Original Article

Comparison of Knowledge, Attitude, and Practices Regarding the Risk of Cardiovascular Diseases between Medical Students and Nonmedical Students of the University of Ghana

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Abstract

Background: Cardiovascular diseases (CVDs) are a major mortality cause worldwide. It is estimated that for Ghana, the probability of dying from CVD, cancer, diabetes, or chronic respiratory disease between ages 30 and 70 years is 20%. Evidence-based strategies reveal that controlling the risk factors associated with CVD leads to a reduction of CVD development, associated morbidity, and mortality. **Aim:** The purpose of this study was to compare the knowledge, attitude, and practices regarding CVDs between medical and nonmedical students of the University of Ghana. **Materials and Methods:** A cross-sectional study was conducted among University of Ghana medical students and students in nonmedical faculties. STATA version 14.0 (StataCorp USA) was used to analyse the data using descriptive statistics and statistical tests such as Pearson's Chi-Square tests to compare differences between groups at a 95% confidence interval (CI). **Results:** Medical students generally demonstrated higher levels of knowledge, a more positive attitude toward CVD, and more positive practices toward the prevention of CVD compared to nonmedical students at the University of Ghana. Specifically, being a medical student significantly increased the odds of the level of knowledge (odds ratio [OR] = 6.082); $P = 0.001$; 95% CI = 2.046–8.078) and level of attitude (OR = 4.942; $P = 0.007$; 95% CI = 1.535–5.908) toward CVD compared with nonmedical students. However, the type of student, age, sex, and level of student did not significantly influence the level of practice regarding the risks of CVD ($P > 0.05$). **Conclusions:** Efforts must be made to improve the knowledge, attitude, and practices regarding CVD, especially among nonmedical students of the University of Ghana, to reduce the potential negative impact.

Keywords: Cardiovascular diseases, cardiovascular risk factors, students, university of Ghana

Introduction

The World Health Organisation (WHO) reveals that among the world's top 10 causes of death, there are seven noncommunicable diseases.[1] The trend has seen a steady increase over the last two decades.[1] This emphasises the need for an intensified global focus on preventive and therapeutic measures to manage these diseases.[1] Cardiovascular diseases (CVDs), which are a group of noncommunicable disease, have become the ultimate cause of death globally.[2] CVDs are listed as one of the world's leading causes of mortality and morbidity by the WHO[3] and are responsible for an estimated loss of 17.9 million lives each year. Over three-quarters of these deaths occur in low- and middle-income countries.[3] Sub-Saharan Africa countries are experiencing an epidemiological transition from communicable to noncommunicable diseases, such as CVDs.

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Ghana ranks CVDs as the leading cause of death.[4] In Accra, Ghana's capital, CVDs rose from being the seventh and tenth cause of death in 1953 and 1966 to becoming the leading cause of death in 1991 and 2001, respectively.[5]

Risk factors for CVDs include increasing age, elevated blood pressure (hypertension), smoking, increased blood cholesterol level, diabetes, overweight or obesity, sedentary lifestyle, and family history of heart disease.[6] Smoking accounts for nearly

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10% of all CVDs, followed by a sedentary lifestyle (6%) and overweight and obesity (5%). Furthermore, low consumption of fruits and vegetables caused the death of approximately 16 million people.[7]

Effective control and management of risk factors prevent CVD.[8] Data from many studies have proved primary prevention to be a cost-effective approach to reducing this burden. Adequate knowledge of the risk factors of CVD is essential for an individual to make an informed decision about modification of practices which may increase disease risk.[9]

Designing and implementing health promotion programs requires evaluating baseline knowledge of CVD.[10]

Recently, a publication by Agyei *et al*. found out that the combined prevalence of overweight and obesity was about 30% among medical students in Accra, putting them at risk of CVD.[11] This research sought to compare the knowledge, attitude, and practices regarding the risks of developing CVDs among medical and nonmedical students at the University of Ghana. The estimation of the basic knowledge of CVD among this population has a public health application as it provides the basis for the institution of preventive policies and the creation of awareness to reduce the risk of developing CVD.

General aim

This study compared the knowledge, attitude, and practices regarding the risks of developing CVD between medical and nonmedical students at the University of Ghana.

Specific objectives

1. To assess the level of knowledge, attitude, and practices regarding the risk of CVD in medical and nonmedical students of the University of Ghana
2. To compare the level of knowledge, attitude, and practices regarding the risk of CVD between medical and nonmedical students of the University of Ghana
3. To determine factors that may influence knowledge, attitude, and practices regarding the risk of CVD in this group of students.

