

Original Article



Predictors and Barriers to Physical Activity Among Adults in Uzbekistan: A Cross-Sectional Study

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Abstract

Introduction: Despite the public health burden of inactivity, evidence on the determinants of physical activity in Central Asia remains scarce. Thus, this study examined socio-demographic, health-related, behavioral, social, and environmental correlates of physical activities among adults in Uzbekistan.

Methods: A cross-sectional online survey was conducted among 400 adults from different regions of Uzbekistan in 2023. After excluding incomplete responses, 360 participants underwent evaluation. Physical activity was measured using the Saltin-Grimby Physical Activity Level Scale and then recoded as inactive versus active. Ultimately, multivariable logistic regression with robust standard errors was used for data analysis.

Results: Overall, 45.6% of respondents were physically active. In addition, 58.1% were female, and mean ($\pm$ SD) age was 32.8 (12.8) years. Lower odds of physical activity were observed among women (odds ratio [OR]=0.53, 95% confidence interval [CI]: 0.31–0.89, $P=.016$), respondents with poorer self-rated health (OR=0.63, 95% CI: 0.46–0.85, $P=.003$), and overweight respondents (OR=0.40, 95% CI: 0.24–0.67, $P<.001$). The odds of physical activity were also lower in those with higher sedentary behavior (OR=0.86, 95% CI: 0.75–0.99, $P=.040$) and those reporting transport-related constraints (OR=0.37, 95% CI: 0.22–0.64, $P<.001$). Having physically active friends was associated with higher activity (OR=2.24, 95% CI: 1.62–3.10, $P<.001$), and model discrimination was acceptable (area under the curve=0.804).

Conclusion: Physical activity among adults in Uzbekistan is shaped by interacting individual, social, and environmental factors. Accordingly, public health strategies should prioritize social support, sedentary behavior reduction, improved access to activity opportunities, and removal of gender-related and transport-related barriers.

Keywords: Exercise, Motor activity, Social support, Sedentary behavior, Uzbekistan

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Introduction

Regular physical activity is a fundamental determinant of population health and well-being. In this article, physical activity refers to any bodily movement that is produced by skeletal muscles and requires energy expenditure, whereas exercise is treated as a planned, structured subset of physical activity. This distinction is important because public health promotion should address not only formal exercises but also broader active behavior in everyday life. It should be noted that physical activity contributes to the prevention of cardiovascular disease, type 2 diabetes, some types of cancer, poor mental health, and loss of functional capacity. Nevertheless, insufficient physical activity remains highly prevalent worldwide, with global evidence indicating that a substantial proportion of adults do not meet recommended activity levels (1).

Although insufficient physical activity is a global concern, its prevalence and determinants substantially vary across countries and population groups. According to evidence from Eastern Europe and Central Asia, physical inactivity is shaped not only by individual characteristics but also by broader social and structural contexts. In an analysis of population-based survey data from nine countries in the region, substantial between-country variation in adult physical inactivity was reported, and women were more likely than men to be insufficiently active in several settings, including Uzbekistan (2). Similarly, the World Health Organization country profile data for Uzbekistan indicate gender inequalities in insufficient physical activity, reinforcing the need to examine local determinants rather than merely relying on global averages (3).

Uzbekistan is a relevant setting for this analysis because



physical activity behavior is influenced by ongoing social changes, uneven access to sport and recreation infrastructures, differences between urban and non-urban environments, and gendered patterns of work, family roles, and leisure. In such contexts, participation in health-enhancing physical activities is unlikely to depend solely on knowledge or personal motivation. Rather, it is influenced by individual, interpersonal, and environmental conditions. This perspective is consistent with socio-ecological approaches, which conceptualize physical activity as the product of interacting determinants operating across multiple levels. Likewise, recent evidence supports this framework, demonstrating that gender, social support, and features of the physical environment (e.g., walkability) are consistently associated with physical activity (4, 5).

Among interpersonal influences, social support appears to be one of the most robust correlates of physical activity. Longitudinal evidence indicates that support specific to physical activity is positively related to higher activities over time, suggesting that social networks may contribute not only to the initiation but also to the maintenance of active behavior (6). This is particularly essential in settings where exercise practices are socially patterned and where peers, family members, and friendship networks affect whether physical activity is perceived as feasible, acceptable, and sustainable.

