

# Assessment of Nutrition Knowledge, Attitudes, and Practices for Cardiovascular Disease Prevention among Attendees of Remera Health Centre, Kigali, Rwanda

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## ABSTRACT

**INTRODUCTION:** Cardiovascular diseases (CVDs) represent a significant global health burden, particularly in low- and middle-income countries. This study aimed to assess the levels of knowledge, attitudes, and practices regarding nutrition for CVD prevention among attendees of Remera Health Centre in the Gasabo District, Kigali, Rwanda.

**METHODS:** A cross-sectional study was conducted, employing face-to-face interviews for data collection. Variables, including knowledge, attitudes, and practices, were analyzed using SPSS, and results were presented using tables and graphs. Study participants were selected through random sampling methods.

**RESULTS:** The study revealed that 52.3% of participants had a moderate level of knowledge, 22.8% had a low level, and 24.9% exhibited a high level of knowledge regarding nutrition and CVD prevention. Moreover, 95.4% of participants demonstrated positive attitudes, with 4.1% holding neutral attitudes and only 0.5% expressing negative attitudes. However, concerning practices, 65.5% of participants exhibited poor nutrition-related practices, while 32.5% displayed moderate practices, and only 2% demonstrated good practices.

**CONCLUSION:** The findings suggest that while most participants possess a high level of knowledge and positive attitudes toward nutrition for CVD prevention, there is a significant gap in translating this knowledge into practice. Efforts to improve nutritional practices among attendees of Remera Health Centre are warranted to effectively mitigate the risk of CVDs in the community.

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## INTRODUCTION

Non-communicable diseases (NCDs) are

the leading cause of mortality and morbidity globally, and most of their burden is carried by developing nations. According to the World Health

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Organization (WHO), NCDs account for 41 million annual deaths, or 74% of the global mortality, with cardiovascular diseases accounting for most NCD deaths of 17.9 million people annually [1].

The morbidity and mortality rates related to cardiovascular diseases (CVDs) have increased dramatically in several low- and middle-income countries (LMICs) in recent years. Approximately 80% of deaths from CVDs are thought to occur in LMICs [2].

In sub-Saharan Africa (SSA), non-communicable diseases are taking the top spot among the causes of death, where they accounted for 37% of deaths in 2019 compared to 24% in 2000, as reported by WHO[3]. Cardiovascular diseases (CVDs) account for roughly 13% of all deaths and 37% of deaths related to NCDs in Sub-Saharan Africa (SSA) [4]. In Rwanda, Cardiovascular diseases (CVDs) represent a significant public health concern as they are the country's third highest cause of mortality [5]. WHO estimates from 2016 showed that CVDs and injuries had the highest percentages of NCD-related deaths (14% each), followed by malignancies (13%), Chronic Respiratory Diseases (3%), diabetes (2%), and other NCDs (13%) [6]. Referring to the WHO Stepwise Approach 2012-2013 to NCD Surveillance (STEPS) survey, 16.4% of Rwandans had at least three of the five CVD risk factors (smoking, being overweight, having high blood pressure, eating insufficient amounts of fruit and vegetables each day, and being physically inactive [7].

A study conducted at the University Teaching Hospital of Kigali indicated that the top cause of death among inpatients was hypertension [8]. In addition, 9.4% had high blood sugar, 11.7% were obese, and 23.7% had high blood pressure since 2016 when the car-free day was launched, among 48782 people screened [9]. Poor nutrition is consistently linked to the formation of several NCDs, which comprise coronary heart diseases and diabetes. According to WHO, 80% of diabetes, cardiovascular diseases, and obesity are due to lifestyle and dietary factors [10]. Improving lifestyle and dietary intake by taking a nutritionally healthy diet is essential to overcome the above-mentioned medical conditions [11]. Food choice can be influenced by biological, economic, social, and physical factors, including taste, hunger, price, income, availability, time, skills (like cooking), education and customs, families, groups of friends, and eating habits, stress, guilt, and mood.

