

Factors Promoting Health-Enhancing Physical Activity Among the Saudi Population: A National Survey Informing Saudi Vision 2030's Health Transformation

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ABSTRACT

Physical activity constitutes a significant public health concern in Saudi Arabia. This study aims to investigate Saudi lifestyle factors affecting physical activity and propose a policy that enhances physical activity among the Saudi population, aligning with and contributing to the achievement of Saudi Vision 2030's health goals. This is a cross-sectional national survey of 1,508 Saudi adults, randomly sampled from primary health care centers (PHCs). To measure physical activity, the Global Physical Activity Questionnaire (GPAQ) is used. The STATA BE version 19, 2024, was used to conduct the analysis. This study revealed several significant factors associated with physical activity level. The findings reveal that a notable proportion, 540 participants (35.8%), are classified as inactive, indicating a lack of sufficient physical activity in their daily routines. In this regard, the analysis highlights several significant factors influencing health-enhancing physical activity including age (OR of 1.02 95% CI: 1.01 - 1.03, $p=0.004$), gender (OR of 0.75 95% CI: 0.60 - 0.93, $p=0.010$), education (OR=1.50, 95% CI: 1.05 - 2.15, $p=0.026$), employment status (OR=1.80, 95% CI: 1.40 - 2.30, $p<0.001$), economic status (OR=1.60, 95% CI: 1.10 - 2.25, $p=0.015$), chronic diseases (OR=1.40, 95% CI: 1.10 - 1.70, $p=0.007$), and work type (OR=1.30, 95% CI: 1.02 - 1.67, $p=0.036$). This study revealed low physical activity among the population, indicating a need for targeted intervention, which has the potential to reduce socioeconomic inequities, promote workplace wellness, and incorporate exercise into healthcare, thereby enhancing public health outcomes and supporting Saudi Vision 2030.

Keywords: Lifestyle Behaviors, Physical Activity, Saudi Arabia, Primary Health Care Centers, Health Policy, Saudi Vision 2030

INTRODUCTION

Saudi Vision 2030¹ is an ambitious national development plan that is causing significant changes in Saudi Arabia's society, aiming to improve the people's well-being. Consequently, lifestyle behaviors have become essential determinants of health. This significantly affects the development and management of non-communicable diseases (NCDs)². Understanding the factors that influence lifestyle choices is essential for developing effective public health programs and policies addressing the country's health issues to know what factors affect the lifestyle choices of adults in Saudi Arabia³.

The physical activity levels among adolescents aged 14-19 years in Saudi Arabia highlight the need for interventions to promote active lifestyles among the youth and population in general to align with the objectives of Saudi Vision 2030, focusing on preventive measures and promoting healthy lifestyles^{4,6}.

Sociodemographic factors significantly impact lifestyle behaviors. Therefore, understanding how sociodemographic characteristics affect lifestyle choices is essential for developing practical intervention projects⁷. Saudi Vision 2030 is a strategic development initiative designed to diversify the Saudi Arabian economy. A key component of the vision is enhancing lifestyle behaviors in the country⁸.

Health awareness campaigns launched under Saudi Vision 2030 have significantly promoted positive lifestyle behaviors⁹. Health education campaigns increased awareness of the importance of regular physical activity to the Saudi population, which has the potential to encourage behavior change and improve public health outcomes¹⁰.

Saudi Vision 2030 initiatives aiming to improve food security and promote healthy food choices have positively impacted activity patterns, with reporting of promoting better dietary choices among participants in a community-based intervention¹⁰. The coexistence of multiple unhealthy lifestyle behaviors amplifies the risk of NCD development¹¹. So, the prevention of NCD and the enhancement of well-being required the adoption of a healthful lifestyle. However, adopting and maintaining healthy behaviors often faces multiple challenges¹².