Health-related and behavioral constraints are crucial as well. A systematic review focusing on adults living with overweight and obesity revealed that higher body mass index, obesity severity, pain, comorbidities, and lack of time or energy were consistently associated with lower physical activities, whereas social support and better self-perceived health were linked with higher activities (7). These findings imply that overweight, poorer self-rated health, and sedentary behavior may function as both practical and psychological barriers to regular physical activity.

Additionally, gender remains a critical dimension of physical activity inequality. A systematic review and thematic synthesis of qualitative studies on women's physical activity identified multiple barriers, including competing family responsibilities, lack of time, body-related concerns, limited social support, safety issues, and restricted access to suitable activity environments. The findings further highlighted the importance of religious and cultural norms, representing that physical activity promotion for women should be culturally sensitive and attentive to beliefs related to modesty and gender roles (8).

Despite the growing international literature, empirical evidence on predictors and barriers of physical activities among adults in Uzbekistan remains limited. Although there is useful descriptive information, a limited body of research has so far examined socio-demographic, health-related, behavioral, social, and environmental correlates of physical activities within a single multivariable framework. This gap limits the development of context-sensitive interventions that go beyond health promotion messages and instead target modifiable barriers and facilitators relevant to the Uzbek context.

Therefore, the present study aims to investigate predictors and barriers associated with physical activities among adults in Uzbekistan. Specifically, the study seeks to estimate the prevalence of being physically active in an adult online sample from Uzbekistan and to identify socio-demographic, health-related, behavioral, social, and environmental factors linked with being physically active using multivariable logistic regression.

Materials and Methods

Study Design and Participants

A cross-sectional online survey was performed in June 2023. Initially, 400 adults from different regions of Uzbekistan participated in this study. After excluding 40 incomplete responses, 360 respondents were included in the final analysis. The survey link was distributed via social media platforms and direct messages. Moreover, participants were recruited using a non-probability online sampling strategy that combined convenience sampling through social media platforms with snowball sampling. Furthermore, they were encouraged to share the survey link within their networks to facilitate additional recruitment.

Additionally, participation was voluntary and anonymous. Before accessing the structured questionnaire, participants were also informed about the purpose of the study and the use of the collected data for research purposes. It should be noted that completion of the questionnaire was considered to indicate informed consent.

Sample Size Considerations

Considering that no prior population-based estimate was available for all predictors in the Uzbek context, the sample size was evaluated using an events-per-variable approach for logistic regression (9). The final analytic sample contained 164 active and 196 inactive outcome events. With nine predictors retained in the final model, the smaller outcome category provided more than 18 events per retained predictor, exceeding the commonly used minimum of 10 events per predictor. Therefore, the achieved sample size was considered adequate for exploratory multivariable modeling while acknowledging that the non-probability sampling strategy limits generalizability.

Outcome Variable

Physical activity level was measured using the Saltin-Grimby Physical Activity Level Scale (SGPALS), which classifies respondents into four activity levels (10). For regression analysis, the measure was recoded into a binary outcome: inactive (levels 1–2) and active (levels 3–4). The structured questionnaire was administered in Russian and Uzbek. Then, minor wording adaptations were made by the bilingual members of the research team in order to improve clarity while preserving the original response structure.

Predictors and Covariates

The survey assessed factors potentially associated with physical activities. Sociodemographic variables included gender, age, marital status, education level, presence of

children, place of residence, employment status, work sector, and monthly income.

In addition, perceived barriers to physical activities were assessed on a three-point scale, including “Not a barrier,” “Somewhat of an important barrier,” and “A very important barrier.” Further, barriers encompassed lack of motivation or enjoyment, absence of skills, lack of safe outdoor spaces, absence of family support, limited access to venues, affordability issues, financial constraints, and feelings of embarrassment.

Additional social and environmental factors were the necessity of convenient public transport for sport activities, preference for professional instructors, availability of sport and wellness facilities and services (e.g., gyms and fitness centers), and the need for additional services (e.g., parking or babysitting). Time constraints due to work or family commitments were assessed as well.

Moreover, health-related and behavioral variables consisted of self-rated health, awareness of physical activity benefits, intention to be physically active, sleep duration satisfaction, sleep quality satisfaction, self-reported weight status, smoking status, presence of diseases, daily internet use, sedentary behavior, and physically active friends. Self-rated health was coded from 0 to 4, where 0 and 4 indicated excellent health and very bad health, respectively; therefore, higher scores represented poorer perceived health.

Statistical Analysis

Data were analyzed using Stata 16. Descriptive statistics included means, standard deviations, frequencies, and percentages for study variables. Multivariable logistic regression with robust standard errors was employed to examine factors associated with being physically active.

