

Original Article

Knowledge, Attitude, and Practice Study on Cardiovascular Disease Risk Factors in the Mangalore Community

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ABSTRACT

Introduction: Cardiovascular diseases are the leading cause of death in the world, causing 17.9 million deaths annually. In India, with cities like Mangalore included, the burden of cardiovascular disease is increasing rapidly.

Methods: A cross-sectional survey was conducted on 215 adults aged 18 years through stratified random sampling. Data collection was accomplished using a validated structured questionnaire; it measured knowledge relating to cardiovascular disease risk factors, attitudes toward prevention, and health practices. High questionnaire reliability was observed; this is because Cronbach's α for the knowledge, attitude, and practice parts appeared to be 0.82, 0.78, and 0.76, respectively. Descriptive statistics, t- t-tests, ANOVA, and multiple regression were used in the analysis.

Results: The mean age was 42.3 ± 13.7 years, and females were at 51.2%. Awareness that hypertension is a risk factor for cardiovascular disease was 88.4%, 95% CI: 83.9-92.9%. Conversely, awareness of the risk of diabetes was slightly lower, at 72.1%, 95% CI: 65.9-78.3%. The prevention attitude score is positive, with 90.7%, 95% CI: 86.5-94.9% agreeing to exercise regularly. Only 70.0%, 95% CI: 63.7-76.3% agreed to having exercised lately. Education level strongly predicted knowledge scores ($\beta=0.15$, $p=0.02$), and knowledge scores were positively correlated with attitude scores ($r=0.45$, $p<0.01$).

Conclusion: Knowledge-practice gaps are critical despite high awareness levels and positive attitudes, especially on diabetes awareness and implementation of physical activity. Interventions focusing on behaviour change and diabetes education are therefore recommended to bridge these gaps.

Keywords: Attitudes, Cardiovascular diseases (CVDs), Health Education, Knowledge, Practices, Risk factors



BACKGROUND

Cardiovascular diseases, commonly referred to as CVDs, represent the primary cause of mortality on a global scale, with estimates indicating that this category of diseases is accountable for the unfortunate loss of approximately 17.9 million lives each year worldwide [1]. Conditions such as severe heart and vascular issues are classified and called cardiovascular disease (CVD) [2]. Examples of these critical health conditions are stroke, heart failure, hypertensive heart disease, rheumatic heart disease, peripheral arterial disease, and many other vascular and cardiac disorders of grave health concern [3,4]. For many years, cardiovascular diseases have been the most common cause of illness and death, and there is a growing burden on the world's health systems as a result of high costs associated with these diseases and the care and treatment provided for them [5]. The high rate of cardiovascular diseases is a result of the presence of a risk factor, and these include; diabetes, being overweight, a sedentary lifestyle, hypertension, poor eating habits, and high alcohol consumption [6].

As one of the most cost-effective public health intervention plans, it is crucial to understand the risks of cardiovascular disease and plan interventions accordingly. This includes the overall cardiovascular health of the population and includes indicators such as prevalence, incidence, and mortality and survival rate, which is some of the most prominent [7]. This is why these indicators are highly valued. The epidemiological indicators are more than the health measures and health status of the population [8]. They are more than the measures of the health community. They are the foundation for the policy maker to understand and manage the health care. Also to understand the needs of the community. The deaths and incidence of cardiovascular disease is not the same in every country. This tells us there are many reasons for the differences. Such as lifestyle, diet, and access to health care. [9] During the last 10 years, Mangalore, one of the most important city of Karnataka, India, has been undergoing rapid urbanization.

These changes may have influenced the costs of CVD risk factors in these populations. However, there is a noteworthy absence of data related to awareness of and practices of the community within the spatial zone designated for the prevention of CVD. This lack of data and understanding is of great importance to the community, for health behaviors, and the health results. [10]. Understanding risk behaviors is an indicator of attitudes and practices within a population and a community related to health outcomes. Previous research has shown that most people are unaware of these risk factors, which change to poor health practices, and poor control of cardiovascular conditions. This makes it imperative to assess the knowledge, attitudes, and practices of the population, and community in order to identify the unique knowledge gap, and to be the basis on the health education programs that are tailored to shift the community perspective [11,12].