Previous cross-sectional studies in Saudi Arabia have reported a high prevalence of physical inactivity, ranging from 66% to 83%^{13,14}. Females are also less active than males, and 80% to 90% of youth do not reach recommended levels of physical activity¹⁵. This evidence, however, is largely based on regional or non-standardized measures and predates the full implementation of Saudi Vision 2030. More significantly, there is a gap in the evidence, as no recent national study using the validated Global Physical Activity Questionnaire (GPAQ) has compared diverse factors within and across post-Vision 2030 contexts related to health-enhancing physical activity, including family size, chronic disease burden, and occupational physical demands. Also, no study has directly linked empirical evidence to targeted context-driven policy solutions designed for the Saudi Arabian environment¹⁶.

Many factors that influence the lifestyle choices of the adult population in Saudi Arabia need to be identified, as current research suggests that certain lifestyle behaviors are valuable insights. This research will furnish evidence-based policy data and targeted interventions, aiding policymakers, public health professionals, and healthcare providers

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in formulating effective strategies to enhance lifestyle choices and mitigate the effects of non-communicable diseases, by the primary goals of Saudi Vision 2030. Therefore, this study aims to investigate Saudi lifestyle factors affecting physical activity and propose a policy that enhances physical activity among the Saudi population, aligning with and contributing to the achievement of Saudi Vision 2030's health goals.

METHODOLOGY

Study Design, Setting, and Sampling: This was a cross-sectional national survey conducted over 12 months (February 2024–January 2025) in Saudi Arabia. The study was conducted across a representative sample of 120 Primary Health Care Centers (PHCs) operated by the Ministry of Health (MoH). The sampling frame was the master list of all MoH PHCs ($n \approx 1,925$ operational centers nationwide) and the Saudi adult population registered therein.

A stratified, two-stage random sampling approach was employed. First, the country was stratified into its five main administrative regions (Central, Eastern, Western, Southern, Northern). Using MoH statistical yearbooks, PHCs were proportionally allocated per region based on PHC density. In total, 120 PHCs were randomly selected (Central: 30, Eastern: 25, Western: 32, Southern: 20, Northern: 13). Second, within each PHC, a systematic random sampling strategy was used: every fifth adult Saudi patient entering the PHC was invited to participate. The sample size was calculated as described above, with an oversampling of 20% to account for potential non-response and missing data.

Participants and Recruitment: Inclusion criteria were: (i) Saudi citizen, (ii) aged ≥ 18 years, and (iii) registered at and attending a participating PHC during the study period.

Exclusion criteria were: (i) non-Saudi residents, (ii) individuals under 18 years of age, (iii) individuals with severe cognitive or physical disabilities that prevented informed consent or questionnaire completion, and (iv) any visitor not registered as a patient at the PHC.

Recruitment procedure: Trained research assistants approached eligible individuals in PHC waiting areas, explained the study objectives, obtained written informed consent, and administered the questionnaire in Arabic (the GPAQ). A total of 2,348 individuals were approached, 1,652 met the inclusion criteria, and 1,508 provided complete and valid data. The response rate was therefore 91.3%, reflecting high participant compliance and data quality.

Chronic disease assessment: Participants were asked to report whether they had been diagnosed with any chronic disease by a physician. Chronic diseases evaluated were selected based on their ranking among the most prevalent non-communicable diseases in Saudi Arabia. The statistics from the General Authority for Statistics and the WHO STEPwise approach. These included: diabetes mellitus, hypertension (high blood pressure), elevated cholesterol (dyslipidemia), cardiovascular diseases (including coronary artery disease and heart failure), chronic respiratory diseases (including asthma and chronic obstructive pulmonary disease), cancer, and other chronic conditions (specified by participants in an open-ended “other” category). For analysis, a binary variable indicating the presence of any chronic disease (yes/no).

The chronic disease data were self-reported by participants based on prior physician diagnosis. Self-reporting is a widely accepted and validated method in large-scale epidemiological surveys, including the WHO STEPwise approach and the Saudi National Health Survey.