However, knowledge, attitudes, and convictions around food influence the most [12]. In the prevention of CVDs, poor nutrition cannot be left behind as a major cause, and nutrition KAP is the only tool solution to challenge poor nutrition in the prevention of NCDs [13]. The effect of food choice on our health is evidenced by different Studies. For example, a study revealed that red meat, processed meat, sugar-sweetened drinks (SSB), and junk foods were linked to a higher risk for CVDs, whereas whole grains were linked to a lower risk [14]. Nutrition is the most essential factor in the prevention of NCDs, especially cardiovascular diseases (CVDs) [15]. The increased CVD burden in Rwanda might be a result of, among other things, limited knowledge, negative attitude, and poor practice on nutrition, concerning CVDs [16]. In a rural setting of Rwanda, a study revealed insufficient practices towards CVD prevention among rural communities, as among study participants, 79.6% habitually consume alcohol, 23.7% smoke, 53.1% eat vegetables while only 5.9% eat fruits daily, and 66.5% consume cooking oil daily[17]. Another study from the semi-urban population of Rwanda also found that the higher risk of hypertension shown in this society may be explained by lifestyle modifications, unhealthy behaviors, and dietary changes brought on by socioeconomic transition and urbanization [18]. This study aimed to assess the health-seeking behaviors of clients aged between 18 and 70 years old who were seeking services at the health center, excluding those visiting the Non-Communicable Diseases (NCDs) department.

## METHODS

### Research Design

This study was a health facility-based cross-sectional study conducted at Remera Health Centre in Gasabo District on participants aged 18-70 attending Remera Health Centre, who could respond to the questionnaire.

### Sampling Technique

To determine the sample size needed for the study, Taro Yamane's formula was utilized,  $n = \frac{N}{1 + N(e)^2}$ , where 'n' represents the sample size, 'N' denotes the total population (100,000), and 'e' signifies the margin of error (0.05). According to data provided by the Remera Health Centre Data Manager, the population served by Remera

comprises 100,000 individuals, distributed across four cells in the Remera sector and three cells in the Kimirinko sector. Applying the formula, the calculated sample size ("n") was determined to be 398.

### Research Tool

The research instrument utilized in this study was a semi-structured questionnaire that was meticulously proofread to ensure clarity and simplicity. It comprised four distinct sections: demographic characteristics, knowledge of nutrition, attitudes toward nutrition, and practices related to nutrition for the prevention of cardiovascular diseases (CVDs) among individuals attending Remera Health Centre. Face-to-face interviews were conducted with participants using the questionnaire, and prior to the interviews, interviewees were informed of the voluntary nature of their participation. The purpose of the study was clearly explained, and consent was sought from each participant before proceeding with data collection. Interviews were exclusively conducted with individuals meeting the specified criteria. Data collection commenced after obtaining ethical clearance.

### Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 28. Quantitative variables pertaining to demographic characteristics were analyzed by calculating frequencies and percentages. Similarly, key factors such as knowledge, attitudes, and practices were described using frequencies and percentages and presented in tabular form.

For analysis, variables were categorized as follows: Knowledge was stratified into low, moderate, and high levels. Attitude was classified as positive, negative, or neutral, and Practices were categorized as good, moderate, or poor. Overall levels of knowledge, attitude, and practices were determined based on Bloom's original cut-off points. High, moderate, and low knowledge scores were defined as ranging between 80%-100%, 60%-79%, and below 60%, respectively. Likewise, positive, neutral, and negative attitudes were delineated within the ranges of 80%-100%, 60%-79%, and below 60%, respectively.

### Ethical Considerations

After the presentation and approval of the research

proposal by the College of Medicine and Health Sciences (CHMS)-School of Health Sciences, the Institutional Review Board of the College of Medicine and Health Sciences at the University of Rwanda issued an ethical clearance CMCH/IRB/431/2023. Subsequently, permission was sought from Remera Health Centre Gasabo District's Authority for the collection of data. Also, before the commencement of data collection, the study participants were orientated and well-informed about the study. We ensured the voluntary participation of respondents in this study, allowing them the freedom to withdraw from the research at any point. Prior to their involvement, participants provided informed consent, and we maintained a commitment to using respectful and non-offensive language throughout the study.

