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Research Article

The prevalence and pattern of physical activity and its relation to socio demographic correlates among the population in Makkah, Saudi Arabia

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Abstract

Background: Although promoting a healthy lifestyle that includes physical activity is essential to preventing chronic diseases, little is known about the prevalence of physical activity and its correlation to socioeconomic factors among the population of Makkah in Saudi Arabia. Thus, this study aims to explore the prevalence and pattern of physical activity and its relation to socio-demographic correlates among this population.

Methods: A web based cross-sectional convenience non-probability study was used study to choose 385 participants aged > 18 from Makkah's general population between May 2023 and September 2023. The Arabic version of the Global Physical Activity Questionnaire (GPAQ), which had previously been validated, was used to explore physical activity. The exact probability test and the Pearson chi-square test were used to evaluate the correlation between social-demographic factors and physical activity.

Results: Overall, exactly 105 (27.3%) of the study participants engaged in physical activity, of whom 15.1% practiced walking, 9.6% practiced weightlifting/bodybuilding, 0.3% played football, and 1.3% practiced other types. The predominant reasons cited for not engaging in physical activity were time insufficiency, reported by 60%, lack of interest (19.3%), lack of suitable places (16.4%), and health limitations (4.3%).

Conclusion: We found that majority of the studied participants were physically inactive; lack of time is their main barrier. There is a need to encourage and motivate them to engage in physical activity to cultivate a healthy lifestyle in the general population.

INTRODUCTION

Physical inactivity is related to a range of chronic illnesses, such as obesity, diabetes, cardiovascular disorders, osteoporosis, and mental impairments. It is also a major contributor to early mortality (Alqahtani et al., 2020, Katzmarzyk et al., 2021). Physical activity is any movement requiring the use of energy, such as walking, cycling, sports, and recreational activities like dancing and yoga (Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World, 2018).

The risk of chronic diseases can be considerably reduced by engaging in regular physical activity, like type 2 diabetes, heart disease, and obesity and it can also improve cognitive health by reducing the risk of depression and anxiety, For optimal health, adults are encouraged to participate in a minimum of 150 minutes of moderate-intensity physical activity per week or 75 minutes of vigorous-intensity physical activity, along

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with muscle-strengthening activities at least two days per week. Children and adolescents are advised to partake in at least one hour of physical activity with moderate to vigorous intensity each day (World Health Organization: WHO, 2024). Many studies indicate more physical inactivity in northern and central Saudi Arabia versus southern and eastern regions (Al- Hazzaa et al., 2011, Prevalence of Physical Activity and Inactivity Among Saudis Aged 30-70 Years. A Population-based Cross-sectional Study, 2007b, The Prevalence of Physical Activity and Its Socioeconomic Correlates in Kingdom of Saudi Ara- bia : A Cross-sectional Population-based National Survey, 2016). Factors that negatively impact participation in physical activity in Saudi Arabia include age, obesity, declining cardiopulmonary function, high levels of television viewing, and a lack of physical education programs, On the other hand, factors that positively impact physical activity include higher education levels and income (Al- Hazzaa et al., 2012, Trost et al., 2002). Adolescents and adults cite health, weight management, recreation, and socialization as the main reasons for engaging in physical activity, Barriers to physical activity include a lack of time and appropriate places for both genders and a lack of facilities and resources, particularly for females (Al- Hazzaa et al., 2014, Physical Activity Behavior Predictors, Reasons and Barriers Among Male Adolescents in Riyadh, Saudi Arabia: Evidence for Obesogenic Environment, 2015).

The prevalence of physical activity lasting at least 150 minutes per week among Makkah adults increased from 36% in males and 15% in females in 2019 to 40% and 20%, respectively, in 2021 Meanwhile, the prevalence of insufficient physical activity declined from 67% in males and 88% in females in 2019 to 58% and 79%, respectively, in 2021 (Household Sports Practice Survey, 2021, Household Sports Prac -tice Survey, 2019). Physical activity has become more common in Saudi Arabia in recent years (Household Sports Practice Survey, 2021).

METHODS

Study design, setting and time

This cross-sectional study used a convenient non-probability sampling technique and was conducted in Makkah region, Saudi Arabia, from May 2023 to September 2023.

Study participants

Participants' inclusion criteria were both Saudi and non-Saudi residents of Makkah and both genders who were over 18 years old and held an education level above primary school. We excluded people with special needs.

Sample size

For this study, we used OpenEpi version 3.0 (OpenEPI Epidemiologic Statistics, n.d.) to calculate the minimum sample size required. The official census shows that the population of both Saudi and non-Saudi people in Makkah is 1,578,722 (General Authority for Statistics. Makkah Al Mukarramah , 2016). With a confidence interval (CI) of 95%, a frequency assumed to be 50%, and a design effect of 1, we calculated the required sample size to be 385 individuals.