Study Variables: In the context of this study on lifestyle behaviors related to physical activity among Saudi Arabian adults, the dependent variable was physical activity, which was assessed based on established global health guidelines. The World Health Organization (WHO) recommends that people get at least 60 minutes of moderate to strenuous exercise every day¹⁷. WHO offers specific physical activity recommendations for adults aged 18–65 years. Adults are recommended to aim for 300 minutes of moderate-intensity activity per week to improve health even further. Also, activities that strengthen muscles should be done at least twice a week, focusing on the main muscle groups^{17,18}. We looked at all aspects of physical activity, including how often, how long, and how hard they did it, to make sure it was in line with accepted ways to quantify active lifestyles. These criteria offered a systematic framework for assessing participants' compliance with health-promoting physical activity levels among the Saudi population.

Instruments: The study utilized a validated tool, the Global Physical Activity Questionnaire (GPAQ)¹⁹. The questionnaire was divided into two sections. The initial part about sociodemographic information and the second part concentrated solely on physical activity patterns with the GPAQ, which assesses frequency, duration, and intensity of exercise to ascertain compliance with WHO-recommended activity levels. This structured approach ensured standardized data.

Sample size calculation: The minimum required sample size was calculated using the standard formula for a population proportion:

$$n = Z^2 \times p(1-p) / d^2 \quad n = d^2 Z^2 \times p(1-p), \quad \text{where } Z = 1.96, Z = 1.96 \text{ (95\% confidence level), } p = 0.68, p = 0.68 \text{ (estimated prevalence of physical inactivity among Saudi adults, derived from the WHO Stepwise study}^{20}, \text{ and } d = 0.05, d = 0.05 \text{ (acceptable margin of error). This yielded } n = 335, n = 335 \text{ participants.}$$

To account for potential non-response, incomplete questionnaires, and to enable robust subgroup analyses, we recruited a total of 1,508 participants—substantially exceeding the minimum requirement and enhancing the precision and generalizability of the study findings.

A post-hoc power analysis indicated that with an effective sample of 1,508, the study had $>99\%$ power to detect an odds ratio of 1.5 at $\alpha = 0.05$ for binary exposures, confirming adequate statistical power for all primary analyses.

Physical Activity Classification: Physical activity data were processed and analyzed according to the WHO GPAQ Analysis Guide¹⁹. Therefore, total physical activity was calculated in MET-minutes/week by summing energy expenditure across three domains: occupational activity, transport-related (walking or cycling), and leisure-time activity. MET minutes per week for all of the aforementioned domains were derived from their duration.

Participants were then classified into three mutually exclusive categories based on the WHO-recommended cut-off values:

- **Inactive (<600 MET-minutes/week):** Individuals who did not meet the minimum WHO physical activity recommendation for health.
- **Minimally Active (≥ 600 to <3000 MET-minutes/week):** Individuals who met the minimum WHO recommendation but did not achieve the high-activity threshold.
- **HEPA Active (≥ 3000 MET-minutes/week, or meeting vigorous-intensity criteria):** Health-Enhancing Physical Activity (HEPA) active status was assigned to individuals who achieved either (i) vigorous-activity 3 days at least with a minimum of 1500 MET-minutes/week, or (ii) any combination of walking, moderate-, or

vigorous-intensity activities on at least 7 days with a minimum total of 3000 MET-minutes/week

Economic status classification

The participants evaluated economic status when asked to report their total monthly household income in Saudi Riyals (SAR) using the following categories:

- Low income: < 8,000 SAR per month (approximately < 2,133 USD)
- Moderate income: 8,000 – 20,000 SAR per month (approximately 2,133 – 5,333 USD)
- High income: > 20,000 SAR per month (approximately > 5,333 USD)

Data Analysis: The analysis by the STATA BE. Version 19 (2025) to ensure accuracy and completeness. To identify factors associated with health-enhancing physical activity (HEPA), we performed binary logistic regression. The dependent variable was HEPA Active status, coded as 1 = HEPA Active and 0 = Not HEPA Active (combining Inactive and Minimally Active categories). Independent variables included age (continuous), gender, residency, number of family members (continuous), housing condition, marital status, education, employment status, economic status, chronic diseases (yes/no), and strenuous work type (yes/no).

