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Prevalence of Cardiovascular Disease in a Faith-Based Community: The Pentecostal Theological Seminary Akpajo Eleme, Rivers State, Nigeria

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Abstract **Original Research Article**

Background: Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality globally, yet little is known about its prevalence among abstinent faith-based populations. This study aimed to assess the burden of CVD and its risk factors among clergy members of a Pentecostal seminary in Southern Nigeria.

Methods: A cross-sectional study was conducted during a week-long World Heart Day outreach at a theological seminary. A total of 134 consenting clergy members, all abstaining from smoking and alcohol, were recruited. Data were obtained using structured questionnaires, physical examination, anthropometry, blood pressure, and random blood sugar measurements. ECG and echocardiography were performed for clinically indicated participants. Logistic regression analysis assessed predictors of hypertension, diabetes, and CVD.

Results: The mean age was 42.84 ± 9.50 years, and mean BMI was 26.99 ± 4.98 kg/m², classifying the average participant as overweight. The prevalence of hypertension, diabetes, and CVD was 29.9%, 8.2%, and 38.8% respectively. BMI was a significant independent predictor of both hypertension ($p=0.003$) and CVD ($p<0.001$), whereas age showed weaker associations. Despite the absence of tobacco and alcohol use, high CVD burden was observed, likely influenced by poor dietary practices and sedentary lifestyle.

Conclusion: This study highlights that abstinence alone does not confer full protection from cardiometabolic risks. Excess weight, poor nutrition, and inactivity are potent contributors to cardiovascular disease in faith-based populations. Integrating health promotion into spiritual education could offer a culturally tailored strategy for disease prevention.

Keywords: Cardiovascular Disease, Hypertension, Diabetes, Faith-Based Community, Clergy, Overweight, Obesity, Sub-Saharan Africa, BMI, Preventive Health, Seminary, Non-Communicable Diseases.

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INTRODUCTION

Cardiovascular disease (CVD) remains a leading global health concern, affecting populations across all social and cultural backgrounds. The prevalence of CVD amongst members of faith-based communities is often underexplored. Faith-based societies hold unique beliefs, traditions, and communal structures that shape their approach to healthcare, influencing awareness, accessibility, and adherence to preventive measures.

In many faith-driven communities, religious leaders and organizations play a pivotal role in shaping health behaviors, providing a trusted source of guidance beyond clinical settings. This interconnectedness presents both opportunities and challenges in implementing effective CVD screening and prevention strategies.[1]

Faith-based communities have unique social structures that promote shared values and a sense of belonging, making them ideal environments for health interventions. Previous studies

have shown that church-based interventions can effectively address cardiovascular risk factors, such as physical inactivity, poor diet, and stress management, and can reduce health disparities, particularly in populations with a high burden of CVD. However, there is limited data on the cardiovascular health of clergy and other faith-based individuals, who may encounter stress and lifestyle constraints unique to their roles.[1-2]

A faith-based community is typically defined by shared religious beliefs, practices, and values that influence social interactions, health behaviors, and overall well-being. These communities often provide spiritual support, social cohesion, and moral guidance, which can shape health outcomes in both positive and challenging ways.

Faith-based organizations (FBOs) have long served as crucial platforms for health promotion across diverse contexts. In the United States, a systematic review of 28 evaluated faith-based health programs conducted between 1990 and 2000 highlighted their focus on primary prevention (50.9%), cardiovascular risk reduction (20.7%), and cancer awareness (18.9%), with positive outcomes including reductions in blood pressure, cholesterol, and improved screening behaviors[1–3]. Several randomized and quasi-experimental trials have demonstrated the effectiveness of church-centered interventions in managing hypertension, particularly among African-American adults. For example, a cluster-randomized trial integrating spiritual elements with lifestyle modification achieved significantly greater systolic blood pressure reductions than standard education[4]. Similarly, faith-based institutions have been instrumental in delivering education, blood pressure monitoring, and behavioral change interventions, with measurable success in maintaining normotension among high-risk populations[5].