In scoring physical activity, we should firstly define metabolic equivalent (MET) as a ratio that compares a person's working metabolic rate with their resting metabolic rate. A resting metabolic rate is the amount of energy the body uses when at rest. In contrast, the working metabolic rate is the body's energy during physical activity.

We use the concept of MET to determine a person's caloric consumption during physical activity. One MET is the energy cost of sitting quietly, equal to the consumption of 1 kcal/kg/hour.

When analyzing GPAQ data, we use existing guidelines to estimate caloric consumption during physical activity. It is estimated that a person's caloric consumption is four times higher when moderately active than when sitting quietly and eight times higher when vigorously active. Therefore, using GPAQ data, we calculate the participant's overall energy expenditure by assigning 4 METs to moderate activities and 8 METs to vigorous activities.

To calculate a categorical indicator for physical activity, we consider the total time spent, number of days, and intensity of activity undertaken in a typical week. The three physical activity levels used to classify populations are low, moderate, and high.

The criteria for each of these levels are as follows, High for a person is classified in this category if they meet any of the following criteria, Vigorous-intensity activity for at least three days, achieving a minimum of 1,500 MET-minutes/week, OR seven days of any combination (walking, moderate or vigorous-intensity activities), achieving at least 3,000 MET-minutes/week.

Moderate A person is classified in this category if they do not meet the criteria for the ḧighc̈ategory but meet any of the following criteria, Three days or more of vigorous-intensity activity of at least 20 minutes/day, OR five days or more of moderate-intensity activity or walking of at least 30 minutes/day, OR five days or more of any combination (walking, moderate- or vigorous-intensity activities), achieving a minimum of 600 MET-minutes/week.

Low is A person who falls into this category if they do not meet the earlier criteria for high or moderate physical activity levels.

Data collection

A previous validated questionnaire from the World Health Organization for physical activity was used. An online Arabic questionnaire was planned using Google

Form and then electronically distributed via social media (WhatsApp, Twitter, Telegram) to all the general population. questionnaire comprises Three parts. Part 1 include question that Ensure the responses are eligible for the inclusion criteria, Part 2 includes a consent form, and questions related to the participant's sociodemographic details such as age, gender, marital status, level of education, job, and income.

Part 3 contains questions about Physical activity, using the Global Physical Activity Questionnaire (GPAQ) tools, Arabic version with assessed validity and reliability (Global Physical Activity Questionnaire (GPAQ) Analysis Guide, 2021, GPAQ, n.d , Doyle et al., 2019) and we committed to its scoring method. The GPAQ covers several components of physical activity, such as intensity, duration, and frequency, and it assesses three domains in which physical activity is performed (occupational physical activity, transport-related physical activity, and physical activity during discretionary or leisure time).

Data analysis

After collecting and reviewing the data, it has been imported to version 21 of the Statistical Package for the Social Sciences (SPSS), which is owned by IBM. Every statistical technique employed had a two-tailed alpha threshold of 0.05, and a P value of less than or equal to 0.05 was deemed significant. Frequency distribution and percentage were prescribed for the study variables, such as participants demographic data, physical activity practicing, types, and pattern. Also, reasons of not practicing were tabulated while overall physical activity level was graphed based on scoring for GPAQ. Cross tabulation for showing factors associated with physical activity among study participants by means of Pearson chi-square test and exact probability test when there were minor frequency distributions.

RESULTS

The survey was completed by 385 participants with a response rate of 88%, aged between 18 and 62, with an average age of 25.9 ± 9.4 years. Among them, 214 (55.6%) were female, and 372 (96.6%) were Saudi. Most of the participants, 300 (77.9%), were single. Regarding educational attainment, 284 (73.8%) held university degrees. In terms of monthly income, 267 (69.4%) reported earning less than 5000 SR, while 62 (16.1%) reported an income exceeding 10000 SR. Regarding employment, 258 (67%) were students, 62 (16.1%) were non-health care workers, and 12 (3.1%) were health care workers (Table 1).

Exactly 105 (27.3%) of the study participants practiced physical activity, of whom 15.1% practiced walking, 9.6% practiced weightlifting/body building, 0.3% played football, and 1.3% practiced other types. A total of 46 (43.8%) practiced activities regularly. The more commonly reported reasons for not practicing were lack of time (60%), lack of interest (19.3%), lack of suitable places (16.4%) and health limitations (4.3%) (Table 2).

Of the respondents, exactly 33 (31.4%) report that their work or the environment in which they operate necessitates intense activity. Examples of such activities include carrying or lifting large loads, excavating, or construction work, all of which cause noticeable increases in heart rate or respiration that last for at least 10 minutes. Fifty-five (52.4%) said that their work or environment involves moderate activity. As for leisure time, 74 (70.5%) do vigorous activities, fitness, or leisure activities, such as brisk walking, swimming, cycling, or volleyball, that raise breathing and/or heart rate for 10 minutes or more. 76 (72.4%) do moderate sports, fitness, or recreational activities. As for transportation, 58 (55.2%) walk or bike continuously for at least 10 minutes to reach their destination (Table 3).