## RESULTS

### Social demographic characteristics of the Respondents

The study involved 401 respondents, with the majority aged 24 to 34 and women comprising 62.2% of the sample. The majority were married (57.1%), with Christianity being the predominant religion (90.6%). A significant portion completed secondary schooling (36.3%), while a minority had no formal education (3.3%). The majority identified as merchants (27.1%), with farmers accounting for 9.2%. Monthly income was mostly in the range of 30000-100000, with 43.9% of participants in that range. A high percentage of participants (98%) reported having insurance coverage. However, 7 individuals were excluded due to incomplete data or responses (Table 1).

### Knowledge of the respondents on CVD Prevention using nutrition

A study of 394 respondents found that a diet rich in vegetables and fruits reduces the risk of cardiovascular diseases (CVDs). A significant majority (96.6%) agreed, while a small percentage (2.5%) disagreed. A significant portion (96.6%) acknowledged the risk of excessive body weight and excessive alcohol consumption on CVDs. The study also included statements with inverted responses, where 87 respondents mistakenly believed red meat consumption was healthier than white meat, 126 disagreed with animal fat being healthier than plant oil, and 55 incorrectly believed high cholesterol prevents CVDs.

**Table 1: Socio-demographic characteristics of respondents (n=394)**

Variable	Frequency (n)	Percentage (%)
<b>Age (years)</b>		
Mean (SD)	31.39 (12.05)	
Min, Max	18, 70	
18 - 24	138	35
25 - 34	140	35.5
35 - 44	65	16.5
45 - 54	23	5.8
≥55	28	7.1
<b>Sex</b>		
Male	149	37.8
Female	245	62.2
<b>Marital status</b>		
Never married	149	37.8
Married	225	57.1
Widowed	11	2.8
Separated	9	2.3
<b>Religion</b>		
Islam	28	7.1
Christianity	357	90.6
Traditional	9	2.3
<b>Education</b>		
No formal education	13	3.3
Primary	110	27.9
Ikiciro rusange	85	21.6
Advanced level	143	36.3
University	43	10.9
<b>Occupation</b>		
Merchant	106	27.1
Student	67	17.1
Daily laborer	46	11.8
Public servant	45	11.5
Farmer	36	9.2
Others	91	23.3
<b>Monthly income (RWF)</b>		
<30 000	125	31.7
30 000 - 100 000	173	43.9
>100 000	96	24.4
<b>Number of family members</b>		
1 - 5	275	70
>5	118	30
<b>Have insurance</b>		
Yes	386	98
No	8	2

A significant majority (79.7%) believed that CVDs are not preventable by nutrition habits (Table 2).

### **The overall level of Knowledge of respondents on CVD prevention using nutrition**

Utilizing Bloom's cut-off criteria, the analysis revealed that a considerable portion of participants demonstrated a moderate level of knowledge. Specifically, 206 respondents, representing 52.3% of the total participants, fell within this category (Table 3).

Sources of information about nutrition and health. The study identified various sources of nutrition and health information for the participants, with social media being the most prevalent, cited by 57.4% of respondents. Additionally, community health workers and health facilities were significant sources, reported by 40.1% and 39% of participants, respectively (Figure 1). Furthermore, an unspecified source contributed to the information acquisition process for 19.3% of the respondents. It's important to note that the total percentage exceeds 100 due to participants often accessing information from multiple sources.

### **Attitude of respondents to CVD prevention using nutrition**

We found that 91% believe everyone can get cardiovascular diseases (CVDs). If they had CVDs, 97% would revise their eating habits and quit smoking. However, 10% would not quit even if they had CVDs. Among participants, 91.6% enjoyed vegetables and fruits, while only 7.9% did not (Table 4).