Candidate predictors were initially considered in the model, followed by backward stepwise elimination using a *p*-removal threshold of .10. Some variables, such as internet use, perceived stress, and motivation, were measured and taken into account during model selection. However, these variables were not retained in the final model because they did not meet the pre-specified retention criterion or improve model performance. Predictors with $.05 \leq P < .10$ were retained under the pre-specified stepwise criterion but were interpreted with caution rather than as definitive findings.

Model performance was evaluated using calibration and discrimination measures. Likewise, calibration and discrimination were assessed using the Hosmer-Lemeshow goodness-of-fit test and the area under the receiver operating characteristic curve (AUC), respectively. *P*-values were reported consistently using three decimal places or as $P < .001$ where appropriate.

Results

A total of 360 respondents were included in this investigation. Table 1 presents the descriptive characteristics of the study sample. Of all respondents, 58.1% were women, and the mean age was 32.8 years (*SD* = 12.8). Overall, 45.6% of respondents were classified as physically active.

Table 1. Descriptive Characteristics of the Study Sample (*N* = 360)

Variable	Number (%) or Mean (SD)
Outcome	
Physically active	164 (45.6%)
Key sociodemographic characteristics	
	209 (58.1%)
Gender (female)	32.8 (12.8)
Age (years)	0.57 (0.50)
Marital status	3.51 (1.22)
Education level	
Employment status	0.46 (0.64)
Work sector	
Income level	0.79 (0.88)
Children (any)	2.42 (1.38)
Residence (urban)	207 (57.5%)
	69 (19.2%)
Health and lifestyle variables	
	1.20 (0.87)
Self-rated health (from 0 = excellent to 4 = very bad)	139 (38.6%)
Overweight (self-reported)	2.70 (1.77)
Sedentary behavior category	
Smoking status	50 (13.9%)
Sleep duration satisfaction	223 (61.9%)
Social and environmental variables	
	1.30 (0.85)
Physically active friends	
Public transport convenient/needed	190 (52.8%)
Sport facilities/services available	279 (77.5%)

Note. SD: Standard deviation. Categorical variables are presented as number (percentage). In addition, continuous and ordinal variables are shown as means $\pm$ SDs.

Regarding health and lifestyle characteristics, 38.6% of participants reported being overweight, and 13.9% reported smoking. Further, the mean self-rated health score was 1.20 (*SD* = 0.87) on a scale ranging from 0 to 4, where higher scores indicated poorer perceived health. In addition, the mean sedentary behavior score was 2.70 (*SD* = 1.77), and 61.9% of respondents reported satisfaction with sleep duration.

With respect to social and environmental factors, the mean score for physically active friends was 1.30 (*SD* = 0.85). Furthermore, 52.8% of respondents mentioned that public transport was needed or convenient, and 77.5% reported access to sport facilities or services. Complete descriptive statistics for additional study variables are provided in [Appendix Table A1](#) and [A2](#).

Table 2 provides the results of the backward stepwise logistic regression model predicting physical activities. Nine predictors were retained in the final model. Women had significantly lower odds of being physically active than men (odds ratio [OR] = 0.53; 95% confidence interval [CI]: 0.31–0.89; $P = .016$). Moreover, poorer self-rated health was associated with lower odds of physical activity (OR = 0.63; 95% CI: 0.46–0.85; $P = .003$). Likewise, overweight status (OR = 0.40; 95% CI: 0.24–0.67; $P < .001$), higher sedentary behavior (OR = 0.86; 95% CI: 0.75–0.99; $P = .040$), and reporting public transport as needed or convenient (OR = 0.37; 95% CI: 0.22–0.64; $P < .001$) were linked with lower odds of being physically active.

Table 2. Backward Stepwise Logistic Regression Predicting Physical Activity (N = 360)

Predictor	Adjusted OR	95% CI	P-Value
Female	0.53	0.31–0.89	.016
Self-rated health (0–4, higher = worse)	0.63	0.46–0.85	.003
Public transport convenient/needed	0.37	0.22–0.64	<.001
Access to sport facilities/services	1.83	0.96–3.52	.068
Smoking status	0.50	0.25–1.02	.058
Sleep duration satisfaction	0.60	0.35–1.03	.062
Physically active friends	2.24	1.62–3.10	<.001
Overweight	0.40	0.24–0.67	<.001
Sedentary behavior	0.86	0.75–0.99	.040

Note. CI: Confidence interval; OR: Odds ratio; AUC: Area under the curve; Variables with $P \geq .10$ were sequentially removed. Nonetheless, predictors with $.05 \leq P < .10$ were retained under the pre-specified stepwise criterion and should be cautiously interpreted accordingly. Model fit: LR chi-square (9) = 107.65, $P < .001$; Pseudo $R^2 = 0.217$; Hosmer-Lemeshow chi-square (8) = 13.05, $P = .110$; AUC = 0.804.

