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Community-Based Screening of Hyperglycemia and Hypoglycemia Among Adult Men in Herat City, Afghanistan

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ABSTRACT

Background and Objective: Community-based data on glycemic abnormalities in Afghanistan remain limited. This study assessed the prevalence and district-level distribution of diabetes-range glucose values and hypoglycemia among adult men screened in community health camps in Herat city, Afghanistan.

Method: A cross-sectional community-based screening survey was conducted in Herat city from 16 to 19 November 2025. Adult male volunteers aged ≥18 years were recruited through walk-in screening camps advertised via social media and printed posters. Capillary blood glucose was measured using a portable glucometer. Participants were classified according to self-reported fasting status as fasting blood sugar (FBS) or random blood sugar (RBS) groups. Descriptive statistics and appropriate non-parametric tests, including Shapiro–Wilk, Mann–Whitney U, Kruskal–Wallis, Dunn's post hoc, chi-square, Fisher's exact, and unadjusted logistic regression analyses, were performed.

Findings/ Result: Among 1,009 adult males screened, 418 (41.4%) underwent FBS testing and 591 (58.6%) RBS testing. Glucose values were non-normally distributed in both groups, and RBS values were significantly higher than FBS values ($U = 162{,}552.5$, $p < 0.001$). Diabetes-range glucose values were identified in 10.29% of FBS and 9.14% of RBS participants. Prediabetes/impaired glucose was more common in the FBS group than the RBS group (19.6% vs. 6.8%). Screening method was significantly associated with glycemic category ($\chi^2(2) = 39.90$, $p <$

0.001). District 2 had higher RBS-based hyperglycemia than District 1 (OR = 3.06, 95% CI: 1.76–5.32, $p < 0.001$), whereas no significant district differences were observed for FBS-defined diabetes-range values. Hypoglycemia occurred in 19 participants (1.9%), exclusively in the fasting group (4.5% vs. 0.0%, $p < 0.001$), with no significant district variation.

Conclusion: Community screening identified a substantial burden of glycemic abnormalities among adult men in Herat, with approximately one in ten showing diabetes-range glucose values. Screening method influenced glycemic classification, and district-level variation was observed for RBS-based hyperglycemia. These findings support targeted community-based screening and follow-up.

Keywords: Hyperglycemia; Hypoglycemia; Diabetes screening; Prediabetes; Afghanistan; Herat

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غربالگری جامعه‌محور هایپرگلایسمی و هیپوگلایسمی در میان مردان بالغ شهر هرات، افغانستان

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چکیده

زمینه و هدف: اطلاعات جامعه‌محور درباره اختلالات گلوکوز خون در افغانستان محدود است. این مطالعه با هدف بررسی شیوع و توزیع ناحیه‌ای مقادیر گلوکوز در محدوده دیابت و هیپوگلایسمی در میان مردان بالغ شهر هرات انجام شد.

روش: این مطالعه مقطعی و جامعه‌محور از ۱۶ تا ۱۹ نوامبر ۲۰۲۵ در شهر هرات انجام شد. مردان بالغ ۱۸ سال و بالاتر از طریق کمپ‌های غربالگری جامعه‌محور جذب شدند. گلوکوز خون مویرگی با گلوکومتر اندازه‌گیری و افراد بر اساس وضعیت ناشتا بودن گزارش‌شده، در گروه‌های قند خون ناشتا (FBS) و قند خون تصادفی (RBS) طبقه‌بندی شدند. برای تحلیل داده‌ها از آزمون‌های شاپیرو–ویلک، من–ویتنی یو، کروسکال–والیس، دان، کای‌دو، دقیق فیشر و رگرسیون لوژستیک غیرتعدیل‌شده استفاده شد.