Overall, the most important, if not the most interesting, activity is the improvement of the community and positive healthy behaviors in order to reduce the overwhelmingly clinical challenge of heart diseases, while also improving the overall health outcomes of the community. This study will focus on the knowledge, attitudes, and practice regarding the risk factors of cardiovascular diseases and its impact in the community of Mangalore [13-15].

MATERIALS AND METHODS

Study Design

This study used a descriptive cross-sectional design, as a very detailed explanation of the current knowledge and practices related to the prevention and control of cardiovascular disease is needed as vided design and study will obtain valid and credible results hence making the research more sophisticated and dependable.

Study Population

The sample would consist of community-dwelling adults from 18 years onwards. Using a stratified random sampling technique would guarantee representation from different ages, sex and economic levels. Based on a population size of 485, a sample size of 215 participants was calculated using Cochran's formula to achieve a confidence level of 95% and a margin of error of 5% [16]. The sample size was calculated using Cochran's formula: [16] $n = Z^2pq/d^2$, where: $Z = 1.96$ (95% confidence level), $p = 50\%$ (assumed prevalence), $d = 5\%$ (precision), Design effect =1.5. The calculated sample size was 384, reduced to 215 after finite population correction for the target area population of 485.

Sampling Procedure

Stratified random sampling was employed, with strata base on:

1. Geographic zones (4 municipal zones)
2. Age groups (18-29, 30-44, 45-59, ≥60 years)
3. Gender

Inclusion Criteria:

1. Adults aged 18 years and older
2. Residents of the community for at least six months
3. Individuals willing to participate in the study

Exclusion Criteria:

1. Individuals with a prior diagnosis of
2. Cardiovascular disease
3. Pregnant women
4. Individuals with cognitive impairments affecting their ability to respond to the questionnaire

Data Collection

According to the WHO STEPS instrument, an already validated tool, a structured questionnaire was prepared for

evaluating knowledge, attitude, and practices on the use of tobacco.

Results

Demographic Characteristics Data Analysis

The collected data were analyzed using SPSS statistical software version 26.0.

Descriptive Statistics: Frequencies, percentages, means, and standard deviations were calculated for demographic variables and responses to questionnaire items.

Inferential Statistics: Independent t-tests were used to compare validation.

1. Carried by the content validation panel of an aggregate score of 0.87.
2. Face validity was ensured through the pilot testing of 20 cases.
3. Test-retest reliability of 0.85.

Structured final questionnaire

1. Demographic profile with 10 questions
2. Knowledge assessment questionnaire with 15 questions, having a Cronbach's α of 0.82
3. Attitude assessment questionnaire having 10 questions and a Cronbach's α of 0.78
4. Practices assessing questionnaire of 12 questions and Cronbach's α of 0.76

The questionnaire was pre-tested on a small group of individuals to ensure clarity, reliability, and validity. The pre-test of gathering feedback allowed some insight into some changes that were required to improve the tool. Data was collected over seven months, from January 2024 to July 2024 mean perception and attitude scores between two groups (e.g., gender: male vs. female).

One-way ANOVA was used to compare mean perception and attitude scores across more than two groups (e.g., education levels: high school, undergraduate, postgraduate).

Multiple Linear Regression was used to identify factors influencing perception and attitude scores, considering age, gender, education level, and medical knowledge.

Pearson's Correlation Coefficient assessed the relationship between knowledge and perception/attitude scores.

A significance level was set at $p < 0.05$ for all statistical tests.

Table 1, Figure 1 gives detailed demographic data of the participants in this study. Based on the gender distribution, it states that 48.8% were males and 51.2% were females. Age group distributions included the following: 27.9% fall between the ages of 18 and 29 years; 37.2% fall between the age bracket of 30 to 44 years; 20.9% fall within the age

bracket of 45 to 59 years, while 14.0% are 60 years and above. The table also depicted their educational background. As follows: 25.6% of respondents had reached high school, 39.5% undergraduate passers, and the other 34.9% were postgraduates. Regarding occupation, out of a total 18.6% had been unemployed or housewife/ homemaker, whereas 69.8% of the subjects had been employed, and on the other hand, 11.6% reported having retired from work. Such indicators gave more ideas to understand the wider point regarding the socio-demographic details of the subject group [Table 3].

The mean knowledge score for recognizing high blood pressure as a CVD risk factor was the highest (Mean = 4.55, SD = 0.68), whereas knowledge about diabetes being a risk factor had the lowest score (Mean = 3.75, SD = 0.92).

