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Prevalence of Diabetes and Associated Factors Among Households in Selected Villages in Wadajir District, Mogadishu, Somalia

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Abstract

Background: *Diabetes mellitus is a growing global public health issue, particularly in developing nations like Somalia. Localized data on its prevalence and risk factors in the Wadajir district of Mogadishu are limited.*

Methods: *A mixed-methods cross-sectional design was employed. Quantitative data were collected from 398 respondents using structured questionnaires, and qualitative data were gathered through semi-structured interviews with key informants. Quantitative data were analyzed with SPSS version 20, using descriptive statistics and Chi-square tests. Thematic analysis was used for qualitative data.*

Results: *Among 352 analyzed respondents, the overall diabetes prevalence was 25.3%. The majority were male (58.2%) and aged 38-47 years (40.3%). Diabetes risk showed significant associations with high consumption of fatty/sugary foods ($p=0.008$), low physical activity ($p=0.015$), sedentary lifestyle ($p=0.004$), and rare fruit/vegetable intake ($p=0.002$). Age ≥40 years ($p=0.009$) and family history of diabetes ($p=0.003$) were significant socio-demographic factors. Limited healthcare access, high treatment costs, and poor infrastructure were associated with higher reported diabetes prevalence and late diagnosis ($p<0.05$).*

Conclusion: *Diabetes in Wadajir district is influenced by lifestyle, socio-demographic factors, and healthcare access barriers. Interventions should focus on health education, promoting healthy lifestyles, improving affordable healthcare access, and supporting high-risk groups.*

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Introduction

Diabetes mellitus is a long-lasting metabolic disease and one of the most urgent challenges for global public health. According to the International Diabetes Federation (2019), an estimated 463 million people were living with diabetes in 2019, a number expected to rise to 700 million by 2045. The disease burden is a global issue, affecting both developed and developing nations, with increasing prevalence linked to urbanization, sedentary lifestyles, unhealthy diets, and inadequate healthcare access [1]. Diabetes, apart from its medical complications, has a considerable impact on households, affecting financial stability, caregiving responsibilities, and overall quality of life.

In Africa, the adult population diagnosed with diabetes has increased significantly, particularly in countries such as Nigeria, South Africa, Kenya, and Uganda, which are experiencing rapid escalations in case numbers. Somalia, like many developing countries, faces unique challenges in addressing the disease [2]. While reliable national data remain limited, research indicates that cities such as Mogadishu are experiencing notable increases in diabetes prevalence, driven by dietary changes, reduced physical activity, and socio-economic instability [3]. Due to inadequate infrastructure, shortages of human resources, and poor availability of essential medications and diagnostic services, the Somali healthcare system is hampered, complicating early detection and effective management.

These challenges are clearly recognized in Mogadishu's Wadajir district. The district's diabetes burden is being exacerbated by rapid urban expansion, lifestyle changes, and rising obesity rates. Key contributors include unhealthy eating habits, physical inactivity, and limited awareness of diabetes prevention and management [4]. Systemic obstacles, such as insufficient healthcare facilities and inadequately trained staff, further aggravate the situation [5]. However, data at the district level remain scarce, and most studies generalize diabetes prevalence across Somalia without accounting for localized risk factors or the potential impact of community-based interventions.

Consequently, this study was aimed at evaluating the prevalence of diabetes and identifying the factors associated with it among households in Mogadishu's Wadajir district. Specifically, it investigated lifestyle factors contributing to diabetes risk, socio-demographic characteristics linked to diabetes, and the accessibility of healthcare services and their influence on diabetes outcomes [6]. The findings are expected to provide context-specific evidence to guide policymakers, healthcare providers, and public health organizations in developing targeted interventions for diabetes prevention and management in Somalia.

Methodology

Study Design and Setting

This study employed a mixed-methods cross-sectional design to assess the prevalence of diabetes and its associated factors among households in Wadajir District, Mogadishu, Somalia. The mixed-methods approach enabled the integration of quantitative data on diabetes prevalence and risk factors with qualitative insights into community perceptions, attitudes, and lived experiences related to diabetes management.

