



LIFESTYLE MODIFICATION AND CARDIOVASCULAR RISK FACTORS AMONG SENIOR CITIZEN IN BAGUIO DISTRICT, DAVAO CITY

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Abstract: Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality among the elderly population. This study aimed to determine the lifestyle modifications and cardiovascular risk factors among senior citizens in Baguio District, Davao City. A descriptive-correlational design was employed to collect data from 380 conveniently selected senior citizens. The study employed a modified questionnaire adapted from the Department of Health PhilPEN risk assessment tool (2022). Results showed that most of the respondents were aged 64-67 years old, female, married, elementary level, and with average income of 12,302-18,201 PHP. The lifestyle modification of the respondents included never tobacco use, never consuming alcohol intake, physical activity, nutritional and dietary assessment, anthropometric measurement which is the body mass index (BMI), along with clinical measures such as blood pressure, blood sugar levels, and cholesterol levels. The findings reveal a significant association between demographic profile and cardiovascular risk factors in terms of sex and the findings reveal a significant relationship between lifestyle modification and cardiovascular risk factors that reveal anthropometric measurement in terms of BMI. Regular physical activity and a balanced diet were correlated with lower BMI, improved cholesterol profiles, and controlled blood pressure levels. Conversely, smoking and excessive alcohol consumption were linked to heightened CVD risks. The study highlights the critical role of lifestyle interventions in terms of body mass index mitigating cardiovascular risks among the elderly. It underscores the necessity for community-based programs to promote healthy behaviors and support senior citizens in adopting sustainable lifestyle changes. Future research should explore the long-term management and intervention in continuing and strengthening the NCD program in ages 20 years old and above of Baguio District and all districts belonging to Davao City.

Keywords: *cardiovascular disease, lifestyle modifications, elderly, risk factors, physical activity, dietary habits, Baguio District, Davao City, Philippines*

INTRODUCTION

Cardiovascular diseases (CVDs) are the world's leading cause of death, which emphasizes the necessity of population-level statistics to guide efforts for treatment and prevention (Mensah et al., 2019). In 2021 alone, over 20.5 million people died from cardiovascular disease (Huang and Ding, 2024). Elderly individuals are particularly susceptible to these disorders due to the natural aging process, which compromises the cardiovascular system's optimal performance and leads to an increased prevalence of cardiovascular disorders with age (Ciumarnean et al., 2021). Healthy aging, defined as the ability to maintain independence, purpose, vigour, and quality of life into old age, is therefore crucial (Eckstrom et al., 2020). Consequently, age stands as an independent risk factor for CVD, compounding the health issues faced by the elderly population (Rodgers et al., 2019).

Chronic illness rates are steadily rising as a result of the world economy's fast growth and the significant lifestyle changes that follow. Specifically, the annual burden of cardiovascular disease (CVD) is rising (Li et al., 2021). Based on US National Center for Health Statistics, Gaidai et al. (2023) report a 22% rise in inpatient cardiovascular operations between 1999 and 2009. The World Health Organization, (2023) high blood pressure affects 33% of persons between the ages of 30 and 79 (age-standardized). In 2017, CVD was attributed to 17.8 million deaths worldwide, accounting for 330 million years of life lost and an additional 35.6 million years lived with impairment (Mensah et al., 2019).

In the Philippines, cardiovascular illnesses are the leading cause of mortality. Significant demographic shifts are anticipated to increase the proportion of elderly individuals to 18.8% by 2035 (Philippine Statistics Authority, 2020). Additionally, morbidity data from the Baguio District for January to December 2023 indicates that 45% of hypertension patients are 60 years or older, highlighting the urgent need for targeted health interventions in this area. The One Cavite Project found that involving private

medical practitioners in screening, diagnosing, and treating adult patients for significant cardiovascular risk factors can complement government efforts, leading to active prevention and management (Ona et al., 2020).

Despite the rising prevalence of CVDs among the elderly in the Philippines, there are substantial links between obesity, diabetes, and cardiovascular disease in the elderly, emphasizing the necessity of lifestyle adjustments and physical exercise in prevention (Ciumarnean et al., 2021). The intensity of noncommunicable illnesses in the country requires constant efforts to rectify gaps, emphasize preventative measures, and examine the situation holistically (Belarga et al., 2022). Nonetheless, the World Health Organization (WHO) recommends early detection services, weight maintenance, eating healthier, increasing physical activity, avoiding or quitting alcohol and/or smoking, and other critical evidence-based preventive services, but millions of older adults worldwide do not receive these services (Cacciata et al., 2021).

Theoretical Framework

This study is well-supported by William Cockerham’s “Health Lifestyle Theory”, Mollborn et al. (2021), highlighted how Cockerham’s (2005) work has responded to the challenge of concentrating on structural implications on health behaviors, Cockerham’s Health Lifestyle Theory offers a thorough framework that combines structural elements and individual agency. Examining the health behaviors of elderly citizens—who are impacted by socioeconomic, environmental, and personal variables in addition to their own choices—requires a dual emphasis.

Determining the lifestyle changes that are most helpful in lowering cardiovascular risk. This entails assessing the results of community support organizations, health education initiatives, and legislative modifications meant to encourage elderly adults to lead healthier lifestyles and provide insights.