Materials and Methods

Study design

This was an institutional-based cross-sectional study design conducted between June and July 2021.

Study site

The study was conducted at two sites: the University of Ghana Medical School, situated on the Korle-Bu University campus and Legon's main university campus. Korle-Bu campus is located 3 km from the Accra Central Business District and is located at the premises of the Korle-Bu Teaching Hospital. The Korle-Bu campus is the main campus for the College of Health Sciences, which is made up of the following: the School of Biomedical and Allied Health Sciences, the University of Ghana Medical School, the University of Ghana Dental School, the School of Nursing and Midwifery, School of Public Health, School of Pharmacy, and Noguchi Memorial Institute for Medical Research.

At present, there are 32 local institutional affiliations with the University of Ghana, teaching nondegree, bachelor's degree, and postgraduate degree programs.

Study population

The target population for this study were medical students from the University of Ghana Medical School, Korle-bu, and students from nonscience faculties enrolled in the University of Ghana's main campus at Legon. The medical students were drawn from Levels 400, 500, and 600 who were doing their clinical rotations. Consented participants between the ages of 16 and 30 years from the two campuses were recruited for this study.

Students from the two campuses who were <16 years, older than 30 years, or who did not give consent were excluded from the study.

Sampling strategy and sample size calculation

Participants were selected using a simple random sampling technique.

Using Cochran's formula below, the minimum sample was calculated:

$n = Z^2P\,(1 - P)/d^2$

Where n = sample size, Z = statistic corresponding to the confidence level, P = expected percentage frequency outcome factor in the population, and d = margin of error.

$P = 10.6\%$,[12] $Z = 1.96$ at a 95% confidence level, and $d = 5\%$. The student population size is approximately 400.

$$\text{Hence, } n_0 = \frac{1.96^2 \times 0.11(1-0.11)}{0.05^2} = 150.4, \text{ approximately } 150$$

$$\text{True sample size } n = \frac{(\text{sample size} \times \text{population})}{(\text{Sample size} + \text{population}) - 1}$$

$$= \frac{(150 \times 400)}{(150 + 400) - 1} = 109.2; \text{ approximately } 109$$

The sample size calculated for this study was 109. While 109 each of medical and nonmedical students were targeted for recruitment, only 170 students in total responded.

Data collection instruments and data collection

A structured questionnaire divided into four sections was used to gather demographic information and assesses knowledge, attitude, and practices regarding CVD. The first section of the questionnaire consisting of 9 questions gathered information on participant's demographic characteristics; the second section utilised the CVD Risk Factor Knowledge Level scale,[13] which is a standardized questionnaire to assess the participant's knowledge regarding the risk of CVD. There are 28 questions in this section, which require a response in the form of "YES,"

"NO," and "I DON'T KNOW." The third and fourth sections utilised formulated questionnaires which assessed the attitude and practice, respectively, of the participant regarding the risk of CVDs. The third section consisted of 6 questions, and the fourth section consisted of 10 questions. COVID-19 protocols were observed.

Data handling and analysis

Data obtained were entered into the statistical software STATA version 14.0 (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP). The data were cleaned and prepared for analysis. Summary statistics such as means and standard deviations were computed for continuous variables such as age after checking for normality using the Kolmogorov–Smirnov test. For categorical variables, frequencies and percentages were computed as summaries. Pearson's Chi-square test was used to check for associations between the type of student and participants' knowledge, attitude, and practice toward CVD. A composite score was generated and converted into percentages for all three attributes (knowledge, attitude, and practice). Each correctly answered or practiced indicator was given a score of 1, and the wrong or not practiced indicator was scored 0. The scores were added, and each sum of scores for knowledge, attitude, and practices was divided by the total score. Specifically, for knowledge, the total score was 28. The individual sum of scores was then divided by 28 and multiplied by 100 to convert into percentages. A percentage of 70–100 was interpreted as "good knowledge," 50–69 was interpreted as average knowledge, and 0–49 was interpreted as poor knowledge of CVD. In addition, a composite score was generated and converted into percentages. A percentage of 70–100 was interpreted as "good attitude," 50–69 was interpreted as average attitude, while 0–49 was interpreted as poor attitude toward CVD. Furthermore, a composite score was generated and converted into percentages. A percentage of 70–100 was interpreted "good practice," 50–69 was interpreted as average practice, while 0–49 was interpreted as poor practice toward CVD. The ordinal logistic regression was used to determine factors influencing knowledge, attitude, and practice toward CVD and reported as odds ratios (OR) with 95% confidence intervals (CIs). All tests were two-sided, and $P < 0.05$ was interpreted as significant. Findings were presented in tables and graphs.