یافته‌ها: از میان ۱۰۰۹ مرد بالغ، ۴۱۸ نفر (۴۱٫۴٪) تحت آزمایش FBS و ۵۹۱ نفر (۵۸٫۶٪) تحت آزمایش RBS قرار گرفتند. توزیع گلوکوز در هر دو گروه غیرنرمال بود و مقادیر RBS به‌طور معناداری بالاتر از FBS بود ($U = 162,552.5$، $p < 0.001$). مقادیر گلوکوز در محدوده دیابت در ۱۰٫۲۹٪ از گروه FBS و ۹٫۱۴٪ از گروه RBS مشاهده شد. پیش‌دیابت/اختلال گلوکوز در FBS بیشتر از RBS بود (۱۹٫۶٪ در برابر ۶٫۸٪؛ $p < 0.001$). روش غربالگری با وضعیت گلیسمیک ارتباط معنادار داشت ($\chi^2(2) = 39.90$، $p <$

0.001). ناحیه ۲ در مقایسه با ناحیه ۱، هایپرگلایسمی مبتنی بر RBS بیشتری داشت، درحالی‌که تفاوت ناحیه‌ای در مقادیر دیابت‌محدوده FBS معنادار نبود. هیپوگلایسمی در ۱۹ نفر (۱،۹٪) مشاهده شد و فقط در گروه ناشتا رخ داد (۴،۵٪ در برابر ۰،۰٪؛ $p < 0.001$).

نتیجه‌گیری: غربالگری جامعه‌محور، بار قابل‌توجهی از اختلالات گلوکوز خون را در مردان بالغ شهر هرات نشان داد؛ به‌طوری‌که تقریباً یک نفر از هر ده نفر دارای مقادیر گلوکوز در محدوده دیابت بود. تفاوت روش غربالگری و برخی تفاوت‌های ناحیه‌ای، ضرورت غربالگری هدفمند و پیگیری افراد دارای مقادیر غیرطبیعی گلوکوز را نشان می‌دهد.

کلیدواژه‌ها: هایپرگلایسمی، هیپوگلایسمی، اسکرینینگ دیابت، پیش‌دیابت، افغانستان، هرات.

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Introduction

Of the 537 million adults estimated to be living with diabetes in 2021 a figure projected to reach 783 million by 2045 the overwhelming majority of new cases are emerging in low and middle-income countries, where the conditions that accelerate disease progression are also those that most severely limit the capacity to respond [1]. This increase is disproportionately concentrated in low- and middle-income countries (LMICs), where health systems face substantial constraints in diagnosis, long-term management, and complication prevention [1]. In conflict-affected settings, these challenges are intensified by health system disruption, population displacement, and weakened surveillance systems, resulting in underestimation of disease burden and delayed policy response [2]. These conditions create a convergence of structural and biological risks that accelerate the progression and complications of chronic diseases such as diabetes.

Afghanistan represents a critical example of this convergence. Decades of conflict, economic instability, and limited healthcare infrastructure have contributed to a severe humanitarian crisis. As of April 2023, approximately 40% of the population was experiencing Crisis or Emergency levels of food insecurity (Phase 3+), with urban populations increasingly affected [3]. While communicable diseases have historically dominated health priorities, non-communicable diseases are now emerging as a significant and under-addressed burden. A national systematic review estimated the prevalence of diabetes at 12.13% (95% CI: 8.86–16.24%) among Afghan adults [4], and re-analysis of national STEPS data reported a prevalence of 11.07% among individuals aged 18–69, with urban residence identified as an independent risk factor [5]. Studies from major cities such as Kabul and Kandahar report even higher prevalence rates, suggesting that the urban burden of diabetes may substantially exceed national estimates [6,7].