Model-building strategy: A hierarchical (blockwise) approach was used. Block 1 included demographic factors (age, gender, residency, number of family members, housing condition, marital status). Block 2 added socioeconomic factors (education, employment status, and economic status). Block 3 added health and occupational factors (chronic diseases, strenuous work type).

Variable selection: Variables were selected based on statistical significance ($p < 0.05$) in bivariate analyses and/or clinical importance established in the literature²⁰⁻²². No automated stepwise selection was used.

Multicollinearity assessment: Variance Inflation Factors (VIFs) were calculated for all independent variables in the final model. No multicollinearity was detected (all VIF < 2.5; mean VIF = 1.3). The highest VIF was 1.8 (between employment status and economic status), well below the conventional threshold of 5.0.

Goodness-of-fit: Model calibration was assessed using the Hosmer-Lemeshow goodness-of-fit test.

RESULT

In a study involving 1508 participants from various regions across Saudi Arabia, several key determinants influencing lifestyle behavior in terms of physical activities were identified.

The average age of the 1,508 people in our sample was 35.5 years, and each home had an average of 3.6 family members. There were more males than females in the group, with 801 males (53.1%) and 707 females (46.9%). A considerable number of the 1,331 participants (88.3%) lived in cities, with the Central Region having the most participants (30.0% or 452 people). The living situations of the participants were different. Four hundred ninety-two of them (32.6%) rented, 328 (21.8%) lived with relatives, and just 228 (15.1%) owned their own homes. The majority of individuals were married (1,043; 69.2%), which could affect their lifestyle choices. A lot of people had a lot of education: 663 (44.0%) had university degrees, and 167 (11.1%) had postgraduate degrees. In terms of jobs, 969 people (64.3%) were working, suggesting

that the economy is stable. Notably, 949 participants (62.9%) reported having known chronic diseases, a significant factor in assessing health and lifestyle needs. Lastly, most participants (1,343; 89.0%) reported that their work did not require strenuous physical activity, highlighting a need for targeted interventions to enhance more activity in their daily routines, promoting healthier lifestyles as part of Saudi Vision 2030 (Table 1).

Table 2 shows how many people in the study are inactive, minimally active, and HEPA active. It also shows how many people are in each of the three activity levels. We looked at the physical activity levels of 1,508 people and put them into three different activity categories. A significant number of participants, 540 (35.8%), are considered inactive, which means they don't engage in sufficient physical activity in their daily lives. At the same time, 471 people (31.2%) are in the minimally active group, which means they only do physical activities sometimes or not very often. It's good to see that 497 people (33.0%) are HEPA active, which means they are likely doing physical activities that are good for their health. These findings indicated the importance of focused interventions to elevate levels of physical engagement across the community, in line with the health objectives outlined in Saudi Vision 2030.

Identifying factors influencing health-enhancing physical activity among the Saudi population (Table 3). Age is a significant predictor (OR: 1.02, CI: 1.01 - 1.03, $p = 0.004$). This indicates that for each additional year of age, the likelihood of engaging in health-enhancing physical activity increases by 2%. Females are less likely to participate in physical activity compared to males (OR 0.75, 95% CI: 0.60 - 0.93, $p=0.010$). Suggesting that females are 25% less likely to engage in physical activities than their male counterparts. Residency showed a positive association, as individuals living in rural areas had higher odds of engaging in physical activity (OR=1.20, 95% CI: 0.95 - 1.50), although this association did not reach statistical significance ($p=0.115$). The Number of Family Members was significantly associated with physical activity levels, with each additional family member associated with a 13% decrease in the odds of engaging in health-enhancing activities (OR=0.87, 95% CI: 0.80 - 0.95, $p=0.004$). Regarding Housing Condition, individuals in rented housing had an OR of 0.90 (95% CI: 0.70 - 1.15, $p=0.400$), indicating no significant difference in physical activity levels compared to those who owned their homes.