In contrast, having more physically active friends was strongly related to higher odds of physical activity (OR = 2.24; 95% CI: 1.62–3.10; $P < .001$). Based on the results, access to sport facilities/services (OR = 1.83; 95% CI: 0.96–3.52; $P = .068$), smoking status (OR = 0.50; 95% CI: 0.25–1.02; $P = .058$), and sleep duration satisfaction (OR = 0.60; 95% CI: 0.35–1.03; $P = .062$) were retained in the final model under the pre-specified stepwise criterion; however, these associations did not reach conventional statistical significance and should, therefore, be interpreted with caution.

The final model demonstrated good discrimination (AUC = 0.804) and acceptable calibration (Hosmer-Lemeshow chi-square (8) = 13.05, $P = .110$). Overall model fit was statistically significant (LR chi-square (9) = 107.65, $P < .001$), with pseudo $R^2 = 0.217$.

Discussion

This study provided evidence on predictors and barriers associated with physical activities among adults in Uzbekistan. The final multivariable model retained nine variables, including gender, self-rated health, public transport convenient/needed, access to sport facilities/services, smoking status, sleep duration satisfaction, physically active friends, overweight status, and sedentary behavior. Among these factors, female gender, poorer self-rated health, overweight status, higher sedentary behavior, and transport-related constraints were linked with lower odds of physical activity, whereas physically active friends showed the strongest positive association.

The finding that female gender and overweight status were related to lower odds of being physically active highlights serious gender and weight-related barriers to physical activity participation. These results align with those of prior research, demonstrating that physical activity participation may differ by gender and that weight-related stigma and physical limitations can reduce motivation and opportunities for activity (11, 12).

Similarly, our findings revealed a negative association

between poorer self-rated health and physical activities, suggesting that individuals who perceive their health as worse are less likely to engage in physical activities. These results are consistent with those of some previous studies, indicating that poorer perceived health and chronic conditions may reduce activity through both physical and psychological pathways (13, 14).

Sedentary behavior was negatively linked with physical activities. Although sedentary behavior and insufficient physical activity are conceptually distinct, the result conforms to evidence linking sedentary lifestyles to poorer weight-related and health outcomes (15). Smoking status and sleep duration satisfaction were retained in the final model at the pre-specified $P < .10$ threshold but did not reach $P < .05$; therefore, these findings should be interpreted as tentative rather than definitive (16, 17).

A key finding was the inverse association between public transport convenient/needed and physical activities. This result should be cautiously interpreted because the variable may reflect transport-related constraints or reliance on transport to reach activity places rather than public transport use itself. Given that only 19.2% of participants reported urban residence, transport and facility access may be especially relevant in non-urban settings. This finding supports the need to examine how transport, distance, and local infrastructure shape access to physical activity opportunities (18, 19).

Conversely, social support, represented by having physically active friends, was strongly related to physical activities, which corroborates the findings of previous research, revealing that social networks and peer support can facilitate active behavior (20). In practical terms, interventions that rely only on individual motivation may be insufficient if they do not also create socially supportive opportunities for regular activity.

Although 94.2% of respondents perceived the benefits of physical activities, only 45.6% were classified as physically active. This discrepancy suggests a gap between knowledge and practice, underlining the need for strategies that translate awareness into behavior. Barriers such as lack of time due to work (55.8%) and family commitments (56.9%) further emphasize the importance of flexible opportunities for physical activities, particularly in workplace and community settings.

Several limitations should be taken into consideration. First, the online convenience and snowball sampling strategy may have introduced selection bias, thereby limiting the generalizability of our findings. In addition, all key variables were self-reported, which may be affected by recall bias and social desirability bias. Furthermore, although SGPALS is widely used internationally, it was not independently validated in the Uzbek population for the present study. Moreover, the cross-sectional design did not allow causal inference. Nonetheless, this study had some strengths. It provided rare empirical evidence from Uzbekistan, incorporated multiple levels of influence within a single analytic model, and highlighted modifiable social and environmental factors that may inform public

health policy.

