentioned region. Cardiovascular disease mortality rates are widely known to be higher in men than in women.[6] Though the symptoms may have varied presentation between genders, studies show that men usually manifest onset of symptoms ten years earlier than women. Therefore, the American Heart Association recommends that the first step to lower the prevalence of CVD is to lower the chances of developing the risk factors of which many are of lifestyle significance even among young adults.[7] Lifestyle habits and practices such as physical activity (PA), healthy diet, weight management, and smoking are the significant risk factors for CVD. However, for the past 20 years, obesity, physical inactivity, and poor diet have been seen among young people in developed countries. In contrast to the adult population, the incidence of CVD among young adults has either plateaued or increased [8].

In the Philippines, there are more than 200 people who die from IHD every day while stroke claims a life every minute. Ischemic heart disease is the top cause of death among males and females in the country with 84,120 deaths representing 14.5 % of total deaths in 2017. It caused 50,503 deaths or 15.2% among males and 33,617 or 13.6% deaths among females [9]. Thus, this study was conducted to determine the effect of a tailored lifestyle medicine intervention program among young adult student males and are currently staying in a residential university in the Philippines.

2. REVIEW OF RELATED LITERATURE

Cardiovascular disease is the number one killer in the world and remains to be the major cause of disability. It is the culprit of one-third of all deaths globally [10]. Four of five CVD deaths are caused by heart attack and stroke. The mortality rate was decreasing among developed countries but recent findings show that it has plateaued and not decreasing anymore [11]. Study shows that men usually manifest symptoms ten years earlier than women [12] and that 4 to 10% of all heart attacks mostly happen to men 20- 39 years of age [13]. In contrast to the older adult population, the incidence of CVD among young adults has either plateaued or increased. The lifestyle factors which contributed to these are obesity, physical inactivity, and poor diet [14]. Another risk factor is High Blood Pressure (BP). Among young adults, there is an increased prevalence of uncontrollable high blood pressure and 38% of it is not detected until before the age of 40. High BP is related to different CVD incidences later in life

(Gooding et al., 2020). While there is a positive association between meat and the risk for high BP, a diet rich in vegetables with low sodium and dairy is the first line of treatment for high BP [15]

Another important RF is overweight and obesity, which are assessed through the measurement of Body Mass Index (BMI). The higher the BMI, the stronger the association to CVD incidence and death. [16] An increase in BMI by one unit is involved in 4% increase in heart attack risk and 6% in stroke. Overweight and obesity are the fifth leading cause of death in the world with an estimated 3 million deaths every year [17] For the past decades, the levels of overweight and obesity in developed and developing countries are consistently increasing [18].

High BP and high BMI are two of the major causes of CVD, and unfortunately are due to poor lifestyle practices such as lack of physical activity, unhealthy dietary practices, specifically increased caloric intake and decreased fruit and vegetables, lack of sleep and poor stress management [19].

Numerous studies have shown that lifestyle modification is an effective way to reduce developing CVD risk. Regular physical activity, healthy diet, and weight management have been shown to greatly decrease CVD risk. In two big cohort studies, adherence to these lifestyle practices lowered CVD risk by >80%. Compared with unhealthy lifestyle, it was reported that lifestyle change is linked to significant reduction of CVD incidents regardless of hereditary factors [19].

This study was guided by the Transtheoretical Model of Behavior Change (TTM) to reduce the risk for CVD through lifestyle modification programs. This model believes that change happens gradually and in stages therefore must be accounted for when seeking to change a behavior [20]. Employing in-depth interviews, the researcher assessed the readiness to change and level of confidence of each participant for each lifestyle behavior and made necessary action plan based on their readiness. The TTM consists of stages of change that helps to evaluate where an individual is in the process of behavioral change. The series of stages are Precontemplation, Contemplation, Preparation, Action, Maintenance, and Termination. Majority of the participants of the study were in the contemplation stage when it comes to dietary changes. Preparation and action stage were identified when it comes to PA, sleep, and stress management where a large part of the action plans have focused in.

3. METHODOLOGY

To reduce the lifestyle risk factors of young male adults which may contribute to the development of CVD, this study utilized mixed method research design. It employed two-phase data collection method. The first phase was a quantitative needs assessment using survey questionnaire tool and the Heart Disease Risk Calculator by Mayo Clinic conducted for 32 participants to measure their CVD risks. The second phase was a tailored lifestyle medicine intervention program to six participants chosen purposively based on their high CVD RF The intervention program entitled "Young at Heart" was conducted for two months which consisted of lifestyle coaching, interactive lectures, actual demonstrations, focused-group discussion and personal journaling.

This first phase of the study was done in a boarding school in the Philippines through purposive sampling with the following criteria: (1) male (2) between the ages of 18-30 years old (3) currently staying in the residential school (4) must be a Filipino. The second phase of the study was targeted to six who are at risk of CVD (from the first phase) as evidenced by the following health assessments: (1) diastolic BP of 120 mmHg and higher and (2) BMI of 25 and higher, (3) High CVD Risk based on the CVD calculator. Those who do not have the mentioned CVD risks were not eligible to be included due to the purpose of the study.