Marital status was significantly correlated with physical activity. The odds ratio (OR) for married people was 1.10 (95% CI: 0.85–1.41, $p=0.500$). For unmarried, divorced, and widowed people, the ORs were 0.95, 0.85, and 1.20, respectively, with p -values all greater than 0.05. In terms of education, people with graduate degrees were much more likely to be physically active (OR=1.50, 95% CI: 1.05 - 2.15, $p=0.026$). Meanwhile, university (OR=1.25, 95% CI: 0.95 - 1.65, $p=0.100$) and technical institute education (OR=1.10, 95% CI: 0.80 - 1.50, $p=0.500$) did not reach statistical significance. Employment Status was a strong predictor, with individuals working full-time being 80% more likely to engage in health-enhancing physical activity compared to those unemployed (OR=1.80, 95% CI: 1.40 - 2.30, $p<0.001$). Economic Status showed a significant positive association as well, with high-income individuals having 60% higher odds of participating in physical activity compared to moderate-income individuals (OR=1.60, 95% CI: 1.10 - 2.25, $p=0.015$). Chronic diseases were significantly associated with physical activity levels. Specifically, individuals free from chronic diseases had 40% higher odds of being HEPA active compared to those with chronic diseases (OR = 1.40, 95% CI: 1.10 – 1.70, $p = 0.007$). Those who were involved in physically demanding work exhibited a 30% increased probability of engaging in physical activity relative to those in non-strenuous work (OR=1.30, 95% CI: 1.02 - 1.67, $p=0.036$).

Table 1. Characteristics of the participants (n=1508)

Characteristics	Variables	N (%)
Age	Mean	35.5
Number of family members	Mean	3.6
Gender	Female	707 (46.9)
	Male	801 (53.1)
Residency	Urban	1,331 (88.3)
	Rural	177 (11.7)
Region	Central Region	452 (30.0)
	Eastern Region	301 (20.0)
	Western Region	271 (18.0)
	Southern Region	241 (16.0)
	Northern Region	243 (16.0)
Housing condition	Owned	228 (15.1)
	Rented	492 (32.6)
	With my family	328 (21.8)
	With friends	17 (1.1)
	Accommodation without paying rent	36 (2.4)
	Others	32 (2.1)
Marital status	Married	1,043 (69.2)
	Unmarried	375 (24.9)
	Divorce	60 (4.0)
	Widow	29 (1.9)
Education	Postgraduate	167 (11.1)
	University	663 (44.0)
	Technical institute	240 (15.9)
	Secondary	375 (24.9)
	Intermediate school	60 (4.0)
Occupation	Employed	969 (64.3)
	Not employed	539 (35.7)
Economic status	High income	1,000 (66.3)
	Moderate income	411 (27.3)
	Low income	97 (6.4)
Chronic diseases	Known chronic diseases	949 (62.9)
	Not known chronic diseases	559 (37.1)
Work type requires strenuous activity	Yes	165 (11.0)
	No	1,343 (89.0)

Table 2. Activity assessment category ((n=1508)

Activity assessment category	Description	N	%
Category 1	Inactive	540	35.8
Category 2	Minimally Active	471	31.2
Category 3	HEPA Active	497	33.0

Table 3. Logistic regression analysis for factors influencing health-enhancing physical activity Among Saudi Population levels of physical activity (=1508)

Factors	Variables	Reference Category	Odds Ratio	95% CI	p-value
Age	Continuous	-	1.02	(1.01, 1.03)	0.004
Gender	Female	Male	0.75	(0.60, 0.93)	0.010
	Male		Reference		
Residency	Rural	Urban	1.20	(0.95, 1.50)	0.115
	Urban		Reference		
Number of Family Members	Continuous	-	0.87	(0.80, 0.95)	0.004
Housing Condition	Rented	Owned	0.90	(0.70, 1.15)	0.400
	Owned		Reference		
Marital Status	Married	Unmarried	1.10	(0.85, 1.41)	0.500
	Unmarried		0.95	(0.80, 1.12)	0.400
	Divorced		0.85	(0.60, 1.21)	0.360
	Widow		1.20	(0.85, 1.71)	0.290