The results can help shape public health initiatives targeted at enhancing elderly adults’ cardiovascular health. It is possible to make suggestions for expanding healthcare access, strengthening social networks within the community, and developing surroundings that encourage healthy living. Future studies examining lifestyle changes and health outcomes in various groups can build on the foundation of this study. The idea may be modified by researchers to look at different risk variables and health habits in different demographic groups.

Conceptual Framework

INDEPENDENT VARIABLE

Demographic Profile
 Age
 Gender
 Civil Status
 Educational Background
 Socioeconomic Status

Lifestyle Modification
 Tobacco Use
 Alcohol Intake
 Physical Activity
 Nutrition and Dietary Assessment
 Anthropometric Measurements

DEPENDENT VARIABLE

Cardiovascular Risk Factors
 Blood pressure;
 Blood sugar levels
 And Cholesterol levels

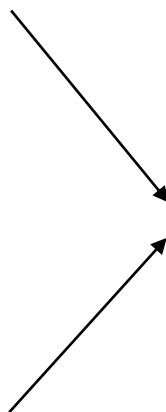


Figure 1. Research Paradigm

The figure above illustrates the conceptual framework that was used in the study. The independent variables: the demographic profile consisted of age, gender, civil status, educational background, and socioeconomic status; and lifestyle in terms of tobacco use, alcohol intake, physical activity, nutrition, and dietary assessment, and anthropometric measurements. The dependent variable is the cardiovascular risk factors of senior citizens in terms of their blood pressure, blood sugar levels, and blood cholesterol levels.

Statement of the Problem

This study seeks to answer the lifestyle modification and cardiovascular risk factors among senior citizens. Especially, it will answer the following questions:

1. What is the demographic profile of the respondents in terms of the following:
 - 1.1 age;
 - 1.2 gender;
 - 1.3 educational background; and
 - 1.4 socioeconomic status?
2. What is the lifestyle modification among the respondents in terms of :
 - 2.1 tobacco use;
 - 2.2 alcohol intake;
 - 2.3 physical activity;

- 2.4 nutrition and dietary assessment; and
- 2.5 anthropometric measurements?
3. What is the cardiovascular risk of the respondents in terms of the following factors:
 - 3.1 blood pressure;
 - 3.2 blood sugar levels; and
 - 3.3 cholesterol levels?
4. Is there a significant association between the demographic profile and cardiovascular risk among senior citizens?
5. Is there a significant relationship between lifestyle modification and cardiovascular risk factors among senior citizens?

Hypotheses

The following null hypothesis were formulated and were tested at 0.05 alpha level of significance:

- H₀₁.** There is no significant association between demographic profile and cardiovascular risk factors among senior citizens.
- H₀₂.** There is no significant relationship between lifestyle modification and cardiovascular risk factors among senior citizens.

RESEARCH METHODOLOGY

This chapter discusses the methods of how the study was conducted which included the details about the research designs, setting, participants, measures, ethical considerations, procedures, data analysis, and the scope of limitations of the study.

Design

The research employs a quantitative descriptive-correlational design to examine the current state of lifestyle modifications and cardiovascular risk factors among senior citizens in Baguio District, Davao City. This design, as described by Miksza et al. (2023), focuses on understanding phenomena without manipulation and exploring relationships between variables. By utilizing this approach, the study aims to identify patterns, relationships, and potential correlations between lifestyle modification and cardiovascular risk factor outcomes in this demographic. Data collection involves the use of adapted questionnaires and standardized measurement tools, ensuring systematic gathering and quantification of data, as suggested by Miksza et al. (2023).

The research design is descriptive, as it determines the demographic profile of the respondents, including age, sex, civil status, educational background, and socioeconomic status. Additionally, it is correlational, as it seeks to determine the association between demographic profile and cardiovascular risk factors, and relationship between lifestyle modifications toward cardiovascular risk factors. Sampling will involve selecting a representative sample of senior citizens in Baguio District, Davao City, using convenient sampling.

Setting

The study was conducted in the Baguio District, Davao City. According to the November 2023 census by the Department of Social and Welfare Development Office (DSWDO), the district has an actual 3,763 senior citizens. Baguio District comprises eight barangays: Barangay Baguio Proper, Barangay Cadalian, Barangay Carmen, Barangay Gumalang, Barangay Malagos, Barangay Tambobong, Barangay Tawan Tawan, and Barangay Wines.

The researcher, is a former NCD Coordinator, a resident of Baguio District, and data encoder, conveniently chosen to conduct the study in this district. This background provided the researcher with the unique opportunity to understand the local context and engage with the community effectively. Through this study, the researcher aimed to explore the relationship between lifestyle modification and cardiovascular risk factors among the respondents and to gather information that could aid in the allocation of supplies, promote equal care access, and improve community awareness regarding available NCD programs.

Participants

The respondents of the study were residing anywhere in Baguio District, Davao City, which consists of Barangay Baguio Proper, Cadalian, Carmen, Gumalang, Malagos, Tambobong, Tawan Tawan and Wines. A total of 380 senior citizens were selected through a convenient sampling method with the following inclusion: must be aged 60 years old and above, must be resident anywhere in Baguio District, and willing to participate in the study.