Herat city, the third largest urban center in Afghanistan and a key economic hub, has had no district-level glycemic data generated in the decade since the 2015 STEPS survey, despite substantial demographic change, internal displacement, and worsening economic conditions. The only available population-level data on glycemic status in Herat comes from the 2015 WHO STEPS survey, which reported a diabetes prevalence of 9.9% [8]. Since then, the city has undergone significant demographic shifts, including population growth, internal displacement, and worsening economic conditions, all of which are likely to influence metabolic health. Despite these changes, no recent or district-level data are available to assess intra-urban variation in glycemic risk. This gap is important, as evidence from comparable settings shows that non-communicable disease risk is not evenly distributed within cities but instead reflects localized differences in socioeconomic status, food access, and healthcare availability. In a city that has absorbed some of Afghanistan's largest internally displaced populations, with marked socioeconomic variation across districts, city-wide estimates cannot substitute for the spatial granularity needed to direct limited public health resources effectively.

Within this context of widespread food insecurity, glycemic risk extends beyond hyperglycemia alone. Irregular access to food and poor dietary quality contribute to glycemic instability, increasing the risk of hypoglycemia, particularly among vulnerable populations. Irregular access to food and poor dietary quality contribute to glycemic instability through disrupted meal timing, inadequate carbohydrate intake, and impaired counterregulatory responses [9], increasing the risk of hypoglycemia, particularly among vulnerable populations. Food-insecure individuals have been shown to have significantly higher rates of hypoglycemia-related emergency department visits (RR = 2.2), underscoring the clinical importance of this often-overlooked condition in nutritionally vulnerable populations[10]. The coexistence of hyperglycemia and hypoglycemia within the same population reflects a dual metabolic burden that is not adequately captured by conventional screening approaches focused solely on elevated glucose levels.

To address the lack of recent and spatially disaggregated data, this study examined the burden of dysglycemia in Herat city, Afghanistan. By generating district-level evidence in a conflict-affected and food-insecure urban setting, the study provides information that may support more targeted and context-sensitive approaches to non-communicable disease prevention and control.

Materials and Methods

Study Design and Setting

A cross-sectional, community-based diabetes screening survey was conducted in Herat, Afghanistan, from 16 to 19 November 2025. The study employed a camp-based approach designed to screen adult male residents for abnormal blood glucose levels. This camp-based screening approach was intended for case detection and glycemic risk profiling rather than diagnostic confirmation or population-representative prevalence estimation.

Three districts of Herat city were selected for implementation. District selection was based on population size, the level of daily commercial and pedestrian activity, and accessibility for large-scale community outreach in order to maximize participation and enhance participation across diverse urban settings.

Recruitment and Participants

Participants were recruited through a walk-in volunteer approach. Prior to data collection, screening camps were advertised through social media platforms and printed posters announcing the locations and dates of the camps across three screening sites in Herat city: District 1 (Sarak-e-Wilayat), District 2 (Darb-e-Khoshk), and District 3 (Tank-e-Markaz). These labels were assigned according to the locations where the screening camps were conducted and are used throughout the manuscript for consistency.

Eligible participants were adult males aged 18 years or older who were residents of Herat city, voluntarily attended the screening camps, and provided verbal informed consent. The screening program included only adult males due to government-imposed restrictions on conducting mixed-gender public health activities at the time of data collection. As a result, female residents were not eligible for participation, and the findings cannot be generalized to women in Herat city. No formal sample size calculation was performed, as the study was designed to screen all eligible volunteers attending the community camps during the study period. All eligible volunteers attending the screening camps during the four-day data collection period were included in the analysis.

Screening Procedure and Instrument

Blood glucose testing was performed using a portable glucometer (On Call Plus Code Free Blood Glucose Meter, REF G115-12B-201, model OGM-421). Measurements included both fasting blood sugar (FBS) and random blood sugar (RBS), assigned based on participant-reported fasting status. Participants who reported fasting for a minimum of 8–12 hours prior to testing underwent FBS measurement; all others underwent RBS measurement. Fasting status was based on participant self-report and was not independently verified. Capillary whole blood samples were obtained via a finger-prick technique from the right hand, using the third and fourth digits, and were analyzed immediately at the screening site. The device was calibrated to provide plasma-equivalent glucose values to ensure measurement comparability with standard laboratory references. The glucometers were checked daily at each camp site using manufacturer-provided control solutions at low and high glucose ranges, and devices were recalibrated when readings fell outside acceptable limits. Single-point glucose measurements were obtained for most participants due to the field-based screening context; however, glucose values in the prediabetic and diabetes-range were immediately repeated using the same device for confirmation, and the confirmatory reading was recorded for analysis.