### **The overall level of Attitude of clients to CVD prevention using nutrition**

We found a predominantly positive attitude towards cardiovascular disease prevention through nutrition, with 95.4% of them expressing positive sentiments. Only 4.1% adopted a neutral stance, and only 0.5% showed negative attitudes (Table 5).

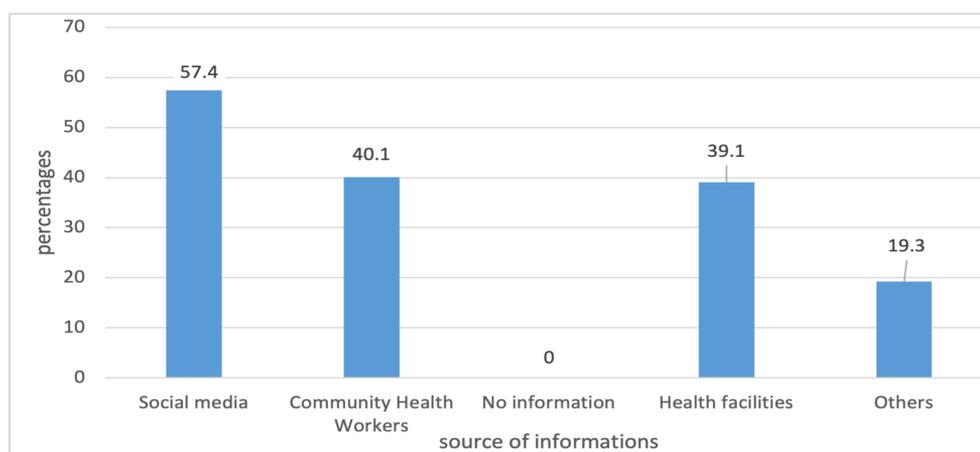
### **Practices in prevention of CVDs using nutrition**

Almost all (99%) participants regularly consumed vegetables and fruits, while 95.9% were non-smokers. However, a significant number of participants engaged in less favorable practices, such as alcohol consumption, fried foods and snacks, smoking, and adding salt to food. A

**Table 2:** Knowledge of respondents on CVD prevention using nutrition (n=394)

Question	Yes (n, %)	No (n, %)	Don't know/ Unsure
Does consuming a lot of vegetables and fruits decrease the risk of CVDs?	357 (90.6)	8 (2.0)	21 (7.4)
Does having excessive body weight increase one's risk of having CVDs?	361 (91.6)	12 (3.1)	21 (5.3)
Generally, is the regular consumption of red meat healthier than white meat?	87 (22.1)	227 (57.6)	80 (20.3)
Is Excessive alcohol drinking dangerous to cardiovascular health?	377 (95.7)	8 (2.0)	9 (2.3)
Is Animal fat healthier than plant oil?	126 (32.0)	217 (55.1)	51 (12.9)
Does high cholesterol in the blood prevent one from CVDs?	55 (14.0)	300 (76.1)	39 (9.9)
Are CVDs not preventable by nutrition habits?	314 (94.9)	8 (2.0)	12 (3.1)
Do sugary drinks carry the risk for CVDs?	285 (72.3)	72 (18.3)	37 (9.4)

Highlighted areas indicate the correct answers

**Figure 1:** Sources of information about nutrition and health**Table 3:** The overall level of knowledge of respondents on CVD prevention using nutrition

Variables	Categories	Frequency (n=394)	Percentage (%)
Level of knowledge*	Low level	90	22.8
	Moderate level	206	52.3
	High level	98	24.9
	Total	394	100.0

**Table 4.** Attitude of the respondent to CVD prevention using nutrition (n=394)

Question	Yes (n, %)	No (n, %)	Unsure (n, %)
Do you believe everyone can get CVDs?	360 (91.4)	24 (6.1)	10 (2.5)
If I had CVDs, would I like to revise my eating habits?	385 (97.7)	2 (0.5)	7 (1.8)
If I had CVD, would I like to quit smoking?	352 (89.3)	42 (10.7)	0
Do you feel happy while eating vegetables and fruits?	361 (91.6)	31 (7.9)	2 (0.5)