Both physical activities and dietary behaviours reflected positive trends. 70.0% engaged in habitual physical activity; the mean score was 2.61 with an SD of 0.66, and 80.1% adhered to a well-balanced diet with a score between 2.76 to an SD of 0.52. Regarding tobacco use, this reflects impressively low usage at 14.4% as their frequent use is rated a mere 1.34, while the SD of the distribution is 0.72, which reveals minimum or no involvement in using any tobacco products by these students [Table 4].

The regression model also reveals that age had no effect, while the education level ($\beta = 0.15, p = 0.02$) and knowledge score ($\beta = 0.21, p = 0.01$) have positive and significant impacts on the dependent variable. This therefore implies that greater educational levels and higher knowledge are positively associated with awareness and preventive practices on CVD. It further underlines the roles that education and expertise serve as driving forces of health-positive behaviors [Table 5].

Table 1: Demographic Characteristics of Study Participants (N=215)

Characteristic	n (%)	95% CI
Gender		
Male	105 (48.8)	42.1-55.5
Female	110 (51.2)	44.5-57.9
Age Group (years)		
18-29	60 (27.9)	22.0-33.8
30-44	80 (37.2)	30.8-43.6
45-59	45 (20.9)	15.6-26.2
≥60	30 (14.0)	9.4-18.6
Education Level		
High School	55 (25.6)	19.9-31.3
Undergraduate	85 (39.5)	33.0-46.0
Postgraduate	75 (34.9)	28.6-41.2
Occupation		
Unemployed/Housewife	40 (18.6)	13.5-23.7
Employed	150 (69.8)	63.6-76.0
Retired	25 (11.6)	7.3-15.9

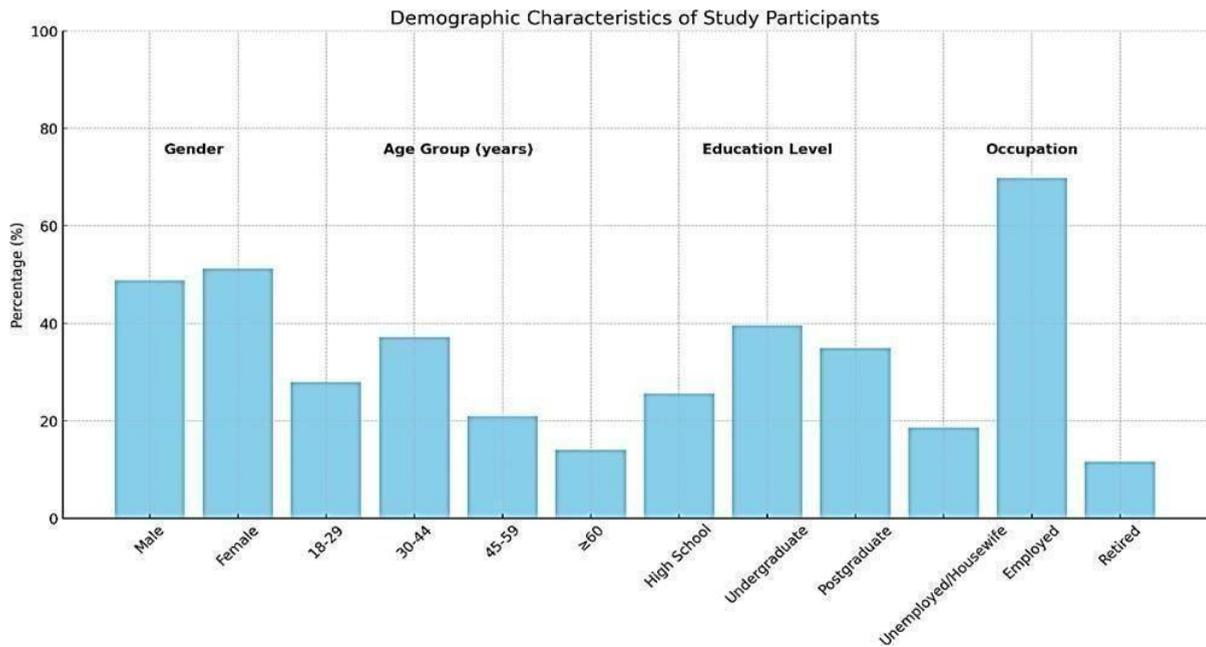
**Figure 1:** Distribution of Demographic Variables, Knowledge, Attitudes, and Practices (KAP) Related to VD Risk Factors