Exactly 20 (19%) of those who practice physical activity did high intensity activity, 23 (21.9%) did low level, but most (59%) practiced a moderate level of intensity (Figure 1).

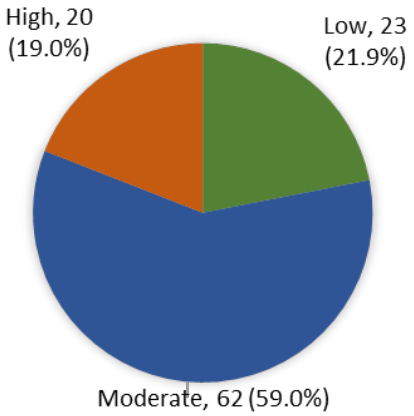

Figure 1: Intensity of physical activity level among physically active study participants, Makkah, Saudi Arabia (n=105).

Thirty-two percent of male participants practiced physical activity versus 23.4% of female participants, with reported statistical significance (P=.047). Also, 33.47% of participants with a low education level practiced physical activity in comparison to 25% of university graduates (P=.049) (Table 4).

DISCUSSION

The relationship between physical activity and sociodemographic characteristics in the general population in Makkah city is insufficient. In our study we aimed to examine the association between physical activity and sociodemographic characteristics and the pattern of physical activity in Makkah. Our finding reveals 27% of participants practiced PA, walking was the preference pattern. Also, male perform PA more than female.

Table 1: Personal data of study participants, Makkah, Saudi Arabia.

Personal data	n	%
Age in years		
18-20	78	20.3
21-24	197	51.2
25-30	41	10.6
> 30	69	17.9
Gender		
Male	171	44.4
Female	214	55.6
Nationality		
Saudi	372	96.6
Non-Saudi	13	3.4
Marital status		
Single	300	77.9
Married	78	20.3
Divorced / widow	7	1.8
Educational level		
Secondary / below	101	26.2
University / above	284	73.8
Monthly income		
<5000 SR	267	69.4
5000-10000 SR	56	14.5
>10000 SR	62	16.1
Work field		
Not working	53	13.8
Student	258	67.0
Non-health care worker	62	16.1
Health care worker	12	3.1

Table 2: Prevalence of physical activity, types, and reasons of not practicing, Makkah, Saudi Arabia.

PA practice	n	%
Physical activity you usually practice		
Walking	58	15.1
Weightlifting/body building	37	9.6
Swimming	4	1.0
Playing football	1	3
Others	5	1.3
Not practicing	280	72.7
Do you do physical activity regularly? (n=105)		
Yes	46	43.8
No	59	65.2
If no, why? (n=280)		
Lack of time	168	60.0
Lack of interest	54	19.3
Lack of suitable places	46	16.4
Health status limitations	12	4.3

The Centers for Disease Control and Prevention (CDC) emphasizes the need for increased physical activity rates among the public. Their guidelines suggest specific amounts and types of physical activity to sustain or enhance overall health and decrease the risk of chronic diseases (Physical Activity, 2019). Regular physical activity is crucial in managing chronic conditions and their com- plications, making it even more important for individuals with such conditions to engage in physical activity (Anderson & Durstine, 2019, Physical Activity and Health, 2009). The World Health Organization (WHO) states that 80% of adolescents and 27% of adults worldwide fail to meet the guided levels of physical activity. This lack of physical activity not only impacts individual health and well-being but also places a financial burden on healthcare services and society (World Health Organization: WHO, 2024b, Hallal et al., 2012).

The study revealed that slightly over 25% of par-

Table 3: Pattern of physical activity among physically active study participants, Makkah, Saudi Arabia (n=105).

Pattern	n	%
Do you perform high-intensity tasks at work, including moving or lifting heavy objects, digging, or construction work, for at least ten minutes at a time, which generates significant increases in heart rate or breathing?		
Yes	33	31.4
No	72	68.6
Does your work entail moderate-intensity physical exertion that results in significant increases in heart rate or respiration, such as lifting or carrying heavy objects, excavating, or building work that lasts for at least ten minutes nonstop?		
Yes	55	52.4
No	50	47.6
Do you get to and from work by walking or riding a bicycle for at least ten minutes at a time?		
Yes	58	55.2
No	47	44.8
Do you engage in any high-intensity sports, exercise regimens, or leisure activities that need you to breathe more deeply or beat your heart rate more quickly than 10 minutes at a time? Examples of these activities are brisk walking, cycling, swimming, or volleyball.		
Yes	74	70.5
No	31	29.5
Do you engage in any moderate-intensity physical activities, such as volleyball, swimming, cycling, walking, or aerobics, that require you to breathe more deeply or elevate your heart rate for longer than ten minutes at a time?		
Yes	76	72.4
No	29	27.6