**Table 5:** The overall level of attitude of clients to CVD prevention using nutrition (n=394)

Variables	Categories	Frequency (N=394)	Percentage (%)
Level of attitude	Negative attitude	2	0.5
	Neutral attitude	16	4.1
	Positive attitude	376	95.4
	Total	394	100.0

significant proportion of participants (50.8%) had never sought advice from a healthcare professional regarding nutritional matters. Vegetable oil was the most used dietary oil, with 62.4% of participants favoring it. Butter was used by 35.6% of respondents, while margarine was used by 2.0% (Table 6).

### Overall Level of Practice of clients towards CVD prevention using nutrition

The overall level of practices among the participants concerning cardiovascular disease (CVD) prevention through nutrition, the analysis indicated varying degrees of adherence. Specifically, out of the total 394 participants, 258 individuals (65.5%) demonstrated poor practice. A moderate level of practice was observed in 128

people (32.5%), while only a small minority of 8 individuals (2%) exhibited good practices (Table 7).

### DISCUSSION

This study assessed the knowledge, attitudes, and practices related to CVD prevention through nutrition among clients attending Remera Health Centre. The results indicated that while participants demonstrated moderate knowledge and positive attitudes, their practices remained poor. This gap between awareness and behaviour highlights the need for targeted interventions to translate knowledge into actionable practices. Public health initiatives should focus on behaviour change strategies, such as nutrition education programs,

**Table 6:** Practice of clients towards CVD prevention using nutrition (n=394)

Question	Yes (n, %)	No (n, %)
Do you eat vegetables and fruits?	390 (99.0)	4 (1.0)
Do you drink a lot of sugary drinks?	355 (90.1)	39 (9.9)
Are you currently smoking?	16 (4.1)	378 (95.9)
Are you currently consuming alcohol?	126 (32.0)	268 (68.0)
Do you often eat fried food and snacks?	282 (71.6)	112 (28.4)
Do you add salt while you are eating?	194 (49.2)	200 (50.8)
Did you consult a nutrition specialist or any other health professional about your nutritional choice?	95 (24.1)	299 (75.9)
<b>What type of oil or fat do you mostly use?</b>		
Vegetable oil	246 (62.4)	
Butter or Ghee	140 (35.6)	
Margarine	8 (2.0)	

**Table 7:** Overall Level of practice towards CVD prevention using nutrition (n=394)

Variables	Categories	Frequency (N=394)	Percentage (%)
Level of practice	Poor practice	258	65.5
	Moderate practice	128	32.5
	Good practice	8	2.0
	Total	394	100.0

tailored counseling sessions, and practical skill-building activities to improve adherence to recommended dietary practices. Interestingly, participants exhibited more favourable attitudes than knowledge levels, challenging the notion that poor practices arise solely from a lack of awareness or negative perceptions. Similar trends were observed in previous studies conducted in Kigali, Rwanda, which reported high knowledge and moderate attitudes but poor practices [18].

However, these studies predominantly examined urban populations, leaving rural populations underrepresented. Addressing this gap requires community-based interventions that extend beyond awareness campaigns and incorporate culturally appropriate, accessible, and sustainable dietary practices tailored to both urban and rural populations. The moderate knowledge levels found in this study align with findings from Uganda [19]. Suggesting a broader regional trend. However, contrasting evidence from Egypt and Spain reported lower knowledge levels, indicating that awareness varies across different socio-economic and cultural settings [20, 21]