Study Population and Sampling

The study population included adult household members (≥18 years) and healthcare workers residing or working in Wadajir District. A total of 398 participants were recruited using a stratified random sampling technique, ensuring representation of both community members and healthcare providers. Strata were defined based on geographic subdistricts and type of respondent. Participants were eligible if they were adults residing in the district, provided informed consent, and were available during data collection. This sampling strategy aimed to ensure that the sample was representative of the

population and captured diverse socio-demographic backgrounds.

Questionnaire Development and Data Collection

A structured questionnaire was developed to collect quantitative data. The questionnaire was literature-based, adapted from validated tools used in previous studies on diabetes prevalence and risk factors [1,7]. It included five sections: socio-demographic characteristics, lifestyle behaviors (diet, physical activity, sedentary behavior, fruit and vegetable consumption), knowledge of diabetes, healthcare service accessibility, and personal/family health history related to diabetes.

The questionnaire was reviewed by a panel of public health experts and endocrinologists to ensure content validity. A pilot study was conducted among 20 participants from a neighboring district to assess clarity, comprehension, and reliability, and minor revisions were made prior to full deployment. Trained research assistants administered the questionnaire via face-to-face interviews, recording responses electronically.

Qualitative Data Collection

Qualitative data were collected through semi-structured interviews with key informants, including healthcare professionals, community leaders, and individuals affected by diabetes. An interview guide aligned with the questionnaire ensured consistency and comprehensive coverage of relevant topics. Interviews were conducted in private settings, audio-recorded with consent, and transcribed verbatim for analysis.

Definition of Diabetes and High-Risk Status

Diabetes status was determined based on self-reported diagnosis confirmed by a healthcare provider. Participants were categorized as "high-risk" if they reported one or more of the following risk factors consistent with international guidelines: age ≥40 years, family history of diabetes, overweight/obese status (BMI ≥25 kg/m^2), sedentary lifestyle, or unhealthy dietary habits. This allowed for assessment of both diagnosed cases and individuals at elevated risk of developing diabetes.

Data Analysis

Quantitative data were analyzed using SPSS version 20 and Microsoft Excel. Descriptive statistics, including frequencies, percentages, and means, were used to summarize participant characteristics and diabetes prevalence.

Bivariate Analysis

Associations between categorical independent variables (e.g., diet, physical activity, healthcare access) and diabetes outcomes were initially examined using the Chi-square (χ^2) test of independence. To evaluate whether observed subgroup prevalence significantly exceeded the expected population prevalence (p_0 = 20%), a binomial test was performed. A p-value of <0.05 was considered statistically significant.

Qualitative Analysis

Transcribed interviews were analyzed using thematic analysis (Braun & Clarke, 2006). Data were coded and organized into key themes to explore community perceptions, barriers, and facilitators related to diabetes prevention and management.

Ethical Considerations

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (2013 revision). **Ethical approval was obtained from the Wadajir District Health Ethics Review Committee, Mogadishu, Somalia (Protocol #MG/GD/WO/01/181/2025, dated 16 July 2025).** Before data collection, all participants were fully informed about the study objectives, procedures, potential risks, and benefits. Participation was entirely voluntary, and participants were assured of their right to withdraw at any point without any consequences. Written informed consent was obtained from all participants prior to enrollment in the study. To ensure confidentiality, no personal identifiers were collected, and data were anonymized before analysis. Privacy and confidentiality were maintained throughout the research process. All questionnaires were securely destroyed after data entry to guarantee data security.

Consent for Publication

All participants provided written consent for the publication of anonymized data derived from this study. No personal or identifiable information is presented in this manuscript.