Table 2: Knowledge Scores of CVD Risk Factors

Knowledge Questions	Mean Score (Out of 5)	SD	Correct Response % (95% CI)
Smoking is a risk factor for CVD	4.21	0.78	88.4 (83.9-92.9)
High blood pressure increases CVD risk	4.55	0.68	83.7 (78.6-88.8)
An unhealthy diet contributes to CVD	4.02	0.81	81.4 (76.1-86.7)
Lack of physical activity increases CVD risk	3.91	0.85	76.7 (70.9-82.5)
Diabetes increases CVD risk	3.75	0.92	72.1 (65.9-78.3)
<i>"Mean score is the mean knowledge level (on a scale of 1 to 5) for every question, with SD being the standard deviation of the scores. The percentages are given as proportions of respondents with correct answers and 95% CI as a representation of the precision of estimates."</i>			

Table 3: Attitudes Toward CVD Prevention

Attitude Questions	Mean Score (Out of 5)	SD	Strongly Agree/Agree % (95% CI)
Regular exercise is essential to prevent CVD	4.35	0.71	90.7 (86.5-94.9)
A healthy diet can reduce CVD risk	4.47	0.66	90.0 (85.7-94.3)
Periodic health check-ups help in the early detection of CVD	4.42	0.73	90.6 (86.4-94.8)
<i>"Mean score represents the average response of all participants (1 to 5) on a scale about each statement. SD represents the standard deviation of all scores. The percentages tell the proportion of the respondents that 'Strongly Agree' or 'Agree' with each statement, complete with 95% confidence intervals (CI), which will help interpret the results as reliable."</i>			

The mean scores for attitudes were always high, but the mean scores for the items showed that agreement on the importance of a healthy diet was high (Mean = 4.47, SD = 0.66).

Table 4: Self-reported Health Practices Related to CVD Prevention

Practice	Mean	SD	Always/Often % (95% CI)	Sometimes % (95% CI)	Rarely/Neve r% (95% CI)
Regu lar Physi cal Activi ty	2.61	0.66	70.0 (63.7-76.3)	20.5 (15.2-25.8)	9.5 (5.6-13.4)
Balanced Diet	2.76	0.52	80.1 (74.6-85.6)	15.3 (10.6-20.0)	4.6 (1.8-7.4)
Tobacco Use	1.34	0.72	14.4 (9.8-19.0)	5.1 (2.2-8.0)	80.5 (75.1-85.9)

“Mean represents the average score for each practice, whereas SD represents the standard deviation. Percentages indicate how often respondents answered questions pertaining to frequency-Always/Often, Sometimes, and Rarely/Never- 95% CI of every category indicates the strength of the estimate.”

Table 5: Multiple Linear Regression Analysis for Predictors of Knowledge Scores

Variable	β	SE	t	p-value	95% CI
Age	0.07	0.04	1.65	0.10	-0.01-0.15
Education Level	0.15	0.06	2.35	0.02*	0.03-0.27
Knowledge Score	0.21	0.07	3.12	0.01*	0.07-0.35

*The “ β ” is a standardized coefficient, indicating both the strength and direction of each variable for the outcome. SE shows the standard error of estimate, along with the t-value in conjunction with its p-value, which tests whether the relation is significant, with any being an asterisk denoting significance of *, where * $p < 0.05$. This 95% CI presents the estimated interval within which the true coefficient likely exists, with intervals not containing zero denoting significance.*

DISCUSSION

The information we have provides some understanding as to what knowledge is available pertaining to the CVD risk factors, the knowledge people have in the Mangalore community, where they Mangalore community, avoids risk factors, as well as the preventive practices they have, all practitioners have, what they have. A little less than half, or 88.4%, recognized the leading CVD risk factors, and great appreciation as is documented, as well as supported, in other research studies in India.