Education	Postgraduate		1.50	(1.05, 2.15)	0.026
	University	Secondary	1.25	(0.95, 1.65)	0.100
	Technical Institute		1.10	(0.80, 1.50)	0.500
	Secondary		Reference		
Employment Status	Working Full Time	Unemployed	1.80	(1.40, 2.30)	<0.001
	Unemployed		Reference		
Economic Status	High Income	Moderate Income	1.60	(1.10, 2.25)	0.015
	Moderate Income		Reference		
Chronic Diseases	Has no Chronic Diseases	Has Chronic Diseases	1.40	(1.10, 1.70)	0.007
	Had Chronic Diseases		Reference		
Strenuous Work Type	Yes	No	1.30	(1.02, 1.67)	0.036
	No		Reference		

This study identifies various critical elements affecting health-promoting physical activity within the Saudi population, such as age, gender, education, employment status, economic situation, chronic diseases, and type of work.

DISCUSSION

A key finding of this study is the high prevalence of physical inactivity (35.8%) among adults in Saudi Arabia, despite the country's emphasis on health promotion as outlined in the Saudi Vision 2030. This reveals a substantial gap between the intentions of the policy and how people live their lives. This is in line with research that shows that health awareness programs can lead to higher levels of physical activity²¹⁻²³. This suggests that while awareness-raising efforts are essential, they are not enough on their own to make significant changes to people's daily habits. The impact of existing public health campaigns needs further investigation to identify areas needing improvement in their design and implementation.

The positive association between age and physical activity (OR = 1.02, $p = 0.004$) contradicts much of the international literature, where activity typically declines with age²⁴⁻²⁶. Several Saudi-context explanations may account for this finding: older adults have more discretionary time post-retirement, may be more health-motivated due to chronic disease prevalence (62.9% in our sample), and face fewer barriers than younger adults who have sedentary occupations (89.0%) and competing family/education demands. However, the modest effect size (2% per year), potential cohort effects in cross-sectional data, and possible residual confounding warrant caution. Longitudinal studies are needed to confirm age-related activity trajectories in Saudi Arabia.

The robust, favorable correlation between elevated educational attainment and work status with physical exercise aligns with global literature^{28,29}. Higher education may correlate with increased understanding of the benefits of physical activity, but employment frequently offers chances and resources for participation in such pursuits. The substantial influence of economic position underscores the necessity for policies that tackle socioeconomic disparities and guarantee fair access to physical activity resources across all socioeconomic levels.

The study revealed significant negative associations between chronic illnesses and larger family size with physical activity levels. This aligns with studies reporting that chronic diseases are associated with lower physical activity levels³⁰⁻³². It is essential to recognize that the causal relationship is intricate and bidirectional; less physical activity may facilitate the onset of chronic diseases. Interventions should incorporate methods to assist those managing chronic diseases and those with heightened familial responsibilities to promote engagement in physical exercise.

The persistently low levels of HEPA observed in our study are consistent with the broader physical inactivity epidemic documented across the Gulf Cooperation Council (GCC) region³³. For example, a 2025 study using the same GPAQ in Kuwait found that half (51.9%) of the adult population did not meet the WHO's minimum physical activity target³⁴. Furthermore, a comprehensive 2025 policy analysis across all six GCC nations, including Saudi Arabia, concluded that while physical activity policies exist, their implementation is often inadequate and lacks consistent funding and robust evaluation mechanisms, particularly for marginalized groups³¹. These regional comparisons underscore that our findings are not isolated, but rather reflect a persistent, multi-country public health challenge within the GCC.