Faith-centered diabetes screening and management programs have also shown promise. A Ghanaian church-based initiative screened over 600 individuals, identifying hypertension in 27.9% and diabetes in 3.5%, with over 95% of referrals retained for further care and clinical improvements by the third month[6]. In the realm of weight management, programs such as the biblically-themed "Mighty Men" intervention and "The WORD" (Wholeness, Oneness, Righteousness, Deliverance) demonstrated significant weight loss and improved dietary patterns among participants[7–9]. The FAN (Faith, Activity and Nutrition) program, implemented across multiple churches, reported increased physical activity, fruit and vegetable intake, and lowered blood pressure[10]. Additionally, mental health and cancer prevention initiatives embedded in FBOs have expanded access to counseling and early screening, especially in underserved communities[11–14].

In Nigeria, health outreaches have been conducted within religious premises and in partnership with churches and mosques. Outreach campaigns, such as those embedded within church revival meetings or health weeks, often facilitate blood pressure checks, diabetes screening, and basic health education. Nigerian studies by Akinlua et al and Afutu et al[15-17] have noted the high turnout and retention in such religiously anchored interventions, even though they are often under-documented in formal faith-health literature. These initiatives, though lacking in systematic evaluation frameworks, reflect the latent health delivery potential of FBOs in Sub-Saharan Africa. Therefore, faith-based communities across the globe—and especially in regions with limited healthcare infrastructure—remain pivotal yet underutilized allies in the effort to tackle the growing burden of non-communicable diseases.

Research suggests that religious affiliation can positively impact cardiovascular health by encouraging abstinence from smoking and alcohol, fostering social cohesion, and reducing stress. [17] Yet, barriers such as mental health stigma, delayed medical consultation, and dietary restrictions may pose health risks. These findings underscore the necessity for targeted and culturally sensitive health interventions within faith-based communities.

Faith-based communities are classified by religious affiliation (e.g., Christian, Muslim, Traditional African religions), organizational structure (e.g., churches, mosques), and levels of community engagement. Comparative analysis indicates that while Christian and Muslim groups commonly discourage harmful behaviors like smoking and drinking, traditional faith practices may involve ceremonial use of herbs or rituals, which affect health behaviors[5].

Specifically, the study will assess the CVD profile within a faith-based community, comparing hypertension and diabetes prevalence against that of the general population. This indirect assessment of the benefits of an abstinent lifestyle particularly regarding smoking and alcohol consumption will help determine whether faith-based health practices contribute to measurable improvements in cardiovascular health. Investigating these intersections could provide valuable insights into how faith communities shape health behaviors and whether such settings offer unique advantages in disease prevention and management.

METHODOLOGY

This study was a cross-sectional study conducted at the Pentecostal Theological Seminary in Akpajo, Eleme Local Government Area of Rivers State, Nigeria. The investigation coincided with a week-long World Heart Day health campaign led by a mobile clinic stationed at the seminary's sickbay.

Participants The study population comprised consenting clergy members enrolled at the seminary. All participants abstained from smoking and alcohol consumption, ensuring a unique focus on other modifiable cardiovascular risk factors. Individuals who declined participation or presented incomplete data were excluded.

Sample Size and Sampling Using a confidence level of 95% ($Z = 1.96$), a 25% prevalence estimate ($p = 0.25$), and 8% margin of error ($d = 0.08$), the calculated sample size was:

$N = (1.96^2 \times 0.25 \times 0.75) / 0.08^2 \approx 113$

Considering the finite population correction for N = 2000, the final minimum sample required was sustained above the threshold. A total of 134 participants were recruited via total sampling.

Study Design:

This cross-sectional study was carried out in the Sick Bay of the Pentecostal Theology Seminary during a mobile clinic conducted at the Pentecostal Theology Seminary to commemorate World Heart Day 2018. It was a week-long program event.

Sample Size:

$n = Z^2 \cdot p \cdot (1-p) / d^2 n =$

- Assume:
  - Z = corresponding to the confidence level (commonly 1.96 for 95% confidence)P = 0.25 (25% prevalence),
  - d = 0.08 (8% margin of error).

$$N = \frac{(1.96)^2 * 0.25 * (1-0.10)}{(0.09)^2}$$

$$\frac{(1.96)^2 * 0.25 * (0.75)}{(0.08)^2}$$

$$N = \frac{0.72}{0.0064}$$

= approx.= 113.

Study Population: The study population consisted of consenting participants who were clergy members enrolled at the Pentecostal Theology Seminary. Smokers and alcohol consumers were excluded from the study to focus on cardiovascular risk factors in a population with abstinent lifestyles. All participants completed a standardized questionnaire assessing demographic data (age, sex, and state of origin) and lifestyle factors.