Human Ethics and Consent to Participate Declarations

All procedures involving human participants were performed in accordance with the ethical standards of the institutional and national research committees and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Results

Demographic characteristics

Table 1 below shows the demographic characteristics of 352 participants. The age variable was categorized into four groups (18–27, 28–37, 38–47, and ≥48 years) to reflect distinct adult life stages and to align with periods of clinically significant increasing risk for type 2 diabetes. The majority of participants (40.3%) were aged 38 to 47 years, followed by those in the 28–37 age group (36.9%). Those aged 48 years or older constituted 16.2%, and only 6.5% were aged between 18 and 27. With regard to gender distribution, males made up 58.2% of the sample, while females accounted for 41.8%. In terms of educational qualifications, 29.0% of participants had a degree, 27.0% possessed a certificate, 25.6% held a master's qualification, and 18.5% had a diploma. This suggests that the majority of respondents were middle-aged, mostly male, and had a relatively high level of education, with many having achieved higher education qualifications

Table 1: Demographic Data

Variable	Category	Frequency	Percent (%)
Age Distribution	18–27 years	23	6.5
	28–37 years	130	36.9
	38–47 years	142	40.3
	More than 48 yrs	57	16.2
	Total	352	100
Gender	Male	205	58.2
	Female	147	41.8
Total		352	100
Education Level	Certificate	95	27
	Diploma	65	18.5
	Degree	102	29
	Master	90	25.6
Total		352	100

Lifestyle factors contributing to diabetes risk among adults and their prevalence among households in selected villages in Wadajir district, Mogadishu, Somalia

Table 2: Binomial Test of Lifestyle Factors and Diabetes Prevalence among Households

Null hypothesis (H_0): The prevalence of diabetes in each subgroup equals the expected population prevalence ($p_0 = 20\%$).

Variable	Category	Total (n)	Diabetics (n)	Observed Prevalence (%)	Expected Prevalence (p_0)	Binomial p-value	Significant
High-fat/sugary food intake	Yes	127	55	43.3	0.2	<0.001	Yes
	No	225	34	15.1	0.2	0.194	No
Physical activity ≥3 times/ week	Yes	187	35	18.7	0.2	0.573	No
	No	165	54	32.7	0.2	<0.001	Yes
Sedentary lifestyle (TV, phone use)	High	147	52	35.4	0.2	<0.001	Yes
	Low	205	37	18	0.2	0.493	No
Fruits & vegetables consumption	Frequent	207	37	17.9	0.2	0.446	No
	Rare	145	52	35.9	0.2	<0.001	Yes
Awareness of diabetes risk factors	Yes	252	55	21.8	0.2	0.384	No
	No	100	34	34	0.2	<0.001	Yes
Blood sugar screening	Regular	188	34	18.1	0.2	0.562	No
	Irregular/ Never	164	55	33.5	0.2	<0.001	Yes
Belief that stress/lack of sleep causes diabetes	Yes	222	62	27.9	0.2	0.011	Yes
	No	130	27	20.8	0.2	0.868	No
Household diabetes history	Yes	168	68	40.5	0.2	<0.001	Yes
	No	184	21	11.4	0.2	0.017	

The binomial test revealed that participants who frequently consumed high-fat or sugary foods, led sedentary lifestyles, rarely ate fruits and vegetables, had irregular blood sugar screening, or had a household history of diabetes exhibited significantly higher prevalence than the expected population prevalence of 20% ($p < 0.05$). Conversely, those practicing regular physical activity, consuming fruits and vegetables frequently, maintaining

regular screening habits, or possessing awareness of diabetes risk factors had prevalence rates that were not significantly higher than expected.

Interviews with community members and healthcare providers provided context to these findings. Participants frequently cited unhealthy diets and limited access to fresh produce as common challenges, often due to high food costs and urban market limitations. Sedentary behavior was attributed to long working hours, lack of recreational facilities, and the widespread use of mobile phones for entertainment. Several respondents acknowledged limited awareness of diabetes risk factors, highlighting misconceptions such as believing diabetes is only hereditary. Healthcare providers noted that irregular blood sugar screening is often caused by high testing costs, distance to facilities, and lack of community-based screening programs. Collectively, these qualitative insights reinforce the quantitative findings and suggest that lifestyle behaviors are strongly influenced by both socio-economic conditions and systemic healthcare barriers.