Evidence-Based Policy Recommendations

Based on the evidence presented and aligned with Saudi Vision 2030's health objectives—particularly the pillars of Quality of Life, Preventive Healthcare, and Healthy Communities—the following evidence-based policy recommendations are proposed (Figure 1). These interventions aim to trace the primary factors contributing to physical inactivity revealed by the study; however, the national objectives are to diminish NCD, encourage active lives, and establish a robust public health infrastructure. These six evidence-based policies translate research findings into actionable, equitable, and sustainable interventions that directly support Saudi Vision 2030's health transformation agenda.

Policy 1: Gender-Sensitive Programs: Females were 25% less likely to be HEPA active (OR = 0.75, $p = 0.010$). Implement women-only fitness hours, female-led community groups, and girls' PE with female teachers. Targets women/girls aged 10–60 years. (*Quality of Life*)

Policy 2: Workplace Wellness: Employed individuals had 80% higher odds of HEPA activity (OR = 1.80, $p < 0.001$), yet 89% had sedentary work. Mandate 30-minute daily activity breaks, subsidize gym memberships, promote standing desks, and certify "Active Workplaces." Targets desk-based employees. (*Preventive Healthcare*)

Policy 3: Family-Centered Interventions: Each additional family member reduced HEPA odds by 13% (OR = 0.87, $p = 0.004$). Offer subsidized family gym memberships, weekend "family walks," on-site childcare, and step-challenge apps. Targets families with ≥ 3 members. (*Healthy Communities*)

Policy 4: Chronic Disease Exercise Prescription: Individuals with chronic diseases had 40% lower odds of HEPA activity (OR = 1.40 for no chronic disease, $p = 0.007$). Train PHC physicians to prescribe exercise plans, create referral pathways to community programs, and establish disease-specific groups (e.g., diabetes walking clubs). Targets patients with hypertension, diabetes, obesity, or CVD. (*Preventive Healthcare*)