These disparities emphasize the importance of strengthening knowledge dissemination efforts through school-based nutrition programs, healthcare provider engagement, and mass media campaigns tailored to local contexts to ensure better comprehension and application of nutritional guidelines for CVD prevention. Positive attitudes towards CVD prevention were consistently observed in studies from Rwanda [18], Nepal, and Eastern Nepal, reflecting a universal trend across diverse populations. However, contrasting findings from Lebanon [22] and Jordan [23] revealed negative attitudes, suggesting that cultural and societal factors may influence perceptions of disease prevention. These variations underscore the need for region-specific approaches that address underlying socio-cultural determinants influencing attitudes and health behaviors. Interventions such as culturally adapted nutrition counseling and community support groups can help reinforce positive attitudes and bridge the gap between awareness and practice. Despite ongoing non-communicable disease (NCD) awareness campaigns, mass media sensitization, and community engagement initiatives such as car-free days, the study found that the translation of knowledge and attitudes into tangible practices remains inadequate. This reinforces the necessity

of practical, hands-on interventions such as cooking demonstrations, grocery store tours, and the integration of nutrition counseling into routine healthcare visits. Policymakers should consider implementing incentive-based programs that encourage individuals to adopt and sustain heart-healthy dietary behaviors.

Consistent with previous research, this study found that poor nutritional practices were predominant, with only a small fraction of participants demonstrating good practices. These results align with findings from Kigali, Rwanda [18], and among Jordanian elderly populations [24] but contrast with studies from Nigeria, where a higher proportion of participants exhibited good nutritional practices, likely due to their chronic disease status and access to education during healthcare visits [25]. Given these regional differences, a comprehensive approach incorporating both preventive and therapeutic nutrition strategies is necessary to encourage better dietary habits among diverse populations.

Given the variability in KAP across regions, further research is needed to explore the underlying barriers to behavioral change and to design interventions that address these barriers effectively. Tailored public health programs that incorporate local dietary habits, socioeconomic factors, and healthcare access can enhance the effectiveness of CVD prevention strategies. Additionally, integrating digital health tools, such as mobile applications and telehealth nutrition counseling, could provide accessible and scalable solutions for promoting healthier lifestyles [26, 27, 28, 29].

This study has some limitations. First, its cross-sectional design restricts the ability to establish causal relationships between knowledge, attitudes, and practices regarding nutrition and CVD prevention. Second, the reliance on self-reported data may introduce recall and social desirability biases, particularly concerning sensitive topics like dietary practices. Third, the study was conducted at a single health center in an urban setting, limiting the generalizability of findings to rural or other regional populations. Fourth, the convenience sampling method may not fully represent the broader population, potentially skewing results. Additionally, the study did not explore the influence of socioeconomic factors, such as income or education, which

could significantly impact nutritional practices. Lastly, the limited time frame for data collection due to academic and clinical commitments may have constrained the depth and breadth of data gathered. These limitations highlight the need for more comprehensive, longitudinal studies to better understand and address the gaps in CVD prevention practices.

## CONCLUSION

This study identified a significant disparity between knowledge, attitudes, and practices regarding CVD prevention through nutrition among clients attending Remera Health Centre. While participants exhibited moderate knowledge and positive attitudes, their actual dietary practices were largely inadequate. This highlights the challenge of converting awareness into sustainable behaviour change. To bridge this gap, public health programs should implement practical, community-driven interventions that not only educate but also empower individuals to adopt and maintain heart-healthy dietary behaviours. Future research should focus on understanding regional disparities and developing evidence-based strategies that effectively promote healthier lifestyles and reduce the burden of CVDs. We recommend conducting longitudinal studies to assess the long-term impact of knowledge and attitude changes on actual dietary practices, investigate the specific barriers preventing individuals from translating knowledge and positive attitudes into healthier nutritional behaviours, developing and evaluate culturally tailored, community-based intervention programs to improve CVD prevention practices, exploring the effectiveness of digital health tools, such as mobile applications and telehealth nutrition counseling, in promoting heart-healthy behaviours, and finally assessing the role of healthcare providers in influencing patient dietary behaviours and identify strategies to enhance their involvement in nutrition education.

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