Name of Barangay	Senior Citizens
Baguio Proper	11
Cadalian	57
Carmen	45
Gumalang	56
Malagos	68
Tambobong	59
Tawan Tawan	53
Wines	31
Total	380

Table 1. Distribution of Respondent

Measure

This study utilized an adapted questionnaire from the Department of Health, based on guidelines from the World Health Organization, the Philippine Package of Essential Noncommunicable Disease Interventions (PhilPEN), which aims to detect and manage total cardiovascular risk at the Primary Health Care (PHC) level (Yamaguchi et al., 2023). The modified risk assessment forms used in the study included both the old and new versions: the PhilPEN Risk Assessment and Screening Form (University of Southeastern Philippines, 2022); the revised PhilPEN Risk Assessment Form (Revised 2022) for adult aged 20 and above (Oro, n.d.). To ensure comprehension, a version of the questionnaire was translated into Cebuano.

The first part of the questionnaire consisted of closed-ended questions. Respondents provided information on their demographic profile, including age, sex, civil status, educational background, and monthly income to assess their socioeconomic

status. The second part of the questionnaire included checklist-type questions and questions answerable by “yes” or “no”, relating to lifestyle modifications and cardiovascular risk factors. Additionally, anthropometric measurements such as height and weight for calculating Body Mass Index (BMI), blood pressure readings, and laboratory results were recorded.

The modified PhilPEN risk assessment tool was validated by research professionals. A pilot study was conducted, yielding a high reliability score as indicated by Cronbach’s Alpha. Subsequently, the researcher consulted a statistician to determine the appropriate data analysis tool. While a reliability test was feasible, consultation with the Department of Health and City Health Office led to approval for the use and modification of the PhilPEN questionnaire.

Ethical Consideration

Social Value. This study aimed to determine the relationship between lifestyle modification and cardiovascular risk factors among senior citizens in Baguio District. The purpose was to explore how lifestyle modification could influence cardiovascular risk factors. The results of this study provided participants with knowledge regarding the importance of lifestyle modifications in preventing cardiovascular diseases. The findings were disseminated to the community, particularly to those who would benefit the most.

Risks and Benefits. The questionnaire asked about the respondent's personal information and lifestyle modification practices. It was assured that the study was used for research purposes only. This research served as a foundation for establishing focused, therapeutic actions by understanding the respondent’s health-related lifestyle. Procedures like anthropometric measurements and blood pressure readings were non-invasive and did not harm participants. They will be questioned if test results such as blood sugar and cholesterol levels are available. Although laboratory results were beneficial, they were not required. The results of this research helped determine if the respondents were at high risk for cardiovascular disease.

Voluntary Participation. Participation in this study was voluntary. Respondents had the right to refuse to participate if they were uncomfortable in any way. Additionally, respondents who initially decided to participate had the right to withdraw from the study at any time without penalty. If respondents chose to withdraw, all information they provided was excluded from the collected data.

Privacy and Confidentiality. In the gathering, retention, and processing of personal data, researchers followed the criteria of transparency, legitimate purpose, and proportionality (Data Privacy Act of 2012). In terms of privacy and confidentiality, the respondents indicated their names and other identifying information, it will not be associated with any part of the written report of the research. The data that will be gathered in this study will be kept with the utmost confidentiality. If the study were to be published, any information included would not reveal respondents' identities. All data gathered was kept strictly confidential and accessible only to the researchers. After the study, participants could request a copy of the results and receive feedback on their cardiovascular risk assessments, along with guidance and counselling on lifestyle modifications if appropriate. Finally, all raw data was disposed of accordingly after the study

Procedures

The following steps were undertaken by the researcher in conducting the study:

1. A transmittal letter was submitted to the Program Chair of the Graduate School of Master of Arts in Nursing at Davao Doctors College, the City Government of Davao, the District Health Officer of the Baguio District, the district head of the Department of Social Welfare and Development Office, Barangay Captains, and all nurses and midwives assigned to the eight barangays to obtain approval to conduct the research.
2. Upon receiving approval, the researcher formulated the survey questionnaires. The PhilPEN risk assessment tool, adapted from the Department of Health, was modified and validated by the research professionals. A pilot study was conducted, yielding a high-reliability score based on Cronbach’s Alpha. Subsequently, the researcher consulted with a statistician to determine the appropriate data analysis tool. Instead of further reliability testing, the research professional advised obtaining permission from the Department of Health to modify the PhiPEN risk assessment tool. Approval was obtained, and the development of the survey questionnaire was finalized. The thesis proposal, including ethical considerations and the preparation of an informed consent form for the qualified participants, was completed. Informed consent was secured from the respondents before proceeding with the interviews.
3. Data gathering commenced, with participants gathered in a common location or through house-to-house visits. The study involved face-to-face individual screenings, each lasting approximately 15-20 minutes. Anthropometric measurements and blood pressure readings were taken for each respondent. Strict adherence to minimum health standards was maintained throughout the interview and data collection process to ensure respondent safety and hygiene.
4. All gathered data were collated to identify patterns, trends, and associated variables. The data were tabulated, interpreted, and analyzed. A summary of findings, conclusions, and recommendations was developed. The data were then submitted to the City Government for proper disposal.
5. A final printout of the manuscript was prepared for the thesis defense.