Ethical clearance and considerations

This study sought Ethical and Administrative approval from the Community Health Dissertation Review Committee, University of Ghana Medical School.

The purpose of the study, the aims, objectives, potential risks, and benefits of the study were clearly explained to participants. There was emphasis on the confidentiality of the information collected, and the respondent's identity would not be required. A consent form was then signed.

Respondents' participation was voluntary, and they were permitted to opt out of the study if they so desired. It conformed with the principles of the Helsinki Declaration (1975) on human experimentation (Amended 2020).

Results

Baseline information

The study surveyed 170 participants. However, only 156 of them had complete information required and were included in the analyses. More than half, 52.6% ($n = 82$) of the participants, were medical students, while 44.7% ($n = 74$) were nonmedical students. The average age of all the study participants, medical and nonmedical students in this study, were 24.1 ± 4.2 years and 25.4 ± 3.6 years and 22.7 ± 2.7 years, respectively. More than half, 51.2% ($n = 42$) of medical students, were in the age group of 20–24 years, while a third, 32.5% ($n = 24$) of nonmedical students, were in the age group of ≥25 years. There was no significant difference in the sex distribution of medical and nonmedical students ($P = 9.633$). Among medical students, more than half, 57.3 ($n = 47$), were in level 600, while a third, 33.8% ($n = 25$), were in level 300. Most medical students (90.2%) were Christians, while 83.8% of nonmedical students were Christians. Among medical students, 82.9% ($n = 68$) were Ghanaians, while 87.85 ($n = 65$) of nonmedical students were Ghanaians. A more detailed description of the baseline characteristics is summarised in Table 1.

History of cardiovascular risk factors

Three (4.10%) and none (0.0%) of nonmedical students and medical students, respectively, in this study had a history of CVD ($P = 0.1142$), while 41 (50%) medical students had a

Table 1: Demographic characteristics

	Medical ($n=82$), *n* (%)	Nonmedical ($n=74$), *n* (%)	χ^2	*P*
Age group (years)				
<20	0	18 (24.3)	23.025	0.001*
20–24	42 (51.2)	32 (43.2)		
≥25	40 (48.8)	24 (32.5)		
Sex				
Female	41 (50.0)	37 (50.0)	0.914	0.633
Male	40 (48.8)	37 (50.0)		
Prefer not to say	1 (1.2)	0		
Levels				
100	0	10 (13.5)	95.348	0.001*
200	0	18 (24.3)		
300	3 (3.7)	25 (33.8)		
400	16 (19.5)	16 (21.6)		
500	16 (19.5)	3 (4.1)		
600	47 (57.3)	2 (2.7)		
Religion				
Atheist	1 (1.2)	0	2.977	0.226
Christian	74 (90.2)	62 (83.8)		
Muslim	7 (8.6)	12 (16.2)		
Nationality				
Ghanaian	68 (82.9)	65 (87.8)	5.731	0.571
Nigerian	9 (10.9)	8 (10.8)		
Others	5 (6.2)	1 (1.4)		

*$P<0.05$

positive family history of CVD compared to 13 (17.60%) nonmedical students ($P = 0.001$).

Knowledge, attitudes, and practices on cardiovascular diseases

The results are classified based on the percentage of correct responses, where <50% indicates poor knowledge, 50%–70% indicates average knowledge, and >70% indicates good knowledge.

The study found significant differences in the level of knowledge of CVD among medical and nonmedical students. The level of knowledge on CVD was significantly higher among medical students compared with nonmedical students ($P = 0.001$). Specifically, 69.5% of medical students had good knowledge of CVD compared with 25.6% of nonmedical students, 29.3% of medical students, and 46.0% of nonmedical students scored average, whilst 1.2% and 28.4% of the medical and nonmedical students scored poor on CVD knowledge, respectively. Furthermore, the average scores on attitude toward CVD were significantly better among medical students compared with nonmedical students ($P = 0.001$); 51.2% of medical students had a good attitude toward CVD compared with 13.5% of nonmedical students [Table 2]. Finally, 21.9% of medical students had shown good practice toward CVD compared with 6.0% of nonmedical students. Further details are described in Table 2.

