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Knowledge, Attitudes and Engagement in Preventive Care Practices Towards Diabetes and Hypertension Among Women in Tanzania: A Community Based- Study

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Article

Keywords: Diabetes, Hypertension, Non-communicable diseases, Preventive care, Knowledge, Attitudes, Practices

Posted Date: July 18th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10306862/v1

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Additional Declarations: No competing interests reported.

Abstract

Non-communicable diseases risks are rising among women in Sub-Saharan Africa, yet localized community prevention data remain limited. This community-based, cross-sectional study assessed knowledge, attitudes, and engagement in preventive care practices for diabetes and hypertension among 301 adult women residing in Kilimanjaro, Tanzania. Data was collected using a structured, interviewer-administered questionnaire adapted from validated KAP and WHO-STEPwise instruments. Composite binary scores were constructed for knowledge, attitudes, and preventive practices. Logistic regression analyses were performed using IBM SPSS V27.0 to identify predictors of engagement in preventive care practices. Pearson correlation and linear regression were used as sensitivity analyses. Statistical significance was kept at 0.05. Most participants demonstrated poor knowledge of hypertension (61.5%) and diabetes (54.5%), with knowledge of non-modifiable risk factors and disease complications being particularly limited. Health-seeking behaviors were relatively common, while sustained lifestyle practices such as regular physical activity (36.9%) and avoidance of refined sugar (34.6%) were infrequent. In multivariable analysis, asset ownership was the only independent predictor of engagement in preventive care practices (aOR = 1.71, 95% CI: 1.01–2.89, *P* = 0.046). Interventions need to move beyond health education to integrate structural strategies that address financial barriers, expand healthcare access, and create supportive environments for sustained behavior change.

INTRODUCTION

Non-communicable diseases (NCDs), predominantly hypertension and diabetes, exemplify a growing public health concern in sub-Saharan Africa. Influenced by rapid urbanization, dietary changes, physical inactivity, tobacco use, and alcohol consumption, these chronic conditions result in severe complications such as cardiovascular diseases, stroke, and renal failure. Despite being highly preventable through early detection and lifestyle modifications, these chronic conditions disproportionately affect many low- and middle-income countries (LMICs), where access to preventive care remains under-prioritized, accounting for over 75% of global NCD deaths [1–3].

Tanzania reflects this regional trend, with NCDs driving almost one-third of mortality numbers; the 2021 Tanzania Non-Communicable Disease Survey reports hypertension prevalence at 26.4% nationally, escalating to 36.4% in Kilimanjaro Region alone, while diabetes affects 9.1% of the population[4–7]. Preventive practices such as routine screening, health-seeking, physical activity, and dietary are vital for NCD control and cost reduction, yet uptake lags due to post-screening dropout, inadequate facilities or medications, and counselling deficits in northern Tanzania[7–9].

While individual knowledge and favorable attitudes are considered preconditions for behavior change, the relationship between these cognitive factors and actual preventive practices remains complex and often inconsistent[10,11]. Theoretical models such as Knowledge, Attitude, Practice (KAP) suggest a sequential pathway from awareness to action; however, evidence from LMICs increasingly points to a persistent gap between what individuals know and believe and what they do[8]. Structural factors

including poverty, limited insurance coverage, and constrained access to supportive environments may shape this gap more powerfully than cognitive determinants alone.

Women represent a critically important yet an underexplored group in NCD prevention research in Tanzania. They bear a disproportionate share of the NCD burden while simultaneously facing gendered barriers to healthcare access, including limited financial autonomy, caregiving responsibilities, and deeply embedded cultural norms around illness and treatment-seeking[12]. Understanding the knowledge, attitudes, and behavioral practices of women in community settings is therefore essential for designing effective, targeted interventions.

Despite the growing recognition of the NCD burden in Tanzania[7], community-level evidence on the factors that shape women's engagement in preventive care for diabetes and hypertension remains limited, particularly in rural and peri-urban settings. This study aimed to assess knowledge, attitudes, and engagement in preventive care practices related to diabetes and hypertension among in Tanzania.

METHODS

Study Design

This study employed a community-based cross-sectional design to assess knowledge, attitudes, and engagement in preventive care services among women residing in Arusha Chini ward, Moshi District in Kilimanjaro, Tanzania.

Setting

The study was conducted between July–December 2024 in Arusha Chini Ward, Moshi District, Kilimanjaro Region, Tanzania. Arusha Chini Ward, a rural ward located in Moshi Rural District, Kilimanjaro Region, in the northern part of Tanzania. Arusha Chini Ward had a population of 13,977 according to the 2022 national census, covering an area of 231.4 km² with a population density of 60.40 persons per km². The population consisted of 7,115 males (49.1%) and 6,862 females (50.9%)[13]. The area is characterized by access to public primary healthcare services, including 3 dispensaries and 1 health center providing screening for non-communicable diseases such as hypertension and diabetes.

Participants

The study population comprised of adult women residing in Arusha Chini Ward, Moshi District Council, Kilimanjaro Region. Eligible participants included women aged 18 years and above who had resided in the study area for at least six months prior to data collection, ensuring adequate familiarity with local health services and practices. Women who were unable to provide informed consent, those who were severely ill and those absent at their household at the time of data collection were excluded from

participation. In this study we utilized a multi-stage sampling technique whereby in the first stage, streets/villages within the ward were selected using simple random sampling. In the second stage, households within selected areas were systematically sampled using a predefined interval of 3 based on household listings. Within each selected household, one eligible participant was identified. Where more than one eligible individual was present, one participant was selected using simple random sampling to minimize selection bias.

The sample size was determined using the single population proportion formula[14]:

$N = Z^2. p (1-p)/e^2$

Where:

n = required sample size, Z = standard normal deviate at 95% confidence level (1.96), p = estimated prevalence (0.18)[12], e = margin of error (0.05).

To account for potential non-response (10%) and to enhance the power of multivariable analysis, the sample size was adjusted upward, resulting in a final sample size of 301 participants, which was considered sufficient to detect meaningful associations.

Variables

The primary outcome was engagement in preventive care services, operationalized through participants' engagement in preventive practices related to hypertension and diabetes. This was derived from the WHO STEPwise approach to NCD risk factor surveillance and the Knowledge–Attitude–Practice (KAP) model. Multiple practice-related items were selected to capture key domains of preventive care. Accordingly, a composite preventive care practice score was developed by combining key behavioral indicators aligned with these domains[15,16].