Data Analysis

The following statistical tools were employed in the study:

Frequency and Percentage. These statistical tools were used and determine the general characteristics of the respondents, in terms of demographic profile, lifestyle modifications, and cardiovascular risk factors among senior citizens in Baguio District, Davao City.

Pearson’s Chi-Square Test of Independence. This statistical tool was used to determine the following: the association between the demographic profiles and cardiovascular risk factors and the significant relationship between lifestyle modification and cardiovascular risk factors among senior citizens in Baguio District, Davao City.

Scope and Limitations of the Study

This study was limited only to senior citizens and the discussion only focused on lifestyle modification and cardiovascular risk factors. This research study was limited to descriptive-correlational design without the in utilized in determining the lifestyle modification and cardiovascular risk factors using the quantitative descriptive-correlational research design However, inferential

data analysis was not included, thereby limiting the ability to draw predictive or conclusive statements. The study was confined to the Baguio District, Davao City, with respondents selected through convenient sampling.

In addition to the respondents' demographic profiles, the study's scope was expanded to include a thorough examination of participant characteristics, which included age ranges from 20 to above, family history, and cultural background. To provide a thorough description and long-term discussion of the respondents' characteristics, topics including medication compliance and routine health check-ups were taken into consideration.

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The research concentrated on screening participants for cardiovascular risk factors and lifestyle adjustments; it did not address the warning signs associated with individual non-communicable diseases (NCDs). These factors were not included in the study: respondents below the age of 20, identification of red flags that respondents could have, understanding of disease processes, compliance with prescriptions, and views towards the NCD program and the government programs supplied to the community.

RESULTS AND DISCUSSION

Presented in this chapter are the results of this study. Discussions made based on the results are also presented.

1. What is the demographic profile of the respondents in terms of age, gender, civil status, educational background, and socio-economic status?

Table 2. Demographic Profile of Respondents.

Demographic Profile	Frequency (n=380)	Percentage
Age:		
60-63 yo	93	24.5%
64-67 yo	102	26.8%
68-71 yo	74	19.5%
72-75 yo	55	14.5%
76-79 yo	25	6.6%
80-83 yo	16	4.2%
84-87 yo	10	2.6%
88-91 yo	1	0.3%
92-95 yo	4	1.1%
Total	380	100%
Sex:		
Male	147	38.7%
Female	233	61.3%
Total	380	100%
Civil Status:		
Single	22	5.8%
Married	230	60.5%
Widowed	122	32.1%
Separated	6	1.6%
Total	380	100%
Educational Background:		
Elementary Level	123	32.4%
Elementary Graduate	87	22.9%
High School Level	64	16.8%
High School Graduate	65	17.1%
College Level	20	5.3%
College Graduate	10	2.6%
Postgraduate	3	0.8%
Vocational	4	1.1%
No Formal Education	4	1.1%
Total	380	100%
Monthly Income:		
500-3,499 PHP	241	63.4%
3,450-6,400 PHP	99	26.1%
6,401-9,350 PHP	15	3.9%
9,351-1,2301 PHP	12	3.2%
12,302-15,250 PHP	2	0.5%
15,251-18,201 PHP	2	0.5%
18,202-21,152 PHP	6	1.6%
27,055-30,005 PHP	3	0.8%
Total	380	100%

Continue... Table 2. Demographic Profile of Respondents.

The table 2 presents the demographic profile in terms of age, gender, civil status, educational background, and socio-economic status of the senior citizens who participated in the study. It can be seen that the majority of the respondents were ages 64 to 67 years old (102 out of 380 respondents; 26.8%), females (233 out of 380 respondents; 61.3%), married (230 out of 380 respondents; 60.5%), elementary level (123 out of 380 respondents; 32.4%), and with an average income of 500-3,499 PHP (241 out of 380 respondents; 63.4%). These results imply that, 380 respondents, majority of them were aged 64 to 67 years old, female, married, elementary level, and with an average income of 500-3,499 PHP.

On the other hand, the minority of the respondent belongs were ages, 88 to 91 years (1 out of 380 respondents; 0.3%), males (147 out of 380 respondents, 38.7%), separated (6 out of 380, 1.6%), postgraduate (3 out of 380 respondents, 0.8%), and with an average income of 12,302-,250 PHP and 15,251-18,201 PHP which comprises of 0.5% each. These results imply that 380 respondents, the minority were ages 88 to 91 years old, male, separated, postgraduate, and with average income range from 12,302-18,201 PHP.

2. What is the lifestyle modification among the respondents in terms of: tobacco use, alcohol intake, physical activity, nutritional and dietary assessment, and anthropometric measurements?

Table 3. The Lifestyle Modifications among the Respondents.