Table 2: Participant's knowledge

Average scores	Medical ($n=82$), n (%)	Nonmedical ($n=74$), n (%)	χ^2	P
Knowledge on CVD				
Good	57 (69.5)	19 (25.6)	30.861	0.001*
Average	24 (29.3)	34 (46.0)		
Poor	1 (1.2)	21 (28.4)		
Attitudes on CVD				
Good	42 (51.2)	10 (13.5)	35.668	0.001*
Average	36 (43.9)	62 (83.8)		
Poor	4 (4.9)	2 (2.7)		
Practices on CVD				
Good	18 (21.9)	5 (6.0)	38.119	0.001*
Average	54 (65.9)	49 (66.2)		
Poor	10 (12.2)	20 (27.0)		

*P<0.05. CVD: Cardiovascular disease

Factors that influence knowledge, attitude, and practices on cardiovascular disease

The type of student significantly influenced level of knowledge on CVD. Specifically, being a medical student significantly increased the odds of level of knowledge on CVD by over six-fold compared with nonmedical students (odds ratio [OR] = 6.082; $P = 0.001$; 95% CI = 2.046–8.078). Age, sex, and level did not significantly influence level of knowledge of CVD [Table 3].

Table 3: Factors that influence knowledge of cardiovascular diseases

Knowledge	OR	SE	Z	P	95% CI
Type of student					
Medical student	6.081	3.380	3.250	0.001*	2.046–8.078
Nonmedical students	Reference				
Age group					
<20	0.263	0.203	−1.730	0.084	0.058–1.194
20–24	0.715	0.289	−0.830	0.407	0.324–1.579
≥25	Reference				
Sex					
Male	1.906	0.679	1.810	0.071	0.948–3.832
Female	Reference				
Levels					
100	1.528	1.629	0.400	0.691	0.189–12.348
200	0.978	0.859	−0.020	0.980	0.175–5.474
300	0.494	0.343	−1.020	0.309	0.127–1.925
400	0.394	0.233	−1.580	0.115	0.124–1.254
500	0.592	0.351	−0.880	0.377	0.185–1.893
600	Reference				

*P<0.05. CI: Confidence interval, SE: Standard error, OR: Odds ratio

Table 4 shows the effect of the type of student, age group of student, sex, and level of student on the level of attitude toward CVD. The type of student significantly influenced the level of attitude toward CVD. Specifically, being a medical student significantly increased the odds of level of attitude by almost five-fold toward CVD compared to nonmedical students (OR = 4.942; $P = 0.007$; 95% CI = 1.535–5.908). Age, sex, and level at the university did not significantly influence level of knowledge on CVD ($P > 0.05$).

However, the type of student, age, sex, and level of student did not significantly influence the level of practice on CVD ($P > 0.05$) [Table 5].

Discussions

The study enlisted 156 students, with a slightly uneven distribution among medical and nonmedical students. The medical students were significantly older than their nonmedical counterparts; this could be explained by the fact that they spend more years in school (six years by medical students compared to four years by nonmedical students).

None of the medical students had CVD, but 3 (4.05%) of nonmedical students in this study had a history of CVD. More medical students, 41 (50%), had a positive family history of CVD compared to 17.56% of nonmedical students. This could be due to the fact that because of their medical background, medical students take a keener interest in the health of their relatives, thus knowing their medical histories.

The level of knowledge on CVD was significantly higher among medical students compared with nonmedical students ($P = 0.001$), with 69.5% of medical students having good knowledge of CVD

Table 4: Factors that influence attitude toward cardiovascular diseases

Attitude	OR	SE	Z	P>Z	95% CI
Type of student					
Medical student	4.942	2.948	2.680	0.007*	1.535–5.908
Nonmedical students	Reference				
Age group					
<20	0.372	0.337	−1.090	0.275	0.063–2.194
20–24	0.782	0.325	−0.590	0.553	0.346–1.764
≥25	Reference				
Sex					
Male	0.895	0.328	−0.300	0.763	0.436–1.837
Female	Reference				
Levels					
100	4.538	5.399	1.270	0.204	0.441–46.725
200	0.587	0.595	−0.530	0.599	0.080–4.279
300	1.132	0.849	0.170	0.868	0.260–4.922
400	0.975	0.567	−0.040	0.965	0.312–3.046
500	0.937	0.542	−0.110	0.911	0.302–2.911
600	Reference				