These indicators included: Screening behavior (whether the participant had ever undergone screening for hypertension or diabetes), Frequency of screening (e.g., attending routine check-ups at least once per year), Health-seeking behavior (seeking medical advice when necessary), Lifestyle practices – physical activity (engagement in regular exercise), and Lifestyle practices – diet (avoidance of refined sugar). Each item was coded as a binary variable (1 = appropriate practice, 0 = inappropriate). The individual item scores were then summed to generate a total composite score for each participant. Participants were categorized as having: Good preventive practices (score ≥ 50%) and poor preventive practices (score < 50%).

Independent variables

Knowledge of hypertension and diabetes was assessed capturing key domains relevant to preventive care, including general awareness of the condition, modifiable (lifestyle-related) risk factors such as smoking, alcohol use, diet, and physical inactivity, non-modifiable risk factors such as age, family history, and gender, and disease-related complications. Separate sets of items were used to assess knowledge of hypertension and diabetes. Each item was coded as correct (1) or incorrect/don't know (0), and individual item scores were summed to generate composite knowledge scores for each participant. The resulting scores were categorized into good knowledge (≥ 50% of the total score) and poor knowledge (< 50%).

Attitudes towards preventive care for hypertension and diabetes were assessing by capturing participants' beliefs and perceptions across domains relevant to preventive care, including perceptions of long-term medical treatment, beliefs regarding the effectiveness of lifestyle modification (diet and physical activity), attitudes towards behavioral risk factors such as alcohol consumption and tobacco use, and preferences for traditional versus modern healthcare approaches. Responses were collected using Likert-scale format ("never" to "most of the time") alongside categorical options. For analytical consistency, these responses were recorded and dichotomized into binary categories, with favorable responses coded as 1 and unfavorable responses coded as 0. Additionally, sociodemographic variables included age, marital status, education level, occupation, and health insurance status, household and health-related variables were included. Asset ownership was assessed as a proxy indicator of socioeconomic status and categorized as present or absent based on ownership of selected household assets. Family history of diabetes and hypertension was assessed as a binary variable (yes/no). Body mass index (BMI) was calculated using measured weight and height and categorized according to standard WHO classifications: underweight (< 18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), and obese (≥ 30 kg/m²).

Data was collected using a structured, interviewer-administered questionnaire, designed to ensure completeness and minimize missing data. The questionnaire was adapted from previously validated instruments used in NCD and KAP studies and contextualized to reflect local socio-cultural and health system characteristics. Prior to the main data collection, the tool was pre-tested in a population with similar demographic and contextual characteristics to assess clarity, relevance, and cultural appropriateness. Feedback from the pilot informed refinement of wording, sequencing, and response options, ensuring improved validity and reliability. Data collection was conducted by trained research assistants, who underwent standardized training on the study objectives, ethical considerations, informed consent procedures, and appropriate interview techniques.

Data Analysis

Data was entered, cleaned, and analyzed using IBM SPSS Statistics version 27 (IBM Corp., Armonk, NY, USA). Prior to analysis, data was checked for completeness, consistency, and outliers.

Descriptive Analysis

Sociodemographic and health-related variables were presented using frequencies and percentages in tables. Knowledge, attitude, and preventive practice variables were summarized using proportions and presented using clustered bar graphs for item-level responses. Composite scores were categorized into binary outcomes (e.g., good vs poor; favorable vs unfavorable) and reported as percentages.

Inferential statistics

Bivariate logistic regression analysis was first performed to estimate crude associations between each independent variable and the outcome, and results were reported as crude odds ratios (cORs) with 95% confidence intervals. Subsequently, multivariable logistic regression analysis was conducted to identify independent predictors of preventive practice, adjusting for all relevant variables. Adjusted odds ratios (aORs) with corresponding 95% confidence intervals were reported. The outcome variable was dichotomized as good versus poor preventive practice, and statistical significance was defined at $P < 0.05$.

Sensitivity Analysis

Pearson correlation analysis was performed to examine relationships between knowledge, attitude, and practice scores. Linear regression analysis was then conducted with preventive practice score as a continuous outcome variable to determine whether knowledge and attitude predicted practice when full variability was retained. The results of these analyses were compared with those from the primary logistic regression models to assess consistency. Several measures were implemented to minimize potential bias. These included standardized training of data collectors to reduce interviewer variability and pre-testing of the questionnaire to enhance reliability and clarity. Additionally, the use of a theory-driven multivariable modelling approach, with all relevant variables included irrespective of statistical significance at the bivariate level, helped to control for potential confounding.

Ethical Considerations

Ethical approval

for the study was obtained from Kilimanjaro Christian Medical University College's Ethical Review Committee (CRERC) (Cert No: 2674/2024) prior to the commencement of the study. Permission to conduct the study was obtained from the District Medical Officer (DMO). All methods were performed in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, and participants were informed of their right to withdraw at any time without consequences. Confidentiality was ensured by anonymizing data and securely storing all study materials.

RESULTS

Demographic characteristics of study participants

The study included 301 women, with the majority aged 18–39 years (61.5%) and married or cohabiting (75.7%). Most participants had attained primary education (65.4%) and were economically active (70.4%), while a large proportion did not have health insurance coverage (88.4%). Asset ownership was reported by 59.5% of participants. A minority reported a family history of diabetes (15.9%), whereas 59.5% reported a family history of hypertension. The distribution of body mass index indicated that 59.8% of participants were either overweight or obese as shown in Table 1.

Table 1
Demographic characteristics of study participants (N = 301)

Variable	Frequency	Percentage
Age, years		
18–39	185	61.5
40–59	100	33.2
≥ 60	16	5.3
Marital status		
Never married	43	14.3
Married/ cohabiting	228	75.7
Separated	30	10.0
Education		
No formal education	19	6.3
Primary	197	65.4
Secondary	75	24.9
Tertiary	10	3.3
Health Insurance		
No	266	88.4
Yes	35	11.6
Occupation		
Not-economically active	89	29.6
Economically active	212	70.4
Asset ownership		
Absent	122	40.5
Present	179	59.5
Family history of Diabetes		
No	253	84.1
Yes	48	15.9
Family history of Hypertension		

Variable	Frequency	Percentage
Age, years		
No	122	40.5
Yes	179	59.5
BMI (kg/m^2)		
< 18.5	6	2.0
18.5–24.9	115	38.2
25–29.9	99	32.9
≥ 30	81	26.9

Knowledge of Hypertension and Diabetes

Knowledge of modifiable lifestyle-related risk factors was relatively higher, with 63.5% of participants recognizing that lifestyle changes can reduce blood pressure and over two-thirds identifying behaviors such as smoking and alcohol use as risk factors for hypertension. Similarly, 59.1% identified unhealthy lifestyle behaviors as risk factors for diabetes, and 56.8% recognized the association between obesity, hypertension, and diabetes.