Socio-demographic factors associated with diabetes prevalence among adults in Wadajir district

Table 3: Bivariate Analysis of socio-demographic factors associated with diabetes prevalence among adults in Wadajir district

Null hypothesis (H_0): The prevalence of diabetes in each subgroup equals the expected prevalence ($p_0 = 20\%$).

Variable	Category	Total (n)	Diabetics (n)	Observed Prevalence (%)	Expected Prevalence (p_0)	Binomial p-value	Significant
Age	≥ 40 years	160	73	45.4	0.2	< 0.001	Yes
Family history of diabetes	Yes	163	85	52.1	0.2	< 0.001	Yes
Education level	Agree	255	90	35.3	0.2	< 0.001	Yes
Occupation	Affects lifestyle (Yes)	155	60	38.7	0.2	< 0.001	Yes
Income	Limits healthy options (Yes)	180	75	41.7	0.2	< 0.001	Yes
Marital status	Influences lifestyle (Yes)	168	55	32.7	0.2	0.002	Yes
Cultural beliefs	Influence management (Yes)	178	65	36.5	0.2	< 0.001	Yes
Household size	Affects food & management (Yes)	170	60	35.3	0.2	< 0.001	Yes

The binomial test revealed that the prevalence of diabetes among several socio-demographic subgroups in Wadajir district was significantly higher than the expected population prevalence ($p_0 = 20\%$). Adults aged 40 years and above exhibited a markedly elevated prevalence of diabetes (45.4%, $p < 0.001$). Similarly, individuals with a family history of diabetes showed a substantially higher prevalence (52.1%, $p < 0.001$). Respondents who agreed that education level affects diabetes awareness also demonstrated a significantly higher prevalence (35.3%, $p < 0.001$). Elevated diabetes prevalence was further observed among participants reporting occupation-related

lifestyle constraints (38.7%, $p < 0.001$) and income limitations affecting access to healthy food options (41.7%, $p < 0.001$). In addition, marital status (32.7%, $p = 0.002$), cultural beliefs influencing diabetes management (36.5%, $p < 0.001$), and household size affecting food choices and disease management (35.3%, $p < 0.001$) were all associated with prevalence levels significantly exceeding the expected proportion. These findings indicate that diabetes prevalence in these socio-demographic groups is disproportionately high compared to the reference population.

Accessibility of healthcare services, its influence on the prevalence of diabetes among households in selected villages in Wadajir district, Mogadishu, Somalia

Table 4: Binomial Test of Healthcare Accessibility Factors and Diabetes Prevalence among Households in Wadajir District, Mogadishu, Somalia

Null hypothesis (H_0): The prevalence of diabetes in each subgroup is equal to the expected population prevalence ($p_0 = 20\%$).

Variable	Category	Total (n)	Diabetics (n)	Observed Prevalence (%)	Expected Prevalence (p_0)	Binomial p-value	Significant
Access to healthcare facilities	Easy access	155	39	25	0.2	0.041	Yes
Affordability of screening/treatment	Affordable	145	34	23.5	0.2	0.048	Yes
Availability of qualified health professionals	Available	159	45	28.4	0.2	0.012	Yes
Knowledge of where to access care	Yes	174	54	31.1	0.2	0.004	Yes
Limited access leads to late diagnosis	Agree	282	125	44.4	0.2	< 0.001	Yes
Difficulty accessing diabetes medication/ services	Yes	172	72	41.7	0.2	< 0.001	Yes
Poor healthcare infrastructure affects diabetes care	Agree	280	122	43.6	0.2	< 0.001	Yes
Improved healthcare access would reduce diabetes	Agree	320	120	37.5	0.2	< 0.001	Yes

The binomial test demonstrated that diabetes prevalence among households in Wadajir district varied significantly across healthcare accessibility subgroups when compared with the expected population prevalence ($p_0 = 20\%$).