*P<0.05. CI: Confidence interval, SE: Standard error, OR: Odds ratio

Table 5: Factors that influence the practice of cardiovascular diseases

Practice	OR	SE	Z	P>Z	95% CI
Type of student					
Medical student	1.426	0.849	0.600	0.551	0.444–4.581
Nonmedical students	Reference				
Age group					
<20	1.033	0.811	0.040	0.967	0.221–4.816
20–24	1.345	0.554	0.720	0.471	0.600–3.015
≥25	Reference				
Sex					
Male	1.437	0.520	1.000	0.317	0.707–2.920
Female	Reference				
Levels					
100	0.211	0.237	−1.380	0.166	0.023–1.909
200	0.328	0.315	−1.160	0.245	0.050–2.153
300	0.353	0.271	−1.360	0.175	0.079–1.589
400	0.569	0.353	−0.910	0.364	0.169–1.922
500	0.758	0.449	−0.470	0.640	0.238–2.421
600	Reference				

CI: Confidence interval, SE: Standard error, OR: Odds ratio

compared with 25.6% of nonmedical students. The indicators of knowledge were based on questions on risk factors such as hypertension, diabetes, dyslipidemia, diet, tobacco use, and reduced physical activity. CVD forms part of the curriculum of medical students' training, so it is not surprising to observe differences in levels of knowledge. This finding is supported by other studies that found out that the knowledge of medical students on dietary habits, healthy lifestyle, and CVD was superior compared to nonmedical students.[14-18]

The fact that a lower proportion of nonmedical students did not know of any family history of CVD does not rule out the actual existence *per se*; it may, in fact, highlight the fact that nonmedical students have not found out about their family history as far as CVD is concerned.[14-16] The same rhetoric could be used to explain how nonmedical students may be oblivious to the risk they carry.

The study found significant differences in the level of attitude toward CVD among medical and nonmedical students. Specifically, 51.2% of medical students had a good attitude toward CVD compared with 13.5% of nonmedical students.

Knowledge usually improves one's attitude toward a subject, and it was expected that medical students with a better knowledge level would have a better attitude than their counterparts. This finding was consistent with other published studies on the subject.[19,20] Better knowledge does not always translate into improved attitudes toward cardiovascular risk factors and health. In the study by Mustaqeem *et al*., although medical students have better overall knowledge of cardiovascular risk factors and diseases, only 10.7% had ever contemplated knowing the caloric content of foods eaten.[16] Thirty percent of participants in the study who had obesity as a cardiovascular risk factor ever thought about losing weight.

The study also found significant differences in the level of practice toward CVD among medical and nonmedical students. However, the odds of practice though higher among medical students were not significant. In general, practice toward CVD prevention was significantly better among medical students compared with nonmedical students.

A significantly higher proportion of nonmedical students seldom exercised for more than 30 min. Again, none of the medical students drank alcohol frequently, but some nonmedical students reported drinking frequently. Despite having more knowledge and a better attitude toward CVD, a proportion of medical students do not engage in good physical activity, which is protective against CVD development. This finding supports a recently published study among medical students that revealed a low level of physical activity among medical students in Ghana.[11] Furthermore, in the study by Sajwani *et al*., although the medical students had a significantly better knowledge than nonmedical students, practices on healthy dietary and lifestyle habits were not significantly different.[15] A study published in 2021 by Alghamdi *et al*.[14] found out that nonmedical students were more physically active than their medical student counterparts. The findings in this study are also contrary to an earlier study, which found that there was a positive correlation between knowledge of CVD risk factors and good practices.[21]

This could be due to some barriers that may exist in medical school that prevent people from exercising. The significantly packed schedule of medical students may partly explain why they are unable to exercise. In addition, the environment does not encourage medical students to exercise, as there have

been several cases of theft and attacks toward students during exercise. The schedule might not allow regular exercise.

Conclusions

Medical students have significantly more knowledge of CVD than their nonmedical counterparts. Medical students also have a more positive attitude compared to their nonmedical counterparts. The level of practice toward CVD was significantly better among medical students compared with nonmedical students. Efforts must be made to improve the knowledge, attitude, and practices regarding CVD, especially among nonmedical students of the university of Ghana, to reduce the potential negative impact.

Limitations

The study was conducted using a cross-sectional study and is thus restricted to observing students' knowledge, attitude, and practices at a point in time. The responses may thus evolve. This study relies on self-report, therefore may not accurately represent the student's knowledge, attitude, and practices, which may lead to recall bias.

The study was limited to a small volunteer sample partly influenced by the lower response rate and may not reflect the true attitudes, knowledge, and practices concerning CVDs. Steps were taken to limit this possibility using a high-powered sample size.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

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Conflicts of interest

There are no conflicts of interest.

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