In contrast, knowledge of non-modifiable risk factors and disease-related complications was limited. Only 38.5% identified family history and 36.9% identified age as risk factors for hypertension, while 19.3% recognized gender-related risk. For diabetes, 49.5% identified family history, 31.2% identified age, and 36.2% recognized the association between diabetes and stroke. Overall, 61.5% of participants demonstrated poor knowledge of hypertension and 54.5% demonstrated poor knowledge of diabetes (Figs. 1 and 2 respectively).

Attitude towards preventive care practices on diabetes and hypertension

A substantial proportion of participants expressed favorable attitudes towards medical management, with 73.1% rejecting the belief that long-term medication use leads to organ failure and 58.5% disagreeing that diet alone is sufficient for disease control. However, attitudes related to behavioral risk factors were less favorable. Only 10.6% demonstrated favorable attitudes regarding alcohol consumption and 1.7% regarding tobacco use. Additionally, only 25.9% rejected the belief that traditional medicine is superior to modern medical care. Overall, 81.4% of participants were classified as having a favorable composite attitude towards preventive care (Fig. 3).

Preventive care practices among study participants

Engagement in preventive care practices differs by type of behavior. Health-seeking behaviors were relatively common, with 85.4% reporting that they would seek medical advice when needed and 81.4% reporting attendance at routine check-ups at least once per year. In contrast, adherence to sustained lifestyle-related practices was lower. Only 36.9% reported engaging in regular physical activity and 34.6% reported avoiding refined sugar. Overall, 58.8% of participants were classified as having poor engagement in preventive care practices (Fig. 4).

Factors associated with Engagement in Preventive Care Practices among Study Participants

In bivariate analysis, health insurance (cOR = 0.42, 95% CI: 0.21–0.87, p = 0.019), asset ownership (cOR = 1.74, 95% CI: 1.09–2.89, p = 0.021), and family history of hypertension (cOR = 2.14, 95% CI: 1.23–3.71, p = 0.007) were significantly associated with engagement in preventive care practices. In multivariable logistic regression, only asset ownership remained independently associated with preventive care practices. Participants with asset ownership had higher odds of engaging in preventive practices compared to those without (aOR = 1.71, 95% CI: 1.01–2.89, p = 0.046).

Health insurance (aOR = 0.47, 95% CI: 0.22–1.00, p = 0.052), occupation (aOR = 0.58, 95% CI: 0.33–1.01, p = 0.057), and family history of hypertension (aOR = 1.79, 95% CI: 0.95–3.36, p = 0.072) demonstrated borderline associations but did not reach statistical significance (Table 2).

Table 2
Factors Associated with Engagement in Preventive Care Practices among Study Participants: Bivariate and Multivariable Logistic Regression Analysis N = 301

Variable	Bivariate Analysis			Multivariate Analysis		
	cOR	95% CI	*p-value*	aOR	95% CI	*p-value*
Age, years						
18–39 (Ref)						
40–59	1.53	0.51–4.59	0.445	0.71	0.17–2.97	0.641
≥ 60	1.66	0.54–5.13	0.379	0.94	0.23–3.79	0.935
Marital status						
Never married (Ref)						
Married/ cohabiting	1.44	0.55–3.80	0.462	1.18	0.38–3.67	0.775
Separated	1.45	0.65–3.25	0.361	1.57	0.64–3.84	0.322
Education						
No formal education (Ref)						
Primary	0.46	0.09–2.22	0.335	0.59	0.09–3.78	0.574
Secondary	0.67	0.19–2.39	0.536	0.76	0.19–3.09	0.700
Tertiary	0.83	0.22–3.11	0.781	1.10	0.27–4.49	0.893
Health Insurance						
No (Ref)						
Yes	0.42	0.21–0.87	**0.019**	0.47	0.22–1.00	0.052
Occupation						
Not-economically active (Ref)						
Economically active	0.73	0.44–1.22	0.232	0.58	0.33–1.01	0.057
Asset ownership						
Absent (Ref)						
Present	1.74	1.09–2.89	**0.021**	1.71	1.01–2.89	**0.046**
Family history of Diabetes						

cOR – Crude Odds Ration; aOR – Adjusted Odds Ratio; Bolded p-values indicates statistical significance

Variable	Bivariate Analysis			Multivariate Analysis		
	cOR	95% CI	*p-value*	aOR	95% CI	*p-value*
Age, years						
No (Ref)						
Yes	1.87	0.96–3.65	0.068	1.42	0.67–3.03	0.360
Family history of Hypertension						
No (Ref)						
Yes	2.14	1.23–3.71	**0.007**	1.79	0.95–3.36	0.072
DM Knowledge						
Poor (Ref)						
Good	1.15	0.72–1.82	0.566	1.02	0.59–1.75	0.939
HTN Knowledge						
Poor (Ref)						
Good	1.25	0.78–2.00	0.362	1.15	0.67–1.95	0.618
Attitude						
Poor (Ref)						
Good	0.69	0.37–1.26	0.222	0.76	0.39–1.46	0.415

cOR – Crude Odds Ration; aOR – Adjusted Odds Ratio; Bolded p-values indicates statistical significance

Sensitivity Analysis Using Continuous Measures

Using continuous scores, the mean diabetes knowledge score was 2.33 (SD = 1.43), and the mean hypertension knowledge score was 2.06 (SD = 1.15). The mean attitude score was 3.30 (SD = 0.95), and the mean preventive practice score was 2.33 (SD = 1.19). There was a moderate positive correlation between hypertension and diabetes knowledge scores ($r = 0.476$, $p < 0.001$). However, no statistically significant correlations were observed between knowledge scores and preventive practice (hypertension: $r = 0.021$, $p = 0.712$; diabetes: $r = -0.002$, $p = 0.967$), nor between attitude and practice ($r = 0.045$, $p = 0.433$).