Training of Test Administrators

Screening procedures were conducted by volunteer medical graduates who completed a two-day standardized training program prior to data collection. The training covered proper glucometer use and calibration, infection control measures, correct finger-prick technique, informed consent procedures, and accurate recording of results. This training protocol was implemented to maintain procedural consistency and measurement reliability across all screening locations.

Measures

Primary Outcome (Dependent Variable

The primary outcome variable was blood glucose status, assessed both as a continuous glucose value measured in milligrams per deciliter (mg/dL) and as a categorical clinical classification. Participants were categorized into normal, prediabetes/impaired, or diabetes-range groups based on established clinical thresholds.

Diabetes was defined as a fasting blood sugar value of 126 mg/dL or higher or a random blood sugar value of 200 mg/dL or higher. Prediabetes or impaired glucose was defined as fasting blood sugar values between 100 and 125 mg/dL or random blood sugar values between 140 and 199 mg/dL. These thresholds were used for community-based glycemic risk stratification in the screening setting. Values below these thresholds were classified as normal in accordance with standard clinical criteria.

Hypoglycemia was defined as a blood glucose value below 70 mg/dL, irrespective of fasting or random testing status.

Independent Variables

The principal independent variables included the type of glucose test performed (fasting versus random) and the district in which the screening was conducted (Districts 1, 2, and 3). District-level subgroup analyses were prespecified to evaluate geographic variation in glycemic abnormalities across screening locations.

Data Management and Statistical Analysis

All collected data were entered and analyzed using the IBM SPSS Statistics software package (Version 29.0). Descriptive statistical measures were calculated for both continuous glucose values and categorical glycemic classifications according to test type and district. Exact binomial 95% confidence intervals were calculated for key reported prevalence and proportion estimates. Continuous variables were summarized using means, standard deviations, medians, interquartile ranges, and observed minimum and maximum values where appropriate.

The normality of continuous glucose distributions was evaluated using the Shapiro–Wilk test. Because the distributions were found to be non-normal, the Mann–Whitney U test was employed to compare fasting and random glucose values. Differences in continuous glucose levels across districts were examined using the Kruskal–Wallis test, and statistically significant findings were further explored through Dunn’s post-hoc pairwise comparisons with Bonferroni correction.

Associations between categorical variables, including glycemic classification and district of screening, were assessed using Pearson’s chi-square tests. When expected cell counts were less than five, Fisher’s Exact Test was used instead of the chi-square test. Binary logistic regression models were constructed to estimate odds ratios and corresponding 95% confidence intervals for (a) hyperglycemia (prediabetes and diabetes combined) and (b) diabetes-range classifications across districts. Binary logistic regression models were constructed to estimate odds ratios and corresponding 95% confidence intervals for (a) hyperglycemia (prediabetes and diabetes combined) and (b) diabetes-range classifications across districts. All logistic regression models were unadjusted and report crude odds ratios because key covariates (e.g., age, body mass index, family history of diabetes, medication use, and prior diagnosis) were not systematically collected in this screening context.

Ethical Considerations

Ethical approval for this community-based diabetes screening study was obtained from the Institutional Review Board of Ghalib University (Afg-gh.U.H-R.E.C. 2026-0049). Verbal informed consent was obtained from all participants prior to blood glucose testing at the screening camps. Participant confidentiality and anonymity were strictly preserved during data collection, entry, and analysis, and no personally identifiable information was recorded. All study procedures, including finger-prick blood sampling and result counseling, were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki [11]. Participants with glucose values in the diabetic range were informed of their results, counseled on lifestyle modification, and advised to seek further medical evaluation at local health facilities for confirmatory testing and management.