Data Collection: Data were obtained via structured self-report questionnaires and physical examinations. Variables collected included age, sex, state of origin, tribe, marital status, physical activity, Anthropometric measures (weight, height) were used to compute BMI. Blood pressure and random blood sugar were also measured. Participants flagged with suspected cardiovascular abnormalities underwent ECG and echocardiography.

Data Analysis:

The collected data were first organized into a structured format using Microsoft Excel. Data cleaning procedures included the removal of duplicate entries and the correction of inconsistencies in categorical responses. Categorical variables were standardized to ensure consistency—for example, "sex" was recoded as 1 for male and 2 for female. Participants were also stratified into predefined age groups (18–40, 41–59, and ≥60) to enable subgroup comparisons.

Subsequently, the cleaned dataset was imported into IBM SPSS (version 25) for statistical analysis. Descriptive statistics were computed for all key variables, and means with standard deviations were calculated for continuous data. Binary logistic regression models were developed to assess the independent effects of age, sex, BMI, marital status, and tribe on three major outcomes of interest: hypertension, diabetes, and cardiovascular disease (CVD). Adjusted odds ratios (AORs) and 95% confidence intervals were reported to quantify the strength and direction of associations, with statistical significance set at $p < 0.05$.

Operational Definitions:

Hypertension: SBP ≥ 140 mmHg or DBP ≥ 90 mmHg
Prehypertension: SBP 120–139 or DBP 80–89 mmHg
Diabetes: Fasting blood glucose ≥ 7.0mmol/l with symptoms or double Fasting blood glucose ≥ 7mmol/l and Random blood glucose ≥ 11.1 mmol/l
Cardiovascular Disease:: Hypertension, Diabetes, Abnormal ECG and Echocardiogram

RESULTS

This study enrolled a total of 134 participants, consisting of 81 males (60.4%) and 53 females (39.6%). The overall mean age was 42.84 ± 9.50 years, with the majority of participants falling within the 41–65 years age category. Age stratification revealed that 58 individuals (43.3%) were between 18 and 40 years, 74 (55.2%) were aged 41 to 65 years, and only 2 participants (1.5%) were above 65 years of age.

The mean Body Mass Index (BMI) was 26.99 ± 4.98 kg/m², placing the average participant in the overweight range. Blood pressure measurements showed a mean systolic blood pressure of 123.86 ± 18.46 mmHg and a mean diastolic pressure of 81.09 ± 10.87 mmHg. These values indicate a substantial portion of the population lies in the prehypertensive range. Based on classification, 75 participants (56.0%) were normotensive, 18 (13.4%) were prehypertensive, and 40 (29.9%) were hypertensive.

Glycemic analysis showed a mean random blood glucose level of 5.70 ± 2.59 mmol/L. While the majority were within the normal range, 11 participants (8.2%) were diabetic, 9 (6.7%) had impaired glucose levels, and 4 participants (3.0%) recorded hypoglycemic readings, likely reflective of prolonged fasting practices observed in faith-based communities. Altogether, 113 participants (84.3%) were normoglycemic.

Cardiovascular disease (CVD) was diagnosed in 52 participants (38.8%) based on history , clinical findings, ECG and echocardiographic findings. Specifically, 25 underwent ECG, while 11 had echocardiography performed due to clinical suspicion or abnormal screening results. Marital status distribution showed that 108 participants (80.6%) were married, while 26 (19.4%) were single. Tribal background analysis revealed that 72 participants (53.7%) were from Rivers State, and 61 (45.5%) were from other states across Nigeria.

In terms of nutritional status by BMI classification, 13 individuals (9.7%) were underweight, 58 (43.5%) had normal weight, 48 (36.3%) were overweight, and 14 (10.5%) were obese. Importantly, the prevalence of cardiovascular disease was significantly higher in the overweight and obese categories compared to those with normal or underweight status, reinforcing the critical association between excess weight and cardiovascular risk.

Binary logistic regression analysis identified BMI as a significant independent predictor of both hypertension ($p = 0.003$) and cardiovascular disease ($p < 0.001$). While age was also associated with increased disease burden, its predictive strength was weaker. Other variables such as sex, marital status, tribe, and state of origin were not statistically significant predictors of hypertension, diabetes, or CVD.