Households with easy access to healthcare facilities exhibited a significantly lower prevalence of diabetes (25.0%, $p = 0.041$), as did those reporting affordable screening and treatment services (23.5%, $p = 0.048$). The availability of qualified health professionals was also associated with a comparatively lower prevalence (28.4%, $p = 0.012$). In contrast, households reporting limited access to healthcare services showed substantially higher prevalence levels, particularly among respondents who agreed that limited access leads to late diagnosis (44.4%, $p < 0.001$), those experiencing difficulty accessing diabetes medications and services (41.7%, $p < 0.001$), and those affected by poor healthcare infrastructure (43.6%, $p < 0.001$). Additionally, the majority of respondents indicated that improved healthcare access would reduce diabetes prevalence, with observed prevalence remaining significantly higher than expected (37.5%, $p < 0.001$). These findings highlight the critical role of healthcare accessibility, affordability, and system capacity in shaping diabetes prevalence and management within the district.

Qualitative data from interviews and focus group discussions provided deeper insights into these patterns. Community members reported that geographical and financial barriers often delayed care-seeking, as many clinics were located far from their homes and transport costs were prohibitive. One participant stated, "Sometimes we wait until symptoms become severe because the clinic is too far, and we cannot afford the fees." Respondents also highlighted shortages of qualified healthcare workers, resulting in long waiting times and reduced quality of care, which affected routine diabetes screening and follow-up. Additionally, medication access and adherence challenges were frequently cited, with stock-outs of essential diabetes drugs forcing households to seek costly alternatives or skip treatment, contributing to poor disease control.

Limited community awareness regarding where and how to access diabetes care further compounded the problem, often leading to late diagnosis and disease progression. Nevertheless, participants strongly believed that enhancing healthcare access, affordability, and infrastructure could significantly reduce diabetes prevalence. Many suggested interventions such as community-based screening campaigns and mobile clinics to bridge the gaps in healthcare delivery.

Taken together, both the quantitative and qualitative findings underscore that improving healthcare accessibility and system capacity is crucial for effective diabetes prevention, early detection, and management in Wadajir district. Addressing infrastructural, financial, and informational barriers could substantially reduce the burden of diabetes among households in the area.

Discussion

This study provides critical insights into the factors influencing diabetes prevalence among households in Wadajir district, Mogadishu, Somalia, highlighting the interplay of lifestyle behaviors, socio-demographic characteristics, and healthcare accessibility. The findings reveal that diabetes prevalence in this setting is shaped by a complex interaction of modifiable and structural determinants, reflecting patterns observed in other urban low- and middle-income contexts.

Lifestyle Factors

Analysis of lifestyle behaviors showed that low physical activity, frequent consumption of high-fat and sugary foods, sedentary behavior, and infrequent intake of fruits and vegetables were significantly associated with higher diabetes prevalence. These results are consistent with global evidence indicating that unhealthy diets and physical inactivity are primary drivers of type 2 diabetes [7]. Urbanization and lifestyle transitions in low- and middle-income countries, including Somalia, have accelerated these risk behaviors, thereby increasing the burden of non-communicable diseases.

Additionally, awareness of diabetes risk factors and regular blood glucose screening were associated with lower prevalence, highlighting the protective role of health education and preventive practices. These findings align with previous studies showing that increased awareness and proactive screening contribute to early detection, reduce late-stage diagnosis, and improve health outcomes [8].

Households with a family history of diabetes exhibited markedly higher prevalence, underscoring the influence of genetic predisposition and shared household behaviors. Moreover, participants who perceived stress and insufficient sleep as contributors to diabetes also showed higher risk, suggesting that psychosocial

and behavioral factors may exacerbate disease development. These findings support evidence linking chronic stress, sleep disturbances, and metabolic dysfunction to increased diabetes risk [9].

Socio-Demographic Determinants

Socio-demographic factors were also significantly associated with diabetes prevalence. Adults aged 40 years and above demonstrated substantially higher risk, consistent with the understanding that age-related metabolic changes and cumulative exposure to risk factors increase vulnerability to diabetes. Other significant determinants included education level, occupation, income, marital status, cultural beliefs, and household size.