Linear regression analysis showed that knowledge and attitude scores were not significant predictors of preventive practice (Table 3). The overall model was not statistically significant ($F = 0.256$, $p = 0.857$) and explained only 0.3% of the variance ($R^2 = 0.003$).

Table 3
Linear regression analysis of predictors of preventive practice score (sensitivity analysis) (N = 301)

Variable	B	SE	β (Standardized)	95% CI	*p-value*
Hypertension knowledge	0.026	0.065	0.026	-0.102–0.154	0.695
Diabetes knowledge	-0.011	0.064	-0.011	-0.136–0.114	0.867
Attitude	0.055	0.073	0.044	-0.089–0.199	0.451

Discussion

This study documents the knowledge, attitudes, and engagement in preventive care practices related to diabetes and hypertension among women in Arusha Chini ward, Kilimanjaro. Our study findings revealed that, although favorable attitudes towards preventive care were common, knowledge remained limited and engagement in preventive practices was suboptimal. Importantly, knowledge and attitudes were not associated with preventive practices, while asset ownership emerged as the only independent predictor after adjustment.

Knowledge of modifiable risk factors was higher than knowledge of non-modifiable risk factors and complications. Prior studies in Tanzania, Ethiopia, and Gambia have noted overall knowledge scores on chronic disease risk factors tend to be lower among women, particularly in regions with limited health education access[17–20]. In many LMICs health promotion campaigns often emphasize modifiable behavioral risks, which are more actionable, but may result in an incomplete understanding of disease susceptibility. As a result, limited knowledge of non-modifiable risk factors may reduce perceived personal risk, as individuals may associate disease primarily with unhealthy behaviors rather than inherent vulnerability, leading to underestimation of risk and reduced motivation to engage in preventive care, particularly in the absence of symptoms.

Despite the predominance of favorable attitudes overall toward preventive care, this study revealed no significant association with actual engagement in such practices. Importantly, this lack of association persisted in sensitivity analyses using continuous measures, indicating that the observed rift is unlikely to be explained by information loss due to dichotomization. Participants demonstrated acceptance of medical treatment but less favorable attitudes towards behavioural risk reduction, particularly in relation to alcohol and tobacco use. Existing research has similarly observed widespread attitude-practice gaps in NCD prevention, where positive attitudes toward medical care coexist with low engagement due to traditional medicine preferences and unfavorable views on behaviours[8,21,22]. While participants may conceptually accept care, behavioral attitudes and deep-rooted cultural norms continue to shape decision-making, resulting in a disconnect between belief and practice[23]. From a behavioral perspective, knowledge and attitudes are necessary but insufficient determinants of action as individuals may be both informed and positively inclined, yet still unable to translate this into practice due to external constraints[24]. Behavior change and action is influenced by a combination of cognitive, social, and structural factors[25,26].

Preventive practices varied substantially by type. Engagement with health services, including seeking medical advice and attending routine check-ups, was relatively high. In contrast, sustained lifestyle behaviors such as regular physical activity and dietary modification were less commonly reported. Episodic contact may be more feasible than maintaining continuous behavioral changes to reduce long-term health risks. Preventive care practices that require sustained personal effort and lifestyle changes may be more difficult to adopt compared to those involving episodic interaction with the health system. Similar patterns have been observed in other low-resource settings, where environmental, economic, and social barriers limit the feasibility of sustained behavior change[8,27–29].

Women who owned assets had significantly higher odds of engaging in preventive care practices towards diabetes and hypertension. Asset ownership mirrors greater financial stability, improved ability to afford transport and services, and increased autonomy in health-related decision-making[30–32]. The lack of statistical significance for health insurance after adjustment may reflect low overall insurance coverage which limited variability. Similarly, borderline associations observed for occupation and family history may reflect insufficient statistical power rather than the absence of a true effect. The capacity to act, rather than knowledge alone, is a key driver of engagement. Individuals may understand the importance of prevention but remain constrained by financial limitations, competing priorities, or limited access to supportive environments[8,33,34].

While health education remains a critical component of NCDs prevention, approaches that focus exclusively on increasing knowledge are unlikely to achieve meaningful improvements in behavior. Instead, interventions should adopt a more comprehensive approach that integrates health education with strategies to address structural barriers. At the same time, interventions need to place greater emphasis on promoting sustained behavioral change, particularly in relation to physical activity and dietary practices, where gaps remain most evident. Efforts to improve preventive care uptake should include strengthening access to healthcare services, expanding financial protection mechanisms, and creating supportive environments for lifestyle modification[35,36]. Community-based interventions and culturally sensitive approaches may further enhance engagement by aligning preventive strategies with local beliefs and practices.

Further research is needed to better understand the observed knowledge–attitudes-practice gap. Qualitative studies could provide deeper insight into contextual factors such as cultural beliefs, perceived barriers, decision-making processes and lived experiences of accessing healthcare. Longitudinal and intervention-based studies are also needed to evaluate strategies that address both behavioral and structural determinants of preventive care.

Strengths and Limitations

A key strength of this study is its comprehensive assessment of knowledge, attitudes, and engagement in preventive care within a community-based population, allowing behavioral and structural determinants of preventive care to be examined together rather than in isolation. Nevertheless, this study has several

limitations. The cross-sectional design limits causal inference, as associations cannot establish temporal relationships. The use of self-reported data introduces the potential for recall and social desirability bias. Additionally, the use of composite measures may reduce variability within individual components, although such measures facilitate overall interpretation. The relatively low prevalence of certain exposures, such as health insurance coverage, may have limited the statistical power to detect significant associations. Finally, the findings may not be fully generalizable beyond similar rural or mixed rural–urban settings. These limitations need careful considerations when interpreting the findings.

Conclusion

Engagement in preventive care practices for diabetes and hypertension among women in Arusha Chini ward was limited, despite generally favorable attitudes and some awareness of lifestyle-related risk factors. Knowledge and attitudes were not associated with preventive practices, while asset ownership emerged as the only independent predictor. Our study underlines a fundamental challenge: engagement in preventive care practices is not solely determined by individual knowledge or willingness but is constrained by broader structural and contextual factors. While health education remains important, improving knowledge without addressing these underlying constraints is unlikely to result in meaningful changes in behavior.