Indicators	Frequency (n=380)	Percentage
Tobacco Use:		
Never Used.	255	67.1%
Exposure to Secondary Smoke.	41	10.8%
Former Tobacco user (stopped smoking > 1 year).	46	12.1%
Current Smoker (currently smoking or stopped smoking < 1 year).	38	10.0%
Total	380	100%
Alcohol Intake:		
Never Consume	256	67.4%
Occasionally Drink	41	10.8%
Former Drinker (stopped >1 year)	43	11.3%
Yes, drink alcohol	40	10.5%
Total	380	100%
Do you drink 5 or more standard drinks for men, and 4 or more for women (in one sitting/occasion) in the past year?		
No	311	81.8%
Yes	69	18.2%
Total	380	100%
Physical Activity:		
Do you do at least 2.5 hours a week of moderate-intensity physical activity?		
No	163	42.9%
Yes	217	57.1%
Total	380	100%
Nutrition and Dietary Assessment:		
Does the respondent eat high salty food (processed/fast food such as instant noodles, dried fish), "ihaw-ihaw"/fried (e.g. isaw, barbeque, liver, chicken skin) and high sugar food and drinks e.g. chocolates, cakes, soft drinks, pastries, weekly?		
No	163	42.9%
Yes	217	57.1%
Total	380	100%
Antropometric Measurement:		
-Body Mass Index:		
Underweight (<18.5)	21	5.5%
Normal (18.5-22.9)	145	38.2%
Overweight (23-24.9)	71	18.7%
Obese (>25)	143	37.6%
Total	380	100%

Table 3 represents lifestyle modification in terms of tobacco use, alcohol intake, physical activity, nutrition and dietary assessment, and anthropometric measurements.

It can be seen that the majority of the respondents, never used tobacco in terms of tobacco use (255 out of 380 respondents; 67.1%). According to (Gallucci et al., 2020), cigarette smoking is the leading cause of preventable illnesses. Similarly, in terms of the worldwide illness burden across all age groups, smoking ranked third in 2021. It was also a major risk factor in the majority of regions and sociodemographic categories (GBD 2021 Risk Factors Collaborators, 2024). Aside from this, along with other measures like designating non-smoking areas, displaying health warnings, prohibiting the sale of tobacco products to minors, and imposing advertising limits, tax hikes are proven to be the most effective intervention to lower the demand for tobacco products (Cheng & Estrada, 2020).

On the other hand, alcohol intake the respondents never consumed (256 out of 380 participants; 67.4%). Alcohol remains a significant risk factor for the worldwide illness burden (Sornpaisarn et al., 2020). And also according to Stewart et al., (2020) further state that while there are broad consequences of excessive alcohol use, the guidelines for healthy alcohol consumption are not consistent due to lack of clear data. But light to moderate alcohol consumption—one drink or two for males and one drink for women per day—has been linked to a decreased risk of cardiovascular disease, according to earlier epidemiological research (Chase, 2023).

In terms of physical activity, most of the participants had at least 2.5 hours a week of moderate-intensity physical activity (217 out of 380 respondents; 57.1%). According to Lin et al. (2020), effective aging in middle and late age is enhanced by physical activity. Walking has been shown to be beneficial for managing coronary heart disease in older men when it comes to physical exercise (Rodgers et al., 2019). According to the American Heart Association Guidelines, physical activity was defined as 75 minutes per week of vigorous-intensity aerobic physical activity or ≥ 150 minutes per week of cumulative moderate-intensity aerobic physical activity (Cacciata et al., 2021).

In terms of nutrition and dietary assessment the respondents does eat high salty food (processed/fast food, such as instant noodles, dried fish), “ihaw-ihaw”/fried (e.g. isaw, barbeque, liver, chicken skin) and high sugar food and drinks e.g chocolates, cakes, soft drinks, pastries, weekly (217 out of 380 respondent; 57.1%). For this reason, Kwon et al. (2020) noted in their research consuming fruits and vegetables is an essential component of a balanced diet for senior citizens and is linked to several favourable health outcomes as well as a lower risk of chronic illnesses including cancer, stroke, and cardiovascular disease.

In terms of anthropometric measurement, most of the respondents have a normal body mass index (145 out of 380 respondents; 38.2%). According to Rodgers et al. (2019), these findings suggest that BMI stands alone as a CVD risk factor.

3. What is the cardiovascular risk of the respondent in terms of the following factors: blood pressure, blood sugar levels and cholesterol levels?

Table 4. The Cardiovascular Risk Factors among the Respondents.

Indicators	Frequency (n=380)	Percentage
A. Blood Pressure:		
Normal (<120/<80mmHg).	123	32.4%
Pre-Hypertension (120-139/<80mmHg).	71	18.7%
Stage 1 hypertension (140-159/80-89 mmHg).	124	32.6%
Stage 2 hypertension (>160/>90 mmHg).	47	12.4%
Hypertensive Crisis (>180/>120 mmHg).	15	3.9%
Total	380	100%
Diagnosed with Hypertension?:		
No	140	36.8%
Yes	240	63.2%
Total	380	100%
Taking Medication?:		
No	156	41.1%
Yes	224	58.9%
Total	380	100%
Specify Medication:		
no medication.	140	36.8%
amlodipine 5mg.	22	5.8%
amlodipine 10mg.	18	4.7%
losartan 50mg.	72	18.9%
losartan 100mg.	65	17.1%
forget	4	1.1%
Total	380	100%
B. Blood Sugar Levels:		
-Diagnosed with Diabetes Mellitus II		
No	339	89.2%
Yes	41	10.8%
Total	380	100%
Taking Medication?		
No	348	91.6%
Yes	31	8.2%
Stop	1	0.3%
Total	380	100%