RESULTS

1. Study Sample and Descriptive Statistics

A total of 1,009 adult males were screened during community health camps in Herat city. Based on self-reported fasting status, 418 (41.4%) participants underwent fasting blood sugar (FBS) testing and the remaining 591 (58.6%) underwent random blood sugar (RBS) testing.

Table 1. Descriptive Statistics of Blood Glucose Levels

Test Type	N	Mean (mg/dL)	SD	Median	IQR	Min	Max
FBS	418	93.9	28.0	85.0	29.8	67.0	323.0
RBS	591	120.9	78.3	96.0	38.0	70.0	983.0

Note: All glucose values are reported as plasma-equivalent concentrations.

2. Distribution and Group Comparison

Blood glucose values were not normally distributed in either group (Shapiro–Wilk test: FBS $p < 0.001$; RBS $p < 0.001$). Consequently, the Mann–Whitney U test was used for group comparison. RBS values were significantly higher than FBS values ($U = 162{,}552.5$, $p < 0.001$).

3. Prevalence of Elevated Blood Glucose

Glucose levels in the diabetes range (FBS ≥ 126 mg/dL; RBS ≥ 200 mg/dL) were detected in both screening groups (Table 2).

Table 2. Prevalence of Elevated Blood Glucose Levels by Screening Test

Test Type	**Elevated (%)**	**95% CI**
FBS	10.29%	7.73% – 13.57%
RBS	9.14%	7.07% – 11.73%

Overall, approximately one in ten screened participants had glucose values within the diabetic range in this camp-based screening sample.

4. Clinical Risk Classification

Participants were categorized into clinically relevant glycemic risk groups (Table 3).

Table 3. Clinical Categories by Screening Test

Test Type	Diabetes (n)	Impaired / Prediabetes (n)	Normal (n)
FBS	43 (10.3%)	82 (19.6%)	293 (70.1%)
RBS	54 (9.1%)	40 (6.8%)	497 (84.1%)

A significant association was observed between screening method and glycemic category ($\chi^2(2) = 39.90$, $p < 0.001$), indicating substantial differences in clinical classification outcomes between fasting and random screening conditions.

5. District-Wise Comparison of Continuous Glucose Levels

Given the non-normal distribution of glucose values across districts, the Kruskal–Wallis test was applied.

FBS: No statistically significant difference in glucose levels was observed across districts ($\chi^2 = 2.53$, $p = 0.282$).

RBS: A statistically significant difference was observed across districts ($\chi^2 = 16.79$, $p < 0.001$).

Post-hoc Dunn tests with Bonferroni adjustment showed that District 2 had significantly different RBS values compared with both District 1 ($p = 0.001$) and District 3 ($p < 0.001$). No significant difference was observed between Districts 1 and 3 ($p = 0.798$).

6. District-Wise Distribution of Elevated Glucose

Of the 1,009 participants included in the study, 395 (39.1%) were from District 1, 392 (38.9%) from District 2, and 222 (22.0%) from District 3.

FBS Hyperglycemia (Prediabetes + Diabetes, FBS ≥ 100 mg/dL)

Participants in District 2 had lower odds of FBS-defined hyperglycemia compared with District 1 (OR = 0.55, 95% CI: 0.30–0.99, $p = 0.047$). The contrast between District 3 and District 1 was not statistically significant (OR = 0.52, 95% CI: 0.24–1.14, $p = 0.100$).