Interventions aimed at improving preventive care uptake should therefore move beyond awareness campaigns and adopt a more comprehensive approach that integrates health education with strategies to address socioeconomic barriers and enhance access to supportive environments for behavior change. Strengthening community-level support systems and promoting feasible, context-specific lifestyle interventions will be essential in bridging the gap between knowledge and practice. Addressing these structural and behavioral gaps will be critical for improving engagement in preventive care and advancing the prevention and control of non-communicable diseases in similar low-resource settings.

Declarations

Competing interests

The author(s) declare no competing interests.

Funding

The project on which this publication is based was in part funded by the Hologic Global Women's Health Index Grant, administered by the Consortium of Universities for Global Health (CUGH) and awarded to KCMC University (*formerly Kilimanjaro Christian Medical University College*). The funder had no role in the study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the article for publication.

Author Contribution

S.B. contributed to the conceptualization, funding acquisition, project administration, study methodology, investigation, and drafting of the original manuscript. R.A.M. contributed to study methodology, field investigation, data curation, and manuscript review. A.M. was responsible for study methodology, formal analysis, data curation, data visualization, and drafting and editing the manuscript. F.M.N. and K.E.M. contributed to field investigation and manuscript review. F.M. contributed to study conceptualization, methodology, data validation, supervision, and substantive review of the manuscript. All authors read, critically revised, and approved the final submitted version of the manuscript. Furthermore, all authors have agreed to be personally accountable for their own contributions and to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated, resolved, and documented.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References

1. Mudie, K. et al. Non-communicable diseases in sub-Saharan Africa: a scoping review of large cohort studies. *J. Glob Health*. **9**, 020409 (2019).
2. Müller, S. A. et al. The burden and treatment of non-communicable diseases among healthcare workers in sub-Saharan Africa: a multi-country cross-sectional study. *Front. Public. Health*. **12**, 1375221 (2024).
3. WHO. Noncommunicable diseases. *WHO Fact Sheets* (2025). https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
4. Muhihi, A. J. et al. Prevalence, Awareness, Treatment, and Control of Hypertension among Young and Middle-Aged Adults: Results from a Community-Based Survey in Rural Tanzania. *Int. J. Hypertens.* 9032476 (2020). (2020).
5. Mwangome, M., Geubbels, E., Klatser, P. & Dieleman, M. Perceptions on diabetes care provision among health providers in rural Tanzania: a qualitative study. *Health Policy Plan.* **32**, 418–429 (2017).
6. Dika, H. et al. Knowledge and Practice regarding Risk Factors of Type 2 Diabetes Mellitus Among Office Workers in Mwanza City, Tanzania. *East. Afr. Health Res. J.* **7**, 81–87 (2023).
7. MOHCDGEC. National Strategic Plan for Prevention and Control of Non-Communicable Diseases 2021–2026. (2021).
8. Mashauri, H. L., Angolile, C. M., Muro, F. J. & Knowledge Attitude, Practice, and Determinants of Community Health Workers' Involvement Toward NCD Prevention and Control in Northern Tanzania:

A Cross-Sectional Study. *Health Sci. Rep.* **8**, e70978 (2025).

9. Tani, K. et al. Seeking and receiving hypertension and diabetes mellitus care in Tanzania. *PLOS ONE*. **19**, e0312258 (2024).
10. Joho, A. A., Sandi, F. & Yahaya, J. J. Determinants of knowledge, attitude, and practice among patients with type 2 diabetes mellitus: A cross-sectional multicenter study in Tanzania. *PLOS Glob Public. Health*. **3**, e0001351 (2023).
11. Ajzen, I. The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* **50**, 179–211 (1991).
12. Hologic *The Hologic Global Women's Health Index*. (2021). https://hologic.womenshealthindex.com/sites/default/files/2025-06/Hologic%20Global%20Womens%20Health%20Index%20Inaugural%20Report.pdf
13. The United Republic of Tanzania (URT). Ministry of Finance and Planning, Tanzania National Bureau of Statistics and President's Office - Finance and Planning, & Office of the Chief Government Statistician, Zanzibar. *The 2022 Population and Housing Census: Administrative Units Population Distribution Report*. (2022). https://www.nbs.go.tz/nbs/takwimu/Census2022/Administrative_units_Population_Distribution_Report_Tanzania_volume1a.pdf
14. Hasanain Faisal Ghazi. *Sample Size Made Easy* doi:10.13140/RG.2.2.28801.89442. (2020).
15. Pengpid, S. & Peltzer, K. Prevalence and correlates of multiple behavioural risk factors of non-communicable diseases among university students from 24 countries. *J. Public. Health*. **43**, 857–866 (2021).
16. Atorkey, P. et al. Clustering of multiple health-risk factors among vocational education students: a latent class analysis. *Transl Behav. Med.* **11**, 1931–1940 (2021).
17. Gibore, N. S., Munyogwa, M. J., Ng'weshemi, S. K. & Gesase, A. P. Prevalence and knowledge of modifiable cardiovascular diseases risk factors among vulnerable population in Central Tanzania. *BMC Cardiovasc. Disord*. **23**, 373 (2023).
18. Masikini, P., Constantine, I. & Mwita, S. Knowledge of Risk Factors for Hypertension among University Students in Northwestern Tanzania: A Cross-Sectional Study. *Open. J. Epidemiol.* **14**, 471–479 (2024).
19. Sambou, M. L., Bafei, S. E. C. & Bass, P. Factors associated with knowledge of hypertension risk factors and symptoms among Gambian women: A cross-sectional study based on the Gambia Demographic and Health Survey. *Prev. Med. Rep.* **42**, 102754 (2024).
20. Workina, A., Habtamu, A., Diribsa, T. & Abebe, F. Knowledge of modifiable cardiovascular diseases risk factors and its primary prevention practices among diabetic patients at Jimma University Medical Centre: A cross-sectional study. *PLOS Glob Public. Health*. **2**, e0000575 (2022).
21. Mahajan, M. et al. Study of Knowledge, Attitudes, and Practices Toward Risk Factors and Early Detection of Noncommunicable Diseases Among Rural Women in India. *J. Glob Oncol.* 1–10. 10.1200/JGO.18.00181 (2019).