Specify Medication:		
no medication	339	89.2%
metformin 500mg	24	6.3%
gliclazide 30mg	3	0.8%
insulin	4	1.1%
forget	1	0.3%
Total	380	100%
Fasting Blood Sugar:		
No Results	348	91.6%
Normal Level (<5.6 mmol/L)	8	2.1%
Pre-Diabetes (5.6-6.9 mmol/L)	13	3.4%
Diabetes (>7 mmol/L)	11	2.9%
Total	380	100%
Random Blood Sugar:		
No Results	371	97.6%
Normal Level (110-140 mg/dL)	6	1.6%
Pre-Diabetes (5.6-6.9 mmol/L)	0	0%
Diabetes (>200 mg/dL)	3	0.8%
Total	380	100%
C. Cholesterol Levels:		
-Total Cholesterol:		
No Results	366	96.3%
Normal Level (1-5.2 mmol/L)	13	3.4%
Low Level (<1 mmol/L)	1	0.3%
High Level (>5.2 mmol/L)	0	0%
Total	380	100%
High Density Lipoprotein:		
No Results	366	96.3%
Normal Level (0.9-1.5 mmol/L)	12	3.2%
Low Level (<0.9 mmol/L)	2	0.5%
High Level (>1.5 mmol/L)	366	96.3%
Total	380	100%
Low Density Lipoprotein:		
No Results	366	96.3%
Normal Level (0.03-3.4mmol/L)	12	3.2%
Low Level (<0.03 mmol/L)	0	0%
High Level (>3.4 mmol/L)	2	0.5%
Total	380	100%
Triglycerides		
No Results	366	96.3%
Normal Level (0.9-2.3 mmol/L)	10	2.6%
Low Level (<0.9 mmol/L)	4	1.1%
High Level (>2.3 mmol/L)	0	0%
Total	380	100%

Table 4 represents the cardiovascular risk factor in terms of blood pressure, blood sugar levels, and cholesterol levels. A total of 380 respondents participated in the study. It can be seen that the majority of the respondents' blood pressure are stage 1 hypertension with a measure of 140-159/80-89 mmHg (124 out of 380 respondents; 32.6%). According to Rodgers et al. (2019), age, gender, and obesity are the three factors that are most closely linked to hypertension in older persons. Even though office blood pressure readings are still the primary method for diagnosing hypertension, it is highly advised to confirm the diagnosis with ambulatory or home blood pressure monitoring (Brouwers et al., 2021).

The majority of the participants are diagnosed with hypertension (240 out of the 380 respondents). According to the World Health Organization, (2023), globally, men are somewhat more likely than women (34%), to have hypertension compared to women (32%). Unlikely, according to Rodgers et al. (2019), after 75 years of age, the rates of diagnosed hypertension drastically increased to 80.0% in males and 85.6% in women.

The majority of the participants are taking their medication (224 out of 380 respondents; 58.9%). According to Poulter et al. (2020), inadequate compliance with antihypertensive drugs is a primary cause of inadequate blood pressure regulation. However, regular follow-ups can have a major impact on medication adherence among individuals with hypertension, and oral education can greatly increase medication adherence in hypertension patients (Ampofo et al., 2020). And treatment resistance and failure are frequently caused by nonadherence (Hameed & Dasgupta, 2019).

On the other hand, the majority of the respondents are not diagnosed with Diabetes Mellitus type II (339 out of 380 respondents; 89.2%). And since not diagnosed most of them are not taking medication related to DM II (348 out of 380 respondents; 91.6%). According to Glovaci et al. (2019), people with type 2 diabetes have a greater chance of dying from cardiovascular disease (CVD) than people without the illness. The final phase in the treatment of diabetes is medication, insulin is required for Type 1 Diabetes Mellitus and 25–30% of Type 2 Diabetes Mellitus diabetic patients (Alam et al., 2021).

In terms of laboratory results, most of the respondents are not undergone any laboratory results with fasting blood sugar levels (348 out of 380 respondents, 91.6%), random blood sugar (371 out of 380 respondents, 97.6%), and in terms of lipid profiles the cholesterol levels, high-density lipoprotein, low-density lipoprotein, and triglycerides majority of the respondents have no results (366 out of 380 respondents, 96.3%). According to Rodgers et al. (2019), a portion of the cardiovascular hazards associated with obesity are mediated by the co-occurrence of high blood pressure, cholesterol, and glucose.

4. Is there a significant association between the demographic profile and cardiovascular risk among senior citizens?

Table 5: The Test of Association between Demographic Profiles and Cardiovascular Risk Factors.