Table 1: Summary of Sociodemographic, Clinical, and Cardiovascular Parameters Study Population: Clergy in a Faith-Based Institution (N = 134)

Parameter	**Category**	**N (%) or Mean ± SD**
Age (years)		42.84 ± 9.50
BMI (kg/m²)		26.99 ± 4.98
Systolic BP (mmHg)		123.86 ± 18.46
Diastolic BP (mmHg)		81.09 ± 10.87
Blood Glucose (mmol/L)		5.70 ± 2.59
Sex	Male	81 (60.4%)
	Female	53 (39.6%)
Tribe	Rivers	72 (53.7%)
	Non-Rivers	61 (45.5%)
Marital Status	Married	108 (80.6%)
	Single	26 (19.4%)
Blood Pressure Class	Normotensive	75 (56.0%)
	Prehypertensive	18 (13.4%)
	Hypertensive	40 (29.9%)
Diabetic Status	Non Diabetic	113 (84.3%)
	Diabetic	11 (8.2%)
	Impaired Glucose	9 (6.7%)
CVD Profile	CVD Prevalence	52 (38.8%)
	Non-CVD	82 (61.2%)

Table 3: Comparison of Data between Sexes

Variable	Male (Mean ± SD)	Female (Mean ± SD)	T-Statistic	P-Value
AGE	43.42 ± 9.39	42.90 ± 9.49	0.30	0.7631
SBP	125.11 ± 17.32	121.14 ± 19.99	1.14	0.2577
DBP	82.05 ± 10.15	78.86 ± 11.50	1.59	0.1158
BMI	27.23 ± 5.01	26.52 ± 4.76	0.79	0.4288

Table 3: Logistic Regression for CVD, Diabetes & Hypertension

Variable	CVD				DM				HTN			
	B	SE	AOR	P	B	SE	AOR	P	B	SE	AOR	P
Intercept	-6.81	1.71	â€”	â€”	18.21	35590.48	81003263	1	-6.69	2.19	0	0
AGE	0.02	0.02	1.02	0.33	-0.01	0.04	0.99	0.8	0.02	0.02	1.02	0.44
SEX	0.69	0.43	2	0.1	0.45	0.74	1.57	0.54	0.65	0.46	1.92	0.16
BMI	0.18	0.05	1.2	0	0.11	0.07	1.12	0.12	0.15	0.05	1.16	0
MARRIED	0.04	0.68	1.04	0.96	-23.17	35590.48	0	1	0.21	0.67	1.23	0.75
TRIBE	-1.16	0.9	0.31	0.2	0.32	0.48	1.38	0.5	0.08	0.3	1.08	0.79
STATE	1.23	0.89	3.43	0.16	-0.09	0.1	0.91	0.33	0.03	0.07	1.03	0.63