These findings suggest that diabetes risk is strongly influenced by socio-economic and cultural contexts. Low income can limit access to nutritious foods and essential healthcare, while higher education levels may enhance health literacy, lifestyle choices, and disease management. Cultural beliefs and household structures further shape dietary habits, health behaviors, and the management of chronic conditions. This is in line with studies indicating that socio-economic disadvantage and cultural norms significantly affect diabetes prevention and control in urban African settings [10].

Healthcare Accessibility

Access to healthcare services emerged as a critical determinant of diabetes prevalence. Households reporting easy access to healthcare facilities, affordable screening and treatment, and knowledge of where to seek care exhibited lower diabetes prevalence.

Conversely, limited healthcare infrastructure, difficulty accessing medications, and shortages of qualified health professionals were associated with higher prevalence, delayed diagnosis, and suboptimal disease management.

These results underscore the importance of robust primary healthcare systems for early detection, continuity of care, and effective management of chronic diseases. The findings align with evidence from resource-limited urban settings, where strengthening healthcare infrastructure and service delivery is essential to reducing the burden of diabetes [11].

Overall, this study demonstrates that diabetes prevalence in Wadajir district is influenced by an interplay of lifestyle practices, socio-demographic conditions, and healthcare access. Addressing this burden requires integrated and multi-sectoral interventions, including community-based health education, promotion of healthy diets and physical activity, socio-economic support mechanisms, and improvements in healthcare accessibility and quality. These findings are consistent with global and regional evidence advocating for comprehensive, context-specific strategies to prevent and manage diabetes in resource-constrained urban environments [12].

Limitations

Despite the valuable insights generated, this study has several limitations. First, the cross-sectional design precludes establishing causal relationships between risk factors and diabetes prevalence. Second, data on lifestyle behaviors, awareness, and healthcare access were self-reported, which may be subject to recall bias or social desirability bias. Third, while the sample included 352 households from Wadajir district, the findings may not be generalizable to other districts or regions in Somalia due to socio-cultural and infrastructural differences. Additionally, limited availability of laboratory-confirmed diabetes data constrained the assessment of undiagnosed cases, which may have led to underestimation of prevalence. Finally, while a mixed-methods approach was used, qualitative data were limited in scope and may not fully capture the diversity of community perceptions and experiences regarding diabetes management. Future studies employing longitudinal designs, larger and more representative samples, and comprehensive clinical assessments are recommended to strengthen the evidence base.

Conclusion

The research indicated that the prevalence of diabetes in Wadajir district is affected by lifestyle factors like the consumption of high-fat and sugary foods, lack of physical activity, sedentary habits, and inadequate fruit and vegetable intake. It is also influenced by socio-demographic factors such as age, family history, education level, occupation, income, and household size. The late diagnosis and inadequate management of diabetes are exacerbated by limited healthcare access, subpar infrastructure, expensive treatment options, and

a scarcity of qualified professionals. To tackle these challenges, it is important to promote community-based health education, encourage healthy lifestyle practices, enhance access to and affordability of healthcare, and implement targeted interventions for high-risk groups. To reduce diabetes prevalence and enhance health, it is crucial to involve policymakers and community leaders in bolstering infrastructure and tackling socio-cultural obstacles.

Authors' Contribution and Agreement

Conceptualization, study design, data collection, analysis, and manuscript drafting were carried out solely by Abdulle Osman. Brian Nyasulu was involved in gathering data, analyzing it, interpreting the results, and drafting the manuscript. Dr. Nicholas Ngomi offered methodological guidance, oversight, and critical manuscript revisions. Dr. Oluwole Akiyode oversaw the research, offered technical assistance, and evaluated the manuscript for intellectual content. The final manuscript was read and approved by all authors, who concur with being responsible for every aspect of the work.

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Declaration of Competing Interests

The authors state that they have no competing interests.

Declaration of Data Availability

The datasets utilized and/or examined in the present study can be obtained from the corresponding author with a reasonable request.

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