Demographic Profiles	Cardiovascular Risk Factors				
	LR	p	ϕ_c	Decision	Remarks
Age	163.650	.997	.255	Accept H_{o1}	Not Significant
Sex	42.633	.028	.309	Reject H_{o1}	Significant
Civil Status	54.764	.989	.223	Accept H_{o1}	Not Significant
Educational Background	187.248	.922	.313	Accept H_{o1}	Not Significant
Monthly Income	128.675	1.00	.297	Accept H_{o1}	Not Significant

Note: Significant if $p < .05$; LR=Likelihood Ratio; ϕ_c =Cramer's V.

Table 5 revealed the test of association between demographic profiles and cardiovascular risk factors among senior citizens. Significantly, demographic profile terms of sex had an association with the cardiovascular risk factors (LR=42.633, $p = .028$). Additionally, the results also showed a moderate association between sex and cardiovascular risk factors ($\phi_c = .309$). Sex is another possible risk factor in aging individuals, with older females being more likely to develop CVD than age-matched men. However, in both men and women, the risks associated with CVD rise with age (Rodgers et al., 2019). Whereas, globally, male have somewhat greater prevalence of hypertension with 34% than females 32% (World Health Organization, 2023, p.8).

On the other hand, the other demographic profiles in terms age (LR=163.650, $p = .997$) **according to An et al. (2020) a positive curvilinear relationship between age and happiness and life satisfaction was significantly predicted by age squared. , civil status (LR=54.764, $p = .989$), educational background (LR=187.248, $p = .922$), and monthly income (LR=128.675, $p = 1.00$) did not show any significant association with the cardiovascular risk factors. Hypertension, an established risk factor for cardiovascular disease, disproportionately affects older persons (Shukuri et al., 2019). However, it is still debated whether marital status influences the prevalence of cardiovascular risk factors. Psychosocial and socioeconomic variables, as well as other acute stresses, may contribute to the link between marital status and CVD outcomes, although the underlying processes are not well understood. Additional research is necessary (Dhindsa et al., 2019).

In conclusion, the results indicate that there is moderate association between sex and cardiovascular risk factors. However, age, civil status, educational background and monthly income did not show significant association with the cardiovascular risk factors.

5. Is there a significant relationship between lifestyle modification and cardiovascular risk factors among senior citizens?

Table 6: The Test of Relationship between Lifestyle Modification and Cardiovascular Risk Factors.

Lifestyle Modification	Cardiovascular Risk Factors				
	LR	p	ϕ_c	Decision	Remarks
Tobacco Use	80.976	.480	.275	Accept H_{o1}	Not Significant
Alcohol Intake	105.903	.539	.263	Accept H_{o1}	Not Significant
Physical Activity	35.625	.124	.283	Accept H_{o1}	Not Significant
Nutrition and Dietary Assessment	21.192	.777	.222	Accept H_{o1}	Not Significant
Anthropometric Measurement	124.150	.001	.338	Reject H_{o1}	Significant

Note: Significant if $p < .05$; LR=Likelihood Ratio; ϕ_c =Cramer's V.

Table 6 shows the test of the relationship between the respondents' lifestyle modification and cardiovascular risk factors among senior citizens. The lifestyle modification, in terms of anthropometric measurement, revealed a significant relationship with the cardiovascular risk factors (LR=124.150, $p < .001$). Moreover, the results also showed a moderate relationship between lifestyle modification and cardiovascular risk factors ($\phi_c = .338$). A healthy lifestyle is the foundation of cardiovascular health (Gibbs et al., 2021). Conversely, the other indicators of lifestyle modifications in terms of tobacco use (LR=80.976, $p = .480$), alcohol intake (LR=105.903, $p = .539$), physical activity (LR=35.625, $p = .124$), and nutrition and dietary assessment (LR=21.192, $p = .777$) did not show any significant correlation with the cardiovascular risk factors.

The study by Salawu et al. (2024), which examined the utility of various obesity indices in predicting cardiovascular risk, it's evident that measure such as Body Mass Index (BMI), waist circumference (WC), and waist-to height ratio (WHtR) are all significantly associated with cardiovascular risk factors. While WHtR has been proposed as a potentially superior indicator for predicting cardiovascular risk due to its focus on central obesity, the study findings suggest no special advantage of WHtR over BMI or WC in this regard. The study, encompassing 441 subjects with a diverse male-to-female ratio, revealed statistically significant differences between sexes concerning blood pressure, pulse rate, height, and other obesity indices. Particularly noteworthy was the observation that male subjects tended to exhibit higher values across these parameters compared to females. Furthermore, the study highlighted significant variations in BMI and waist circumference between males and females, with a considerable proportion of female subjects displaying abnormal values in these metrics.

On the other hand, the study conducted by Baig et al. (2023) delves into the correlation between middle upper arm circumference (MUAC) and cardiovascular risk factors in young adults, presenting MUAC as a potential screening index of assessing cardiovascular risk. The study was conducted randomly selected from urban areas of Pakistan, where 366 participants were involved. The study suggested that MUAC can serve as an alternative anthropometric indicator for assessing CVD risk factors.