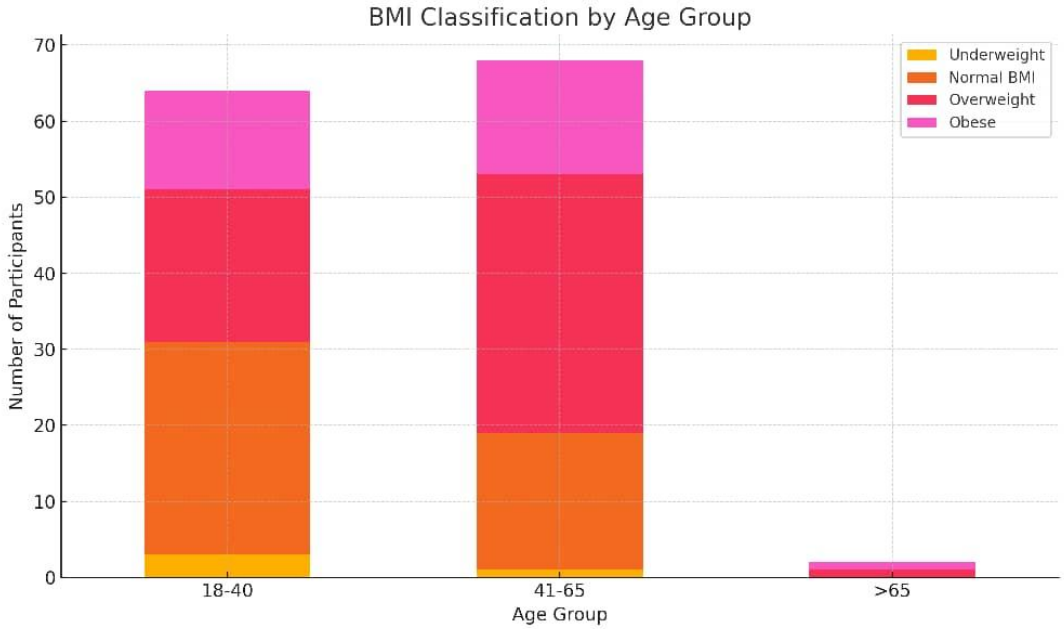

Figure 1BMI Classification by age

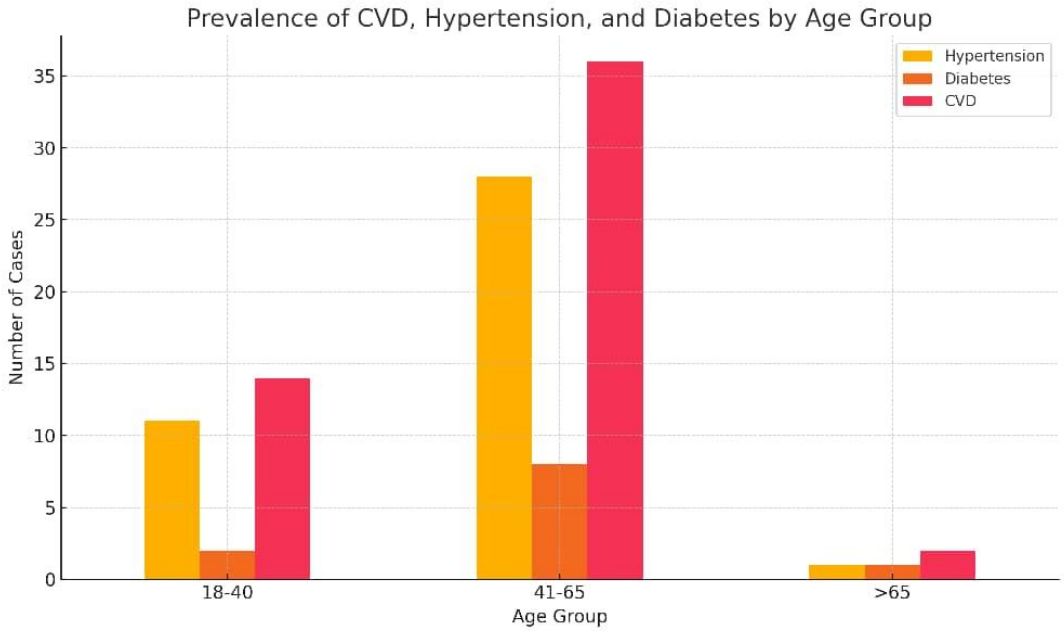

Figure 2Prevalence of CVD/HYPERTENSION/ DIABETES amongst Age Groups

DISCUSSION

The findings from this study reveal a significant burden of cardiovascular disease (CVD) and hypertension among members of a faith-based seminary community. Notably, 29.9% of participants were hypertensive, 38.8% demonstrated evidence of cardiovascular abnormalities, and 8.2% were diabetic, underscoring the presence of multiple interrelated cardiovascular risk factors despite the community's abstention from smoking and alcohol—two well-recognized modifiable contributors to cardiometabolic disease.

This high burden is likely driven by the age composition of the cohort. With over 55.2% of participants falling within the 41–65 years age range, the population aligns with a demographic segment known to experience escalating cardiovascular risk due to vascular stiffening, endothelial dysfunction, declining metabolic resilience, and lifestyle-induced syndromes such as metabolic syndrome. Age, though a non-modifiable risk factor, serves as a critical lens for interpreting the observed disease prevalence, particularly when considered alongside lifestyle and anthropometric variables.

The prevalence of diabetes (8.2%) in this cohort is consistent with, though slightly lower than, previously reported values in broader regional studies. A study by Cookey et al. identified a diabetes prevalence ranging from 8.9% to 11.0% in South-South and South-East Nigeria, with urbanization and healthcare access influencing rates.[18] The relatively lower diabetes prevalence here may reflect some protective effects of a structured, abstinent lifestyle; however, the presence of impaired glucose regulation in 6.7% and hypoglycemia in 3% of participants suggests dietary extremes likely influenced by prolonged fasting and restrictive religious food practices. These patterns may delay symptom recognition or mask early disease, creating diagnostic blind spots in communities guided by spiritual routines.