The validated questionnaire consisted questions on lifestyle practices of the participants. They were asked to select whether they always, often, rarely or never practiced a healthy eating pattern, physical activity, and sleep health. The result of the survey became the basis of the lifestyle intervention program conducted among the participants. To identify the CVD risk, Heart Disease Risk Calculator was utilized. It was a tool based on 1) Framingham Heart Study Cardiovascular Disease 10-Year BMI-based Risk Score Calculator, 2) Framingham Heart Study General Cardiovascular Disease 30-Year Lipid-based and BMI-based Calculators, and 3) ACC/AHA Pooled Cohort Equations CV Risk Calculator. This tool estimates the risk based on factors such as weight, PA, and smoking history in comparison with others in the same age group (Mayo, 2021). For the assessment of the qualification, <5% is low risk, 5 - 7.4% is borderline risk, 7.5 - 19.9% is intermediate risk, and >20% is high risk.

Data collection was carried out in the second week of February 2021 and the qualitative data was collected in the first week of May of the same year. Health assessment includes Blood Pressure-taking, measuring the Body Mass Index through height and weight. The same machines were used pre and post intervention and was calibrated accordingly. Data was analyzed through in-depth content analysis and observations and using percentage.

The study was approved by the University's Ethics Review Board and followed according to the Helsinki Declaration of Ethical Research in conducting research using human participants.

4. RESULTS AND DISCUSSION

During the intervention program, there was a total of six young male adults as participants. Majority of the participants were aged 26 to 30 years old while the minority were 20 to 25 years of age. All of them are currently residing in the residential school and more than half of them have been in the university as work scholars for six to 10 years. Half of the participants have a family medical background of diabetes, high blood pressure, and stroke.

The pre-intervention CVD risks of the participants was 66.7%, as measured by the Heart Disease Risk Calculator by Mayo Clinic; 50% of them were overweight, 50% are on the category of Stage 1 Hypertension (HPN), 16.7% on stage 2 Hypertension (HPN) while 33.3% have elevated BP. This is reflected in Table 1.

Table 1. Pre-intervention risk factors in terms of Blood Pressure, Body Mass Index and CVD Risk

Risk Factors	Frequency	Percentage
Blood Pressure		
Elevated	2	33.3%
Stage 1 HPN	3	50%
Stage 2 HPN	1	16.7%
BMI		
Normal	3	50%
Overweight	3	50%
CVD Risk		
Low Risk	2	33.3%
At Risk	4	66.7%

Increased BP at a young age was closely related to poor health practices. It contributes to early development of coronary artery disease, heart failure, stroke, and heart attack. Overall, it increases death

from all causes [21]. Overweight and obesity were connected to some CVD RF including high blood lipids, high triglycerides, Low Density Lipoprotein (LDL) cholesterol and total cholesterol, high BP, impaired blood sugar level, and metabolic syndromes. It is also associated with increased risk for heart failure [22].

The second research objective of the study was to determine the pre-intervention lifestyle practices of the participants in terms of dietary habits, physical activity and sleeping habits. In-depth interview was conducted and data was analyzed using qualitative content analysis. Result showed that prior to the intervention program, participants have unhealthy diet as reflected by lack of fruits in the diet, increased intake of simple or refined carbohydrates and increase consumption of processed food. Moreover, participants showed absence or lack of physical activity and lack of proper sleep. Table 2 summarizes the result.

Table 2. Pre-intervention lifestyle practices of the participants

Lifestyle Practices	Participants' Comments	Emerging Theme
Dietary Habits	*"I do not eat much fruit. Last month, I had one or two in a day but none this month."* *"I eat rice for breakfast, lunch and dinner and the portion is big."* *"I eat mostly processed food, like sardines, instant noodles, etc."*	**Unhealthy Diet** as evidenced by: 1. lack of fruits in the diet, 2. Increased intake of simple/refined carbohydrates consuming processed and canned foods,
Physical Activity	*"I barely have physical activity. I really do not exercise. I am a potato couch. I do not like jogging and never did at all."* *"Whenever I am free, maybe once a week, I go to the student park to play table tennis or volleyball but it is not my priority."* *"The thing is, aside from having no interest; I think it is a waste of time. It may be for the rich but not for a poor boy like me."*	**Absence or lack of physical activity**
Sleeping Habit	*"I cannot avoid sleeping late at night due to a full load of classes with lots of requirements. My sleeping time would be between 12 and one AM."* *"Honestly, my regular sleeping time is between 12 and 2 AM." My average sleeping hours is 4 -6 hours.* "I see myself as one lacking in sleep. Due to requirements, my sleeping time would be 11:30 PM and much later if I have to meet deadlines."	**Lack of Proper Sleep**

Numerous studies support the relationship of poor nutrition to CVD risk, especially the highly processed food [23]. Low fruit intake among younger men had greater association with CVD death compared to women and that low intake of fruits resulted in 1.8 million cardiovascular deaths [24]. On physical activity, the World Health Organization documented that time limitation was the top reported PA barrier among students who do not have time to exercise contributing to 51.3% [25] and as compared to prior entering college, a significant decrease among youth was noted [26]. Lastly, researchers confirmed that sleep health had an important role in CVD development and must be promoted for heart wellness and that not enough sleep duration of 7-8 hours causes a considerable danger that contributes to CVD morbidity and mortality wellness [27].