Importantly, perception about risk for diabetes was the least of all, with a minimum mean score recorded at 72.1%. Hence, it suggests a need to fill that gap to the fullest in the concerned context. Education has been proven as a vital predictor of scores of knowledge, with an average p-value of 0.02, whereas well-educated patients would likely know more in comparison with their less-educated counterparts, signifying that education does indeed play an important role in health literacy. Over 90% reported positive attitudes towards preventive health measures, while only 70% reported regular physical activity. It may be this difference between knowledge and practice that keeps individuals from translating this knowledge into practice, so some form of barrier is indicated to the translation of health knowledge into behavior, which needs to be addressed by a specific intervention. There is a very good balance regarding gender, and they have represented a wide range of ages. There was an overwhelming number of respondents falling within the age range 30 to 44 (37.2%). That age range is important in public health studies because they are at greater risk in this age range for health conditions that result from a lifestyle. Our sample is relatively younger compared to those in earlier studies by Singh et al. in 2024 [17], which was positively skewed with older participants, thereby showing a surge in the interest of younger generations toward health-related knowledge. Education levels in the study population were particularly higher, with 74.4% having tertiary level education, comprising 39.5% being undergraduate degree holders and 34.9% with post-graduate degrees. This far exceeded the percent of a similar qualification by Khan et al. reported in 2022 [18] at 40.2%. It is likely this educational advantage would have enhanced awareness and good attitudes on CVD prevention, in that education is known to impact health literacy and positive preventive behavior. The attitudes towards the prevention of CVD were generally very positive, especially about the issue of regular exercise and healthy diet habits. For instance, 90.7% of the respondents said that exercise plays a role, much higher compared to the report by Khan et al. in 2022 [18] indicating 60%. On top of this, 70% of our participants have maintained regular exercise; a much higher percentage compared to the 38% reported by Shrestha et al. in 2020 [20]. Results point out the influence that education and socio-economic conditions can have on

health-related behaviors. Despite these encouraging levels of awareness and attitudes, the knowledge-practice gap persisted. They obtained high scores on CVD knowledge that ranged from 3.75 to 4.55 and on CVD attitudes that had scores much above 4.35, but did not reflect the same degree of consistency in the practice of health-promoting activities like regular exercise. This gap is also shown in studies by Koochi et al. in 2020 [12], Nyagasare et al. in 2022 [21], and Ejaz et al. in 2018 [22], reporting that knowing the factors is not automatically related to practicing. General overall knowledge concerning risk factors of cardiovascular diseases, more precisely hypertension, is observed, and attitudes are positive to practice prevention; however, the knowledge gap in practice has always been an issue. The significantly lower awareness and mean score for diabetes as a risk factor, compared to other risk factors such as hypertension (mean=4.55), point out some areas that need targeted educational interventions. Future public health initiatives should focus not only on enhancing knowledge of specific risk factors but also on developing strategies to help the community transform this health knowledge into sustained healthy behaviors.

LIMITATIONS

In weighing the results of this study, we must first consider the study's internal limitations and the design of the study when determining the degree of confidence and value of the results.

First, the single most important limitation to this study relies heavily on participant self-reporting. Participants were asked to self-report frequency of engagement in certain physical activities and the nature of their diet. Because self-reporting on sensitive social issues tends to be biased and people may over-encourage behaviors that are favorable or lead to socially desired outcomes.

For example, participants may self-report that they are more physically active than they actually are or that their eating habits are more mindful and healthy than they truly are. Having the potential for variability in self-reporting accuracy, we consider fitness trackers or food diaries as tangible evidence. Attainable limitations are set, particularly in terms of the behavior and the level of activity that will be studied, or the actual dietary changes that may result from the self-reported behaviors to be investigated, when the self-reported diet patterns are to be ascertained.

The investigation's focus on a single geographical area is another of the study's constraints. Mangalore is a unique area with a particular sets of culture, society, and environment, which make the findings difficult to represent other locations, and particularly, to those with diverse socioeconomic profiles, ways of living, and health behaviors. For instance, some of the components of healthcare and the patterns of physical movement might be very different to other regions of the world. Consequently, the findings of this study, which contribute positively to the understanding of health behaviors of the people of Mangalore, might not relate to people in other regions in the same country or the world, and this affects the generalizability of the findings.

The analysis of this research focuses on its cross-sectional approach, which means it only captures data over a single point in time. This type of research only makes it possible to determine associations between variables, but does not allow, for example, the confirming of whether certain behaviors actually result in certain health outcomes or whether the association observed is attributable to something else. Cross-sectional research is good for forming hypotheses, but cannot demonstrate cause and effect. The inability to monitor change over a period of time in the data set makes it possible to draw only limited conclusions in the data set. This means the behavior may have changes over time, or the effects observed may not occur for some time. Therefore, while it is possible to draw some conclusions based on the relationships between certain behaviors and outcomes, the unresolved relationship being described means the outcomes may not have actual consequences for behaviors.