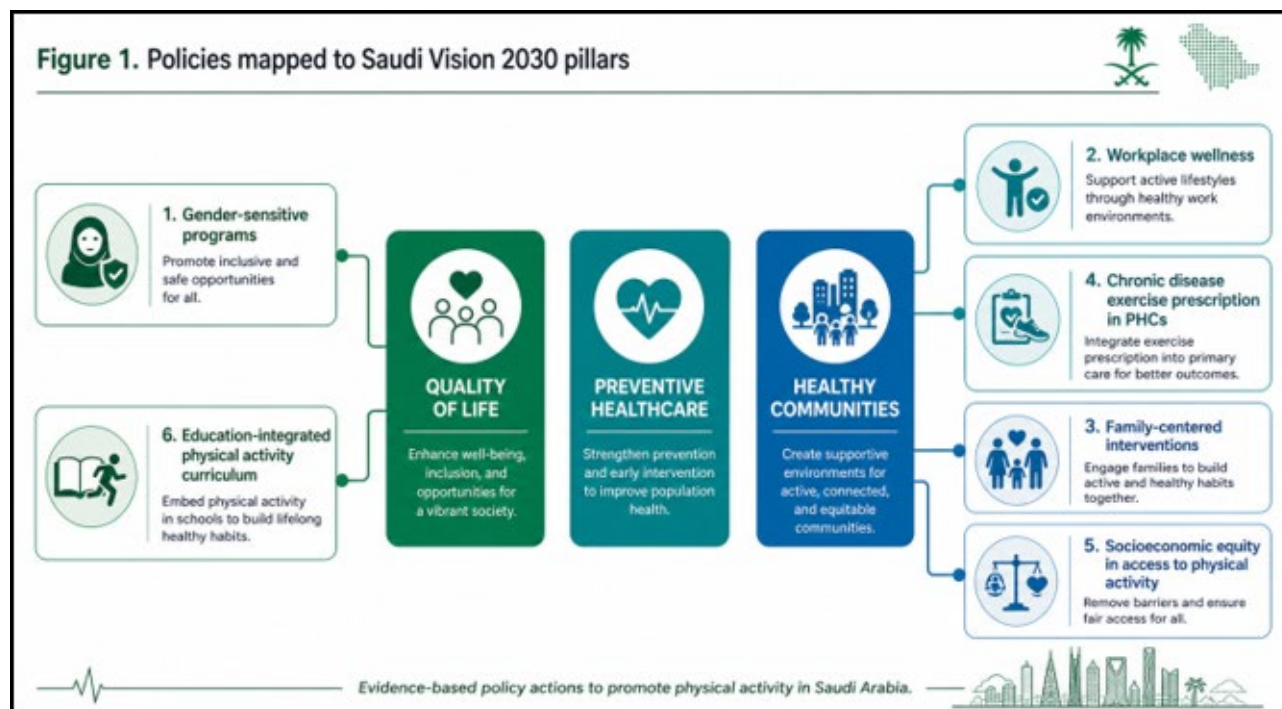


Figure 1. policy to its corresponding Vision 2030 pillars.

Policy 5: Socioeconomic Equity: High-income individuals had 60% higher odds of HEPA activity (OR = 1.60, $p = 0.015$). Provide free/low-cost access to facilities in low-income districts, distribute free equipment via PHCs, subsidize transport to parks, and use means-tested fees. Targets low- and moderate-income households. (*Healthy Communities*)

Policy 6: Education-Integrated Curriculum: Postgraduates had 50% higher odds of HEPA activity (OR = 1.50, $p = 0.026$). Integrate daily PE into all school levels, train teachers in inclusive programming, establish after-school clubs, and include activity literacy in university requirements. Targets children (6–18 years), university students, and adult learners. (*Quality of Life*)

This study's findings reaffirm the importance of addressing physical inactivity in Saudi Arabia within the Saudi Vision 2030, which encourages healthy lifestyles. More focused and extensive interventions are recommended. Future research should prioritize reviewing existing programs, investigating culturally sensitive issues, addressing socioeconomic equity, and including the influence of chronic conditions and family dynamics into intervention frameworks. The findings should guide policy creation and healthcare initiatives that encourage evidence-based, long-term gains in population health.

Limitations

Several limitations warrant careful consideration. The first limitation is that the study used a cross-sectional design, which limits causal inference. Furthermore, self-reported physical activity was collected using the Global Physical Activity Questionnaire (GPAQ), which must be reported over the 12 months preceding the exposure and the outcome, leading to recall bias that may be a factor in the gap between subjective reporting and true levels of activity due to social desirability bias (under-reporting). Finally, perhaps the most important weakness of this research is that only subjects presenting to Primary Health Care Centers (PHCs) are included, which introduces a potential for selection bias. Subjects attending PHCs have higher comorbidities, chronic

illnesses, or treatment-seeking behavior than the general population, which impairs the external validity of the results. This probably explains the high prevalence of chronic conditions in our sample (62.9%), which is higher than the most recent estimates reported by the Saudi Ministry of Health. Consequently, our results could exaggerate the connection between chronic disease and inactivity by not being representative of healthy adults who do not typically visit healthcare settings. However, PHCs would remain the most accessible first point of contact for the large majority of the Saudi population and serve as a pragmatic and adequately representative sampling frame for national health surveys that use stratified random sampling. Fourth, while stratified random sampling was used, response rates were slightly lower in some areas. Fifth, the investigation included only 12-month follow-up data collection, so seasonal variation was not possible. Future studies should consider community-based sampling methods, including household, workplace, or public space recruitment, as a supplement to data obtained by the PHC, which is subject to selection bias.

CONCLUSION

This study revealed low physical activity among the population, indicating a need for targeted intervention. Such interventions may help address socioeconomic inequities, promote workplace wellness, and integrate exercise into healthcare, thereby potentially enhancing public health outcomes and supporting Saudi Vision 2030. Key modifiable factors associated with inactivity include female gender, lower education, non-employment, low income, presence of chronic diseases, larger family size, and sedentary work.

Authorship Contribution: M.H.A. conceived the study, conducted all research phases (design, data collection, analysis), and wrote the manuscript.

Potential Conflicts of Interest: None

Competing Interest: None

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