Implications for Policy and Practice

The results offer several implications for public health policy and practice in Uzbekistan. First, gender-sensitive and culturally acceptable physical activity programs should be developed, including community-based and women-friendly opportunities for exercise. Additionally, weight-inclusive interventions should be integrated into health promotion and primary care services. Likewise, peer-supported and socially engaging physical activity initiatives should be encouraged, given the importance of active friends. In addition, transport and facility access should be considered together, especially in non-urban settings where distance, cost, and availability may limit access to regular activity opportunities. Finally, sedentary behavior reduction should be included in workplace, university, and community health promotion programs.

Accordingly, future studies should use larger and more representative samples and further examine the role of environmental and social determinants of physical activities in Uzbekistan.

Conclusion

In this online sample of adults in Uzbekistan, fewer than half of the respondents were classified as physically active despite high awareness of the benefits of physical activities. Lower levels of activity were associated with female gender, overweight status, poorer self-rated health, higher sedentary behavior, and transport-related constraints, whereas physically active friends were related to higher activities. Our findings revealed that physical activity promotion in Uzbekistan should move beyond awareness raising alone and address social support, gender-sensitive opportunities, sedentary behavior, and access-related barriers. Nonetheless, given that this study used a cross-sectional online non-probability sample, the findings should be interpreted as exploratory, and larger representative studies are required in this regard.

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Authors' Contribution

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Competing Interests

The authors have no competing interests associated with the material presented in this paper.

Ethical Approval

At the time the study was conducted, the Uzbek State University of Physical Education and Sport did not have an institutional ethics committee to review this type of research; therefore, formal ethics committee approval was not obtained. Participation was voluntary and anonymous. Before participation, respondents were informed about the purpose of the study and the use of the collected data for research purposes. The first survey item asked whether they agreed to participate in the study, and selecting "Yes" was considered to constitute electronic informed consent.

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Appendix Table A1. Descriptive Statistics of Binary Variables

Variable	N (%)
Physical activity (active = 1)	164 (45.6)
Gender (female = 1)	209 (58.1)
Children (any = 1)	207 (57.5)
Residence (urban = 1)	69 (19.2)
Overweight (self-reported)	139 (38.6)
Smoking status	50 (13.9)
Sleep duration satisfaction	223 (61.9)
Sleep quality satisfaction	234 (65.0)
Disease (yes = 1)	61 (16.9)
Awareness of physical activity benefits	339 (94.2)
Intention to be physically active	323 (89.7)
Professional support needed	213 (59.2)
Public transport convenient/needed	190 (52.8)
Sport facilities/services available	279 (77.5)
Additional service available	201 (55.8)
Lack of time due to work	201 (55.8)
Lack of time due to family	205 (56.9)

Note. N=360. Binary variables are presented as number (percentage).

Appendix Table A2. Descriptive Statistics of Continuous and Ordinal Variables

Variable	Mean ± Standard Deviations [Minimum-Maximum]
Age (years)	32.80 ± 12.82 [17–72]
Marital status (0–2 categories)	0.57 ± 0.50 [0–2]
Education level (0–5)	3.51 ± 1.22 [0–5]
Employment status (0–2 categories)	0.46 ± 0.64 [0–2]
Work sector (0–2)	0.79 ± 0.88 [0–2]
Income level (0–4)	2.42 ± 1.38 [0–4]
Motivation level (0–3)	0.64 ± 0.91 [0–3]
Embarrassment (0–3)	0.46 ± 0.70 [0–3]
Not joyful (0–3)	0.51 ± 0.76 [0–3]
Skills level (0–3)	0.52 ± 0.77 [0–3]
Support from family (0–3)	0.54 ± 0.80 [0–3]
Accessibility (0–3)	0.86 ± 0.92 [0–3]
Lack of affordable places (0–3)	0.95 ± 0.92 [0–3]
Cost (0–3)	0.86 ± 0.83 [0–3]
Safety (0–3)	0.96 ± 0.91 [0–3]
Internet use (hours/day)	2.60 ± 1.90 [0–6]
Stress level (1–5)	2.83 ± 1.33 [1–5]
Self-rated health (from 0=excellent to 4=very bad)	1.20 ± 0.87 [0–4]
Sedentary behavior (category)	2.70 ± 1.77 [0–6]
Physically active friends (0–3)	1.30 ± 0.85 [0–3]

Note. N=360. Continuous and ordinal variables are expressed as means ± standard deviations [minimum-maximum].