22. Chauhan, A., Mahapatra, P., Kanungo, S. & Pati, S. Scoping Review of Knowledge, Attitude and Practices Related to NCD Risk Factors Among Medical Undergraduates, India. *J. Health Manag*. **09720634241279892** 10.1177/09720634241279892 (2025).
23. Ali Alarabi, A. et al. The Impact of Cultural Beliefs on Medical Ethics and Patient Care. *J. Healthc. Sci.* **04**, 918–924 (2024).
24. Hendel, K. R., Vaughan, E., Kirschmann, J. M. & Johnston, C. A. Moving Beyond Raising Awareness: Addressing Barriers. *Am. J. Lifestyle Med.* **18**, 740–743 (2024).
25. Gardner, B. et al. Developing habit-based health behaviour change interventions: twenty-one questions to guide future research. *Psychol. Health*. **38**, 518–540 (2023).
26. Koulouvari, A. D., Margariti, A., Sakellari, E., Barbouni, A. & Lagiou, A. Applications of Behavioral Change Theories and Models in Health Promotion Interventions: A Rapid Review. *Behav. Sci.* **15**, 580 (2025).
27. Fleary, S. A., Ettienne-Gittens, R. & Heffer, R. W. Perceptions of Preventive Health Care and Healthy Lifestyle Choices for Low Income Families: A Qualitative Study. *ISRN Prev. Med.* 1–6 (2013). (2013).
28. Kaur, N., Kaur, H. & Thakur, J. Navigating NCDs' Self-Management: A Comprehensive Review of Barriers & Facilitators in LMICs through Quantitative and Qualitative Lenses. *Natl. J. Community Med.* **16**, 102–125 (2025).
29. Jose, N. K. et al. Barriers and facilitators of noncommunicable disease (NCD) prevention in Kerala: A qualitative study. *J. Fam Med. Prim. Care*. **11**, 3109–3114 (2022).
30. Malik, M. A., Sinha, R., Priya, A. & Rahman, M. H. U. Barriers to healthcare utilization among married women in Afghanistan: the role of asset ownership and women's autonomy. *BMC Public. Health*. **24**, 613 (2024).
31. Haruna, T. S., Duah, H. O. & Lee, R. Factors associated with health decision-making autonomy on own healthcare among Tanzanian women: A 2022–2023 demographic health survey study. *PLOS One*. **20**, e0302191 (2025).
32. Elmeshmeshy, E. I., Abdelaziz, B. & Soliman, S. Bridging the gap: access to health care and control of type 2 diabetes mellitus, hypertension and bronchial asthma among Egyptian women. *BMC Public. Health*. **25**, 466 (2025).
33. Ferrara, P. Health Risk Factors, Prevention, and Inequalities. *Med. (Mex)*. **61**, 127 (2025).
34. Roberts, D. A. et al. Barriers to accessing preventive health care among African-born individuals in King County, Washington: A qualitative study involving key informants. *PLOS ONE*. **16**, e0250800 (2021).
35. Hyseni, L. et al. The effects of policy actions to improve population dietary patterns and prevent diet-related non-communicable diseases: scoping review. *Eur. J. Clin. Nutr.* **71**, 694–711 (2017).
36. Banatvala, N., Akselrod, S., Bovet, P. & Mendis, S. The WHO Global Action Plan for the Prevention and Control of NCDs 2013–2030. in *Noncommunicable Diseases* 234–239Routledge, (2023). 10.4324/9781003306689-36