FBS Diabetes-Range Glucose Values (FBS ≥ 126 mg/dL)

For diabetes-range FBS values, no statistically significant association was observed between district and glycemic category. Logistic regression using District 1 as the reference showed:

District 2 vs District 1: OR = 0.86, 95% CI: 0.34–2.18, $p = 0.753$
District 3 vs District 1: OR = 1.28, 95% CI: 0.41–3.96, $p = 0.667$

RBS Hyperglycemia (Prediabetes + Diabetes, RBS ≥ 140 mg/dL)

RBS-based glycemic categories differed significantly by district. Logistic regression using District 1 as the reference showed:

District 2 vs District 1: OR = 3.06, 95% CI: 1.76–5.32, $p < 0.001$
District 3 vs District 1: OR = 1.19, 95% CI: 0.70–2.04, $p = 0.522$

RBS Diabetes-Range Glucose Values (RBS ≥ 200 mg/dL)

Logistic regression for RBS diabetes-range values with District 1 as the reference showed:

District 2 vs District 1: OR = 2.89, 95% CI: 1.49–5.61, $p = 0.002$
District 3 vs District 1: OR = 0.87, 95% CI: 0.42–1.82, $p = 0.718$

7. Prevalence and Distribution of Hypoglycemia

Hypoglycemia, defined as a blood glucose level < 70 mg/dL, was detected in 19 (1.9%) of the total study population.

7.1 Prevalence by Screening Method

The prevalence of hypoglycemia differed significantly by testing method (Fisher's Exact Test: $p < 0.001$). Hypoglycemia was exclusively detected in the fasting group.

FBS: 4.5% (19/418)
RBS: 0.0% (0/591)

7.2 District-Wise Distribution

No statistically significant geographic variation in hypoglycemia prevalence was observed across districts ($\chi^2 = 3.44$, $p = 0.179$).

Table 4. Prevalence of Hypoglycemia by District

District	Total (N)	Hypoglycemia (n)	Prevalence (%)
1	395	4	1.0%
2	392	11	2.8%
3	222	4	1.8%

8. Summary of Results

Following the correction of data entries, the primary clinical findings indicate that hyperglycemia prevalence remains stable at approximately 9-10% across screening methods. District 2 exhibited a significantly higher risk profile for random glucose elevation (OR = 3.06 for hyperglycemia) compared to District 1. Hypoglycemia was found in a small minority (1.9%) and was exclusively limited to participants in the fasting state.

DISCUSSION

This community-based screening study identified a dual burden of diabetes-range hyperglycemia and hypoglycemia among screened adult males across three districts of Herat city. Approximately one in ten participants had glucose values within the diabetic range, while hypoglycemia was detected in a smaller minority of participants. Both conditions represent actionable public health targets in a conflict-affected, resource-limited urban setting. This study provides the first district-level glycemic risk data from Herat since the 2015 STEPS survey by Saeed et al.[12].

Diabetes-Range Glucose Among Screened Participants

We detected diabetes-range glucose values in 10.3% of FBS participants and 9.1% of RBS participants. These figures align closely with prior evidence from Herat, where Saeed et al. reported 9.9% using WHO STEPS methodology [12]. A national systematic review by Akhtar et al estimated a pooled Afghan prevalence of 12.13% (95% CI: 8.86–16.24%) [13]. The national STEPS re-analysis by Dadras et al. found diabetes in 11.07% of Afghan adults aged 18–69 [14]. Urban studies from other Afghan cities report higher rates, including 16.1% (in men) in Kabul and 15.2% in Kandahar [15,16]. Our lower estimate may reflect volunteer sampling characteristics and the known sensitivity limitations of single-point capillary screening compared with HbA1c-based or confirmatory laboratory testing.

Prediabetes Detection and the Role of Screening Method

FBS testing identified nearly three times the proportion of prediabetes compared to RBS testing (19.6% vs. 6.8%). This reflects the lower IFG threshold (FBS 100–125 mg/dL) relative to the RBS equivalent (140–199 mg/dL). Dadras et al. reported a 10.32% IFG prevalence in Afghanistan's national survey, consistent with our fasting subgroup finding [14]. Regionally, Moradpour et al. reported 18.22% prediabetes in a western

Iranian cohort using the same ADA fasting threshold, and a 2025 systematic review by Zeyad et al. documented wide IFG variation across 11 Eastern Mediterranean countries [17,18]. The significant difference in glycemic classification by testing method ($\chi^2(2) = 39.90$, $p < 0.001$) underscores the need for standardized protocols when comparing glycemic burden across community screening programs.