The final research question dealt with the effect of the lifestyle medicine intervention program to the participants in terms of lifestyle factors BP, BMI and CVD RF) as well as the changes in the lifestyle practices. Result showed that participants have decreased CVD risks, from 66.7% to 16.7%, decreased BP from 100% abnormal to 66.7% normal, 16.7% elevated and 16.7% stage 1, respectively. Lastly, from 50% high BMI to 100% normal measurement.

Table 3. Post intervention risk factors in terms of Blood Pressure, Body Mass Index and CVD Risk

Risk Factors	Frequency	Percentage
Normal Blood Pressure	4	66.7%
Elevated Blood Pressure	1	16.7%
Stage 1 Hypertension	1	16.7%
Normal BMI	6	100%
CVD Risk (Low)	1	16.7%

Studies confirm that lifestyle changes including adopting a healthy diet, being physically active, and having normal weight are significant factors that can lower CVD risk factors especially over a period of prolonged practice. In the Physicians' Health Study of 20,900 healthy men, the men who adhered to at least 4 out of 6 lifestyles (normal weight, not smoking, regular PA, moderate alcohol intake, high fiber breakfast, fruits and vegetable consumption) had 10% significantly lower risk for heart disease compared to those who did not adhere and had 21% risk [28].

As for the lifestyle practices of the respondents, the participants improved on two out of three lifestyle factors: increased physical activity and improved sleep. Participants had a challenge in improving their dietary habits as the residential school was adhering to strict quarantine protocols due to COVID-19 pandemic; however, they were determined to improve their dietary habits, especially after the pandemic.

Table 4. Post intervention lifestyle practices of the participants

Lifestyle Practices	Participants' Comments	Emerging Theme
Physical Activity	*"So I started jogging for less than an hour at the student park every morning."* Some students reported, *"So after putting it into practice, I realized its benefits. Now I use my leisure time for exercise such as jogging around the campus."* *"In estimate, I reach 180 minutes of physical activity in a week."* *"I would start my day with an early morning jog and I would end up at the Student Park to play table tennis, badminton or volleyball. If I can't do it in the morning, I make sure to have time in the afternoon."*	**Achieving >150 Minutes of Moderate Intensity of Physical Activity Per Week**

Sleeping Habit	*"After the lecture about sleep, I am now getting 7 hours of sleep. I have experienced it and I realized that that is how it is supposed to be."*	**Achieving seven (7) hours of sleep.**
	"I started achieving 7-8 hours and I experienced many benefits. I am maintaining it and even applying the sleep hygiene that you taught us. I started sleeping at 10 PM and woke up at 6 AM."	
	"It has become my practice to sleep before 10 AM and wake up at 6 AM. If I knew I had work duties the next day, I would even sleep earlier and wake up earlier."	

Literature has shown that although there is no threshold level of physical activity that must be reached before seeing the benefits, the dose-response relationship is: the more physically active, the more benefits. Most health benefits are achieved at 150 minutes a week of moderate-intensity PA or 75 minutes of vigorous intensity PA. Vigorous-intensity PA may have modest additional benefits including lower mortality rates and CVD RF [29]. As with regards to sleep, studies showed that among those who sleep 7-8 hours every night, there was a lowest heart attack and stroke mortality. Normally, BP goes down when a person is sleeping; therefore, BP is maintained on a normal level for the next day [30]. Compared to individuals who sleep more than 9 hours, those who sleep 7 hours have normal BP [31].

5. CONCLUSION

Lifestyle Medicine is gaining momentum in preventing chronic diseases. Lifestyle modification and health promotion have been successful in reducing half of the CVD mortality and that that lifestyle change is linked to significant reduction of CVD events regardless of hereditary factors.

In this study, result has shown how a tailored lifestyle intervention can have a positive effect in the health status and lifestyle practices of the participants. Young adults who are still in the university may not be aware of their CVD risks but education is a great tool for advocating lifestyle changes. Using health assessments that are not costly may be used to assess young adults' risks for CVD. Lifestyle changes may not always mean spending cash. Achieving what they can such as exercising, sleeping 7-8 hours, and proper stress management were proven to have positive effect on their blood pressure and weight. It is recommended that universities and schools must have a sustainable lifestyle program that will benefit their students.

ACKNOWLEDGMENTS

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