Figures

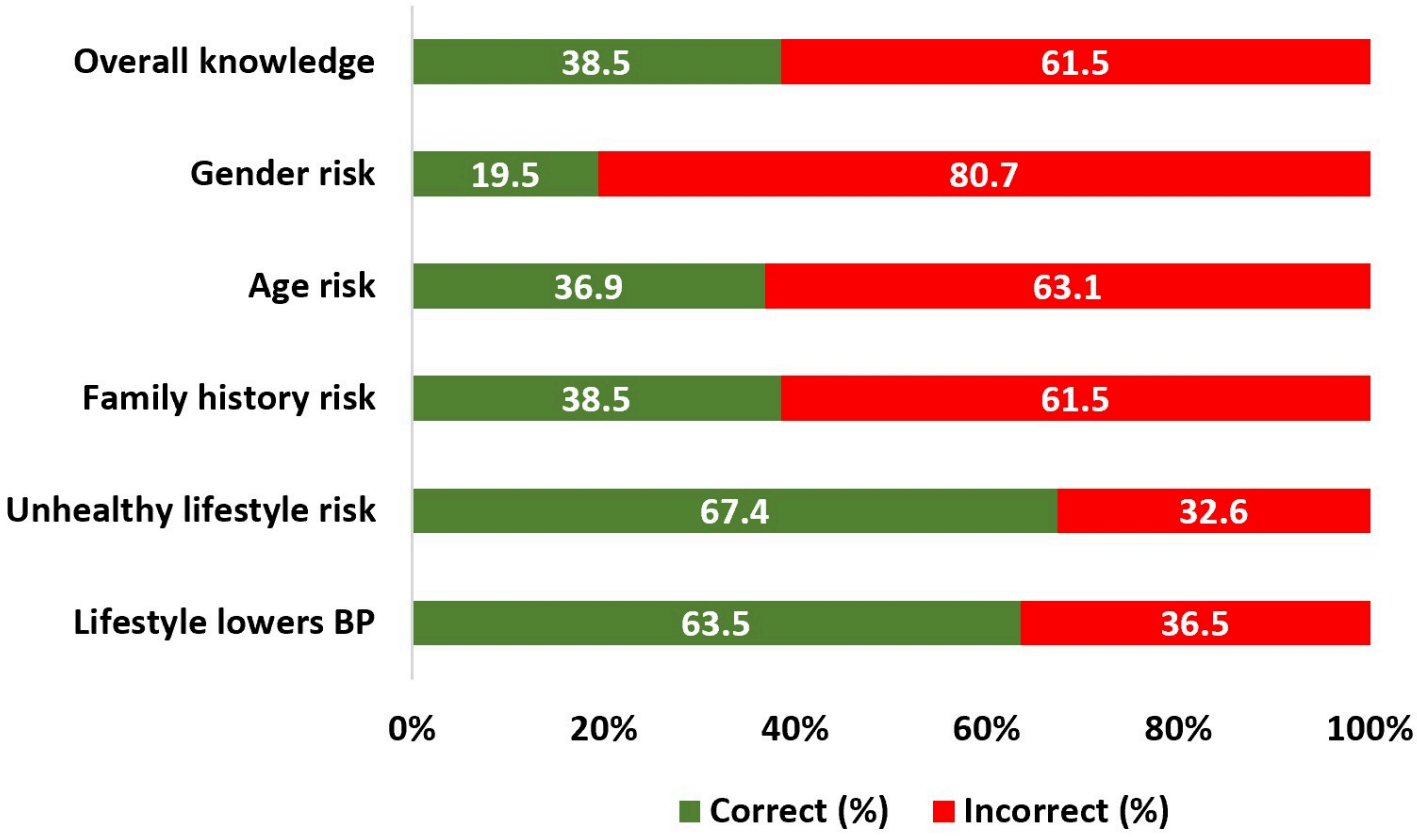


Figure 1

Knowledge of Hypertension Towards Preventive Care among Study Participants

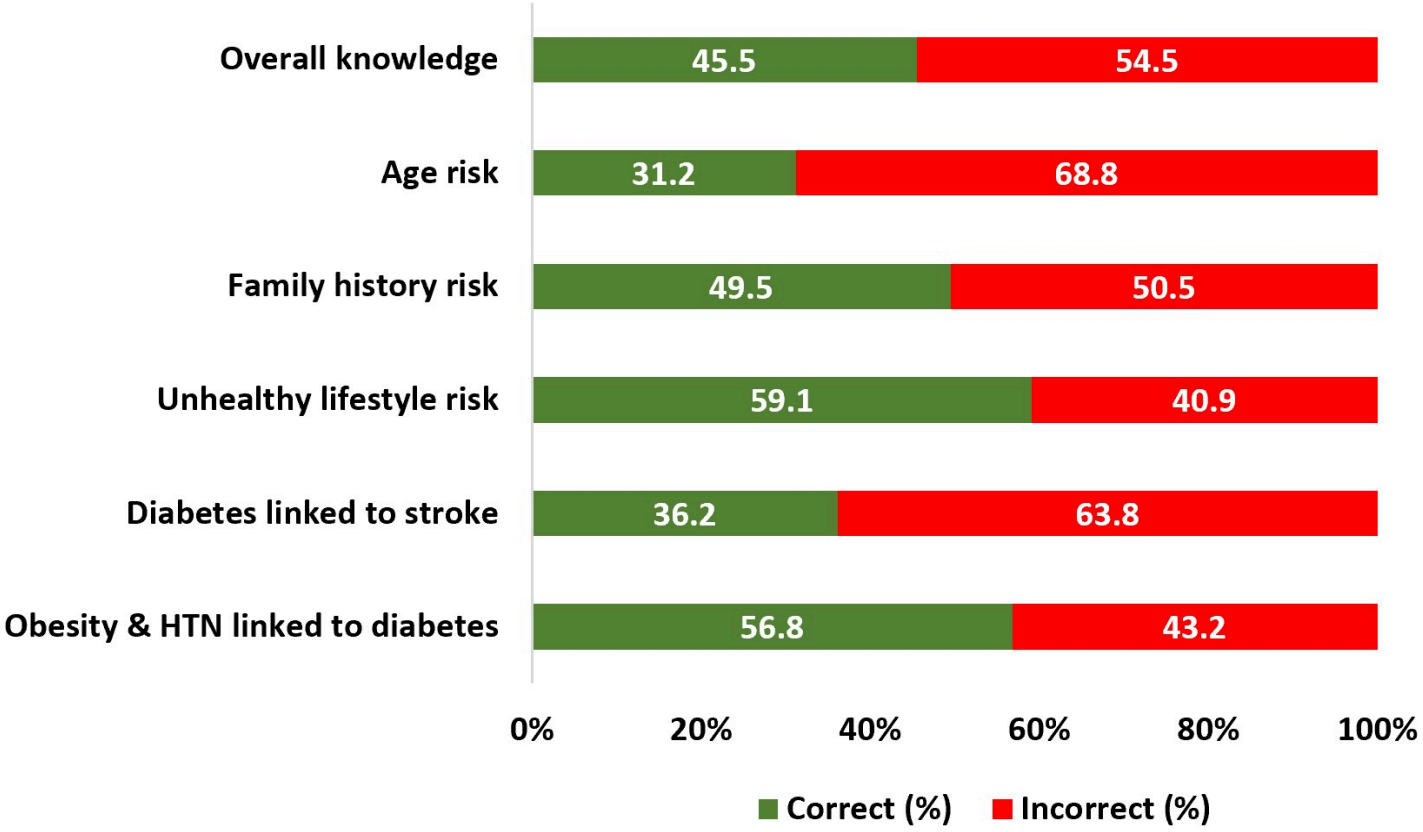


Figure 2

Knowledge of Hypertension Towards Preventive Care among Study Participants