However, Loureiro et al. (2020), conducted a population-based cross-sectional study aiming to analyze the association between anthropometric variables and cardiovascular risk factors in adults and older adults in Rio Branco, Arce. The involved 641 adults and 957 older adults, with the findings that moderate correlations were observed between anthropometric indicators and lipid profile variables. Overweight and obesity were frequent, with a higher prevalence observed in adults aged 40 to 59 years old and older adults aged 60-69 years old but it suggests that longitudinal analyses are necessary to provide stronger evidence of the

relationship observed. And overall, findings advocate for the continued use of anthropometric indicators as valuable tools for early identification and management of cardiovascular disease risk factors in diverse populations.

In conclusion, the results indicate that there is a moderate relationship between lifestyle modification and cardiovascular risk factors which are interpreted through anthropometric measurements. However, the other indicator of lifestyle modification in terms of tobacco, alcohol intake, physical activity, and nutrition and dietary assessment did not show any significant correlation with the cardiovascular risk factors.

SUMMARY, CONCLUSION, AND RECOMMENDATION

This chapter presents the synthesis of the results presented in paragraphs as well as the conclusion formulated based on the findings and theoretical framework. Further, the researcher also highlights in this chapter the recommendations of the study.

Summary of Findings

The following findings that answered the stated researched questions:

1. Most of the respondents were aged 64 to 67 years old, female, married, elementary level, and with an average income of 500-3,499 PHP. And the minority of the respondents were aged 88 to 91 years old, male, separated, post graduate and with average income range from 12,302-18,201 PHP.
2. The lifestyle modifications of the respondents were never used in terms of tobacco use, in terms of alcohol intake they never consumed and some of the respondents had does not have a 5 or more standard drinks for men, and 4 or more for women in one sitting/ occasion in the past year. In terms of physical activity, most of the participants had at least 2.5 hours a week of moderate-intensity physical activity. In terms of nutrition and dietary assessment the respondents most of eat high salty food (processed/fast food, such as instant noodles, dried fish), "ihaw-ihaw"/fried (e.g. isaw, barbeque, liver, chicken skin) and high sugar food and drinks e.g chocolates, cakes, soft drinks, pastries, weekly. And lastly, in terms of anthropometric measurement, most of the respondents have a normal body mass index.
3. The cardiovascular risk factors most of the respondents had a blood pressure are stage 1 hypertension with a measure of 140-159/80-89 mmHg. Most of the participants are diagnosed with hypertension and are taking any prescribed medication. On the other hand, most of the respondents are not diagnosed with Diabetes Mellitus type II. Most of them are not taking medication related to DM II.
4. There is a moderate association between sex and cardiovascular risk factors. On the hand, age, civil status, educational attainment and socioeconomic status did no show any significant association with the cardiovascular risk factors.
5. Lastly, based on the results of this study, the test of the relationship between the respondents' lifestyle modification and cardiovascular risk factors among senior citizens, the anthropometric measurement as represented by their body mass index, revealed a significant relationship with the cardiovascular risk factors.

Conclusions

Listed below are the conclusions made based on the findings of this study:

1. The majority of the respondents were ages 64 to 67 years old, female, married, elementary level, and with an average income of 500-3,499 PHP.
2. In lifestyle modification, the respondents of the study are never using a tobacco, never consume alcohol, engaged in regular physical activity with a recommended of 2.5 hours per week with moderate-intensity activity, with diet of high salt, high sugar, and high fat diets on a weekly basis, and lastly with the anthropometric measurement the respondent had a normal body mass index (BMI).
3. In cardiovascular risk factors, most of the respondent were stage 1 hypertensive blood pressure (140-159/80-89 mmHg), diagnosed with hypertensive medication. In contrast, to diagnosed with diabetic mellitus type II, respondents are not diagnosed and not taking any medication. For most of the respondents, laboratory results related to blood sugar levels and lipid profiles were not taken.
4. There is a moderate association between sex and cardiovascular risk factors.
5. There is a significant relationship between lifestyle modifications, particularly in terms of anthropometric measurement the body mass index and the cardiovascular risk factors. And there was a moderate relationship indicating that lifestyle modifications play a role but might not be a sole determinant of cardiovascular health among senior citizens of Baguio District, Davao City.

Recommendations

Based on the findings that the study gathered, the following recommendations were made:

Health Care Workers. Health care cworkers should enhance health education programs, strengthen community outreach, and collaborate with the barangay stakeholders in providing and implementing comprehensive health interventions. And also provide continued training and capacity building for the health workers to improve their knowledge and skills in cardiovascular health assessment, counselling, and management. This will empower healthcare professionals to have effective communication and provide support to senior citizens in adopting healthy lifestyle behaviours among senior citizens.

Program Managers. It is recommended that the study findings to strengthening the existing health programs aimed in reducing cardiovascular not just the senior citizens but those age 20 years old and above. Also utilization of interventions as evidence-based and responsive to the community needs. This study provide baseline data to set program goals, monitor progress, and assess the impact to senior citizens, and to provide sufficient resources and funding allocation to support cardiovascular health promotion and medication supplies.

Future Researchers. Future researchers should conduct further studies on cardiovascular health among senior citizens, exploring additional factors influencing cardiovascular risk and intervention to address and build a findings and recommendations of this study. And also can expand to a larger sample size, diverse geographic areas, and longitudinal studies to provide more

comprehensive insights into the cardiovascular health trends and outcomes among senior citizens and can be expanded to a larger population.

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