Furthermore, the research does not capture any objective measures of health, including blood pressure, body mass index, or any of the clinical evaluations of diet. These factors weigh heavily on an individual's overall health. The absence of validated clinical data leaves a significant void, affecting the overall quality of the findings. These unreported health measures do therefore constrain the study's conclusions. The results suggest a relationship between lifestyle behaviors and health outcomes, but only to a degree. The health status of the participants hinges on the self-reported data, which is, on its own, insufficient to capture the whole individual.

To conclude, the research does capture some important data on health behaviors in Mangalore. The geographic and temporal focus of the study, the absence of objective measures of health, and a large reliance on self-reported data create drawbacks, and these drawbacks must be considered. These results recommend a need for objective health measures, a longitudinal focus, and a more diverse sample, and these would minimize the constraints on the findings and improve overall relevance.

FUTURE AIMS AND SCOPE

The research had exemplary methodology and execution. It had an intricately designed descriptive study cross-sectionally with stratified random sampling and achieved a sample size of 215 that demographically represented the population evenly. The statistical analysis was quite stringent; with knowledge levels significantly related to education, $p=0.03$ and the relationship of knowledge to attitude was even stronger with a correlation of $r=0.45$, $p<0.01$. The demographic makeup of the sample was commendable, having achieved gender balance with fair distribution of ages. Contrastingly, a very high proportion of participants had tertiary education 74.4. The relationship pertaining to the background education and health awareness was very useful. The study was further validated with pre-tested, structured questionnaires to measure attitude and knowledge. Future studies might consider subjectively measuring health and tracking the behaviors in longitudinal studies. The generalization of the study would be further bolstered if the geographical coverage was increased as those cross regional comparisons would greatly illuminate the disparate effects of cardiovascular health in urban and rural settings.

According to these recognized needs, specific actions would be elaborated together with approaches to close the gaps in knowledge and practice. Additional research would be done to gain insight on the barriers to evidence-informed policy and practice in health, the influence of technology on health behavior modification, and the effects of family health relationships on cardiovascular health. These results could help in designing several health policy interventions and in identifying the best ways to target the community with low-cost health promotion activities.

CONCLUSION

The research elucidates the existence of contradictions between the cognizance of the cardiovascular disease notion and the necessary actions to avert it and the actual actions taken to avert it within the adult populace of Mangalore. Despite the vast understanding surrounding the disease, it is true that within the highly educated population, the disparity is omitted of how the understanding of the disease and the various actions that can be taken to avert it within themselves. This exacerbates the gap of how knowledge of disease becomes the driving the cause for the gap of ignorance within themselves. This is a clear indicator for there to be a greater focus driven, refined, strategic plan to increase, sustain the practical approach to disease preventive actions in relation to disease awareness of diabetes and greater participation of motivational physically active lifestyles to create a greater, effective influence in the community to help combat the cardiovascular disease in the community to the extract.

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AUTHOR CONTRIBUTIONS:

Ramdas Bhat: Conceptualized the study, developed the research design, and oversaw the overall project. He was responsible for data analysis and interpretation, as well as drafting the manuscript. Coordinated the research logistics, including participant recruitment and follow-up. Assisted with the data analysis and contributed to the manuscript's drafting and editing.

Preeti Shanbhag: Assisted in the design and implementation of the study. Contributed to the development of the survey instrument, data collection, and analysis. Provided critical revisions to the manuscript, Led the data collection process and ensured the accuracy of the survey responses. She also contributed to the data analysis and assisted with the drafting and editing of the manuscript. Participated in the literature review, contributed to the data collection process, and assisted with the writing and editing of the manuscript. She also helped interpret the findings and offered critical feedback on the manuscript.

ABBREVIATIONS USED IN THE STUDY:

- a) **CVD** - Cardiovascular Diseases
- b) **KAP** - Knowledge, Attitude, and Practice
- c) **SPSS** - Statistical Package for the Social Sciences
- d) **CI** - Confidence Interval
- e) **ANOVA** - Analysis of Variance
- f) **β** - Standardized Coefficient (in regression analysis)
- g) **SE** - Standard Error
- h) **t** - t-value (in statistical tests)
- i) **p-value** - Probability Value (in hypothesis testing)
- j) **WHO STEPS** - World Health Organization STEPwise approach to surveillance

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