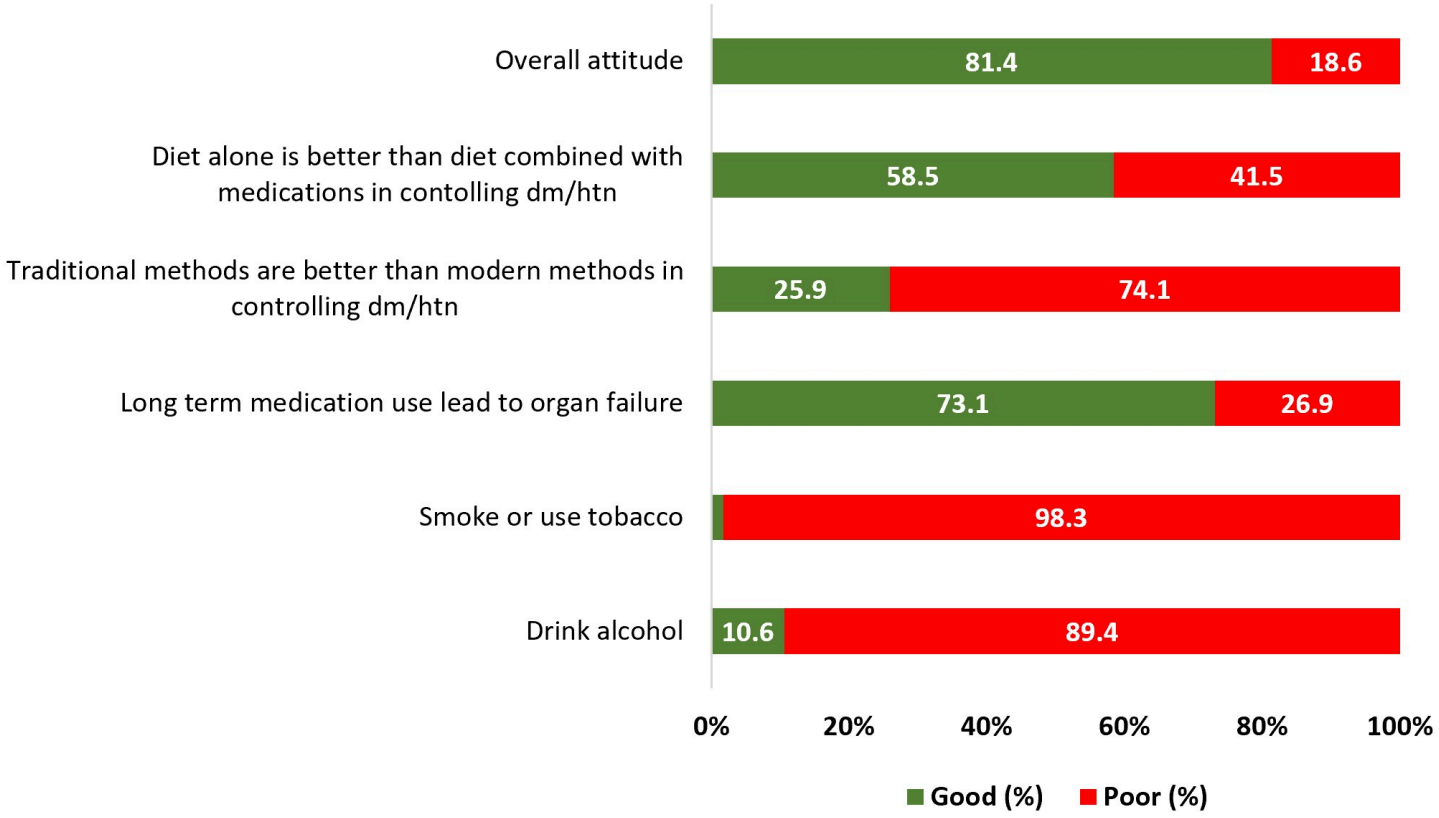


Figure 3

Attitude Towards Preventive Care practices on Diabetes and Hypertension among Study Participants

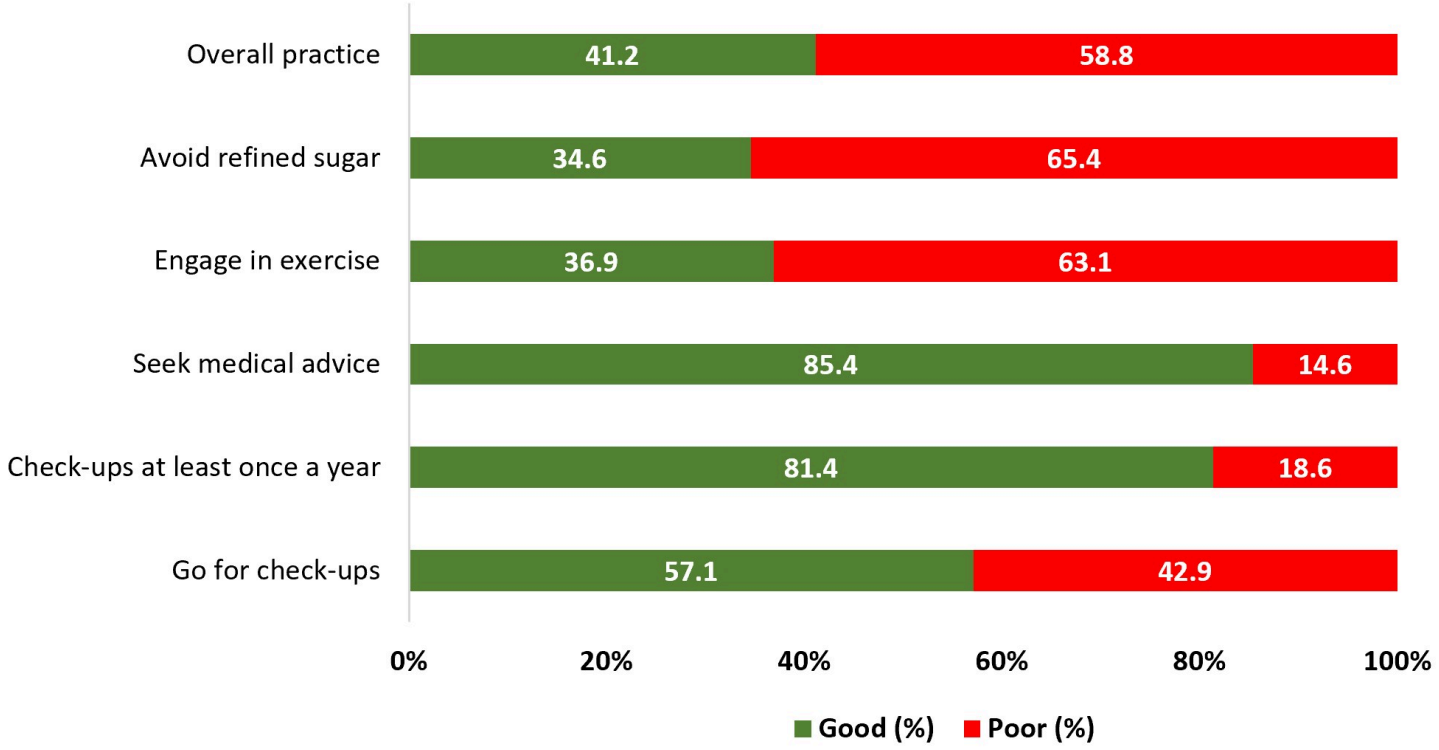


Figure 4

Preventive Care Practices among Study Participants