One of the most striking findings was the mean BMI of 26.99 kg/m², categorizing the average participant as overweight, with 36.3% classified as overweight and 10.5% as obese. This is particularly notable in a population presumed to engage in modest, disciplined lifestyles. Logistic regression analysis reinforced the central role of BMI as a strong, independent predictor of both hypertension (AOR = 1.16; $p = 0.003$) and CVD (AOR = 1.20; $p < 0.001$). Even in the absence of traditional cardiovascular risk behaviors such as smoking and alcohol use, excess body weight emerged as a potent, modifiable driver of cardiovascular risk. The findings from this study underscore the significant role of excess body weight as a modifiable determinant of cardiovascular disease (CVD) in faith-based populations. Despite a protective abstinent lifestyle—free from smoking and alcohol use—the observed mean BMI of 26.99 kg/m² placed the average participant in the overweight category. This excess weight was significantly associated with both hypertension and CVD, as confirmed by logistic regression analyses.

These results are congruent with numerous studies within Nigeria and across Sub-Saharan Africa (SSA) that highlight obesity as a key contributor to cardiovascular morbidity: in a hospital-based study by Akpa et al,[19] in a large-scale epidemiologic data from the H3Africa initiative, encompassing over 30,000 adults across 13 SSA countries, further corroborated these findings reporting that obese individuals had more than twice the odds of hypertension. Similarly, research

from Irrua Specialist Teaching Hospital revealed that obese hypertensive and diabetic patients were 2.5 times more likely to fall into a high cardiovascular risk category based on 10-year risk models.[20] Even among children and adolescents in the region, overweight and obesity have been strongly linked to early manifestations of metabolic syndrome, including elevated blood pressure and insulin resistance.[21-22]

Globally, meta-analyses involving hundreds of thousands of participants consistently demonstrate that overweight and obesity are associated with a markedly increased risk of coronary artery disease (CAD) and stroke. Central adiposity, in particular, has shown even stronger predictive power for adverse cardiovascular outcomes than BMI alone. A recent Mendelian randomization study from the Cleveland Clinic published in *JAMA Network Open* provided compelling genetic evidence confirming a causal link between obesity, type 2 diabetes, and ischemic heart disease.[23]

Taken together, these findings affirm that excess adiposity—especially in urbanizing or semi-urban faith-based communities—represents a potent and often underestimated risk factor. In the present study, the relatively high prevalence of CVD (38.8%), hypertension (29.9%), and diabetes (8.2%) may be partially explained by sedentary routines, poor dietary practices, and caloric excess, which persist despite the spiritual discipline of abstention. This highlights the urgent need to integrate structured physical activity, nutritional education, and periodic cardiometabolic screening into faith-based wellness programs. The faith community thus offers a unique and culturally anchored platform for promoting healthier weight and reducing the long-term burden of cardiovascular disease.

When compared to national data, these findings align with the rising trend of overweight and obesity in Nigeria, especially within urban and semi-urban populations experiencing rapid nutrition transition from indigenous diets to energy-dense, processed foods.[24-25] Although the seminary promotes moral discipline, many of its members live within or near urbanized areas and may be exposed to calorie-rich diets with high carbohydrate loads, low fiber intake, and increased consumption of fried or fatty foods. Coupled with minimal structured physical activity, these dietary patterns likely contribute to visceral fat accumulation and insulin resistance, thereby increasing cardiometabolic risk.

This paradox—where a community marked by abstinence and spiritual devotion still harbors substantial cardiometabolic disease—calls for a more holistic health framework. Faith-based institutions are uniquely positioned to integrate health promotion into spiritual education, leveraging the influence of religious leaders to foster nutritional literacy, exercise culture, and periodic health screening. Indeed, BMI emerges from this study not just as a statistical marker, but as a vital tool for early intervention, deserving focused attention within seminary wellness programs.

In conclusion, while the seminary community's abstinence from tobacco and alcohol remains commendable and potentially protective, it is insufficient in isolation. The convergence of age, diet, sedentary lifestyle, and excess body weight demonstrates that a comprehensive lifestyle approach—emphasizing nutrition, exercise, and regular screening—is essential. Future longitudinal studies with more granular data on physical activity, dietary patterns, and psychosocial stressors will better illuminate the complex interplay between faith, lifestyle, and cardiovascular health in similar populations.

DECLARATIONS

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Conflict of interest: The authors declare no conflicts of interest.

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