Intra-Urban Geographic Variation in Glycemic Risk

We observed significant district-level variation in RBS-based glycemic risk. Participants in District 2 had approximately three times the odds of RBS-defined hyperglycemia compared with District 1 (OR = 3.06, 95% CI: 1.76–5.32). Comparable intra-urban heterogeneity has been documented elsewhere in Afghanistan. Dadras et al. found that urban residence independently predicted diabetes risk, highlighting the role of socioeconomic stratification across geographic strata [14]. Saeed et al. similarly noted district-level variation in NCD risk profiles across Kabul [15]. We could not adjust for individual-level confounders such as age, BMI, or dietary patterns. Future studies should collect spatially referenced individual-level data to identify the structural drivers of intra-urban glycemic inequality in Herat.

Hypoglycemia Among Screened Participants

We detected hypoglycemia in 1.9% of all participants, and in 4.5% of those who underwent fasting testing. In a non-clinical, community-based population where antidiabetic medication use is unlikely, these findings remain clinically relevant given the community-based setting and the absence of known treatment-related hypoglycemia. Although we did not directly measure nutritional intake or food access, this pattern may reflect underlying food insecurity in the study population. Afghanistan faces one of the world's most severe food insecurity crises: the Integrated Food Security Phase Classification (IPC) reported that 40% of the national population was in Crisis or Emergency (Phase 3+) food insecurity as of April 2023, with urban centers including Herat Urban (45%) among the most affected [19]. Levi et al. have outlined mechanistic pathways linking food insecurity to glycemic instability, including hypoglycemia, primarily through irregular meal access and reduced dietary quality [9]. Seligman et al. similarly found that food-insecure individuals had significantly higher rates of hypoglycemia-related emergency department visits (RR = 2.2)[20]. Although hypoglycemia prevalence numerically differed across districts, these differences were not statistically significant. Further studies incorporating dietary assessment and socioeconomic indicators are needed to determine whether spatial nutritional disparities contribute to glycemic vulnerability within Herat.

Limitations

Several limitations should be considered when interpreting these findings. The walk-in design introduces selection bias; results are not population-representative. No individual-level covariates were collected, preventing adjusted analysis. Fasting status relied on self-report and could not be independently verified, introducing potential misclassification. Blood glucose was measured only once for each participant; therefore, day-to-day biological variation could not be assessed. Single-point capillary glucose measurements indicate glycemic risk but cannot confirm clinical diagnosis, which requires repeat laboratory-based testing. Finally, government-imposed restrictions excluded women from participation, which is a fundamental limitation to both the equity and generalizability of these findings.

Conclusion

Community-based glycemic screening in Herat city identified a substantial burden of diabetes-range glucose abnormalities among adult men, with approximately one in ten participants screening positive for diabetes-range values. Hypoglycemia was uncommon and occurred only among participants in the fasting group. District-level variation in RBS-based hyperglycemia suggests possible intra-urban differences in glycemic risk. These findings support expanded community screening and confirmatory follow-up in resource-limited settings.

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Conflict of interest statement

The authors declare that they have no conflicts of interest.

Data availability statement

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Author contributions

N.A.E. conceived and designed the study and provided overall supervision of the project. A.Q.A. contributed to supervision and provided medical training for the study team. A.H.G. contributed to the study design, participated in data collection, conducted the data analysis, and drafted and edited the manuscript. M.F. contributed to the study design and supervision of the research activities. N.G. reviewed the manuscript and provided critical revisions to improve its intellectual content. M.F.W. contributed to the study design and provided supervision throughout the study. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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