ticipants practice physical activity, mainly walking, weightlifting/bodybuilding, and playing football. A study conducted in Europe demonstrate (60% male, 62% female) involved in moderate to vigorous PA at least 5 days a week (Prevalence of Physical Activity in European Adults — Compliance with the World Health Organization's Physical Activity Guidelines, 2015). Another study reported by Alqahtani et al. (2020b), who documented that 17.4% of the Saudi population practice physical activity. The most report-ed activities included walking, playing football, body-building, and swimming, which concordance with the current study findings. Less than half practiced activities regularly. As for the practicing activity pattern, one-third reported that their work or environment in-volves vigorous activity. However, more than half said their work or environment involves moderate activity. As for leisure time, most of the study participants do vigorous sports, fitness, or recreational activities in contrast to the finding that reported in literature re-view (Alqahtani et al., 2020b, Katzmarzyk et al., 2021b). An aerobic exercise, such as swimming and walking, which was the predominant type of physical activity in Saudi Arabia. Also, nearly the same portion do moderate sports (Alqahtani et al., 2020b), regarding transportation, more than 50% of participants walk or bike continuously for at least 10 minutes to reach their distension, compared to another study, about ninety-four percent of their respondents go to places by walking or using a bicycle for a minimum of 10 minutes (View of Physical Activity as a Predictor of Heart Diseases Among Hypertensive Patients in Saudi Arabia, n.d.)

A higher level of physical activity was reported in the United States (US) where 48% of the study adults meet physical activity guidelines (Prevalence of Self-Reported Physically Active Adults --- United States, 2007, 2008). According to Teixeira et al. (2019), Portuguese adults engage in moderate to vigorous physical activity at 30% and 27% respectively, nearly the rate of physical activity among the Saudi population. Also, In China, 78.1% of people in rural areas engage in physical activity compared to only 1.8% in urban areas, it represents variations in occupation those who work in rural areas their jobs require physical effort and usually they work in multiple jobs in contrast to work in urban areas less physical activity is required (Muntner et al., 2005). The prevalence of physical activity in Nepal was exceptionally high, surpassing 95% of the general population, The Most cited reason is that Many of Nepal's population work in the agriculture sector, which explains the high level of occupational and physical activity. Additionally, most of the Nepalese population lives in rural areas, where walking is a standard mode of daily commuting due to relatively poor access to transportation infrastructure for motor vehicles, according to Pedisic et al. (2019). In the current study, as for correlates of practicing physical activity, it was found that a significantly higher level was reported among male participants, which is in concordance with many literature findings (Alqahtani et al., 2020c, Al-Eisa & Al-Sobayel , 2012b, Baranowski et al., 1993b, Ansari et al., 2014b).

In our study we found that female practice physical activities less than men, which is comparable to Fer-

Table 4: Factors associated with physical activity among study participants, Makkah, Saudi Arabia.

Socio-demographics	Practicing physical activity				p-value
	Yes		No		
	n	%	n	%	
Age in years					
18-20	22	28.2	56	71.8	.787
21-24	57	28.9	140	71.1	
25-30	10	24.4	31	75.6	
> 30	16	23.2	53	76.8	
Gender					
Male	55	32.2	116	67.8	.047*
Female	50	23.4	164	76.6	
Nationality					
Saudi	102	27.4	270	72.6	.730$
Non-Saudi	3	23.1	10	76.9	
Marital status					
Single	84	28.0	216	72.0	.258
Married	21	26.9	57	73.1	
Divorced / widow	0	0.0	7	100.0	
Educational level					
Secondary / below	34	33.7	67	66.3	.049*
University / above	71	25.0	213	75.0	
Monthly income					
<5000 SR	73	27.3	194	72.7	.507
5000-10000 SR	18	32.1	38	67.9	
>10000 SR	14	22.6	48	77.4	
Work field					
Not working	11	20.8	42	79.2	.700
Student	74	28.7	184	71.3	
Non-health care worker	17	27.4	45	72.6	
Health care worker	3	25.0	9	75.0	

P: Pearson X2 test $: Exact probability test * P< 0.05 (significant)

nández et al. (2016), found that women with higher body mass indexes perceived greater barriers to physical activity, In this study, the surprising finding was that participants with a low education level showed an increased level of physical activity than participants with a high education, which may be attributed to the fact that more highly educated participants may have jobs with sedentary lifestyle and thus a lack of time and opportunity.

In this study, among individuals who did not engage in physical activity, the most cited reasons included, time insufficiency, lack of interest, lack of suitable places, and health limitations, according to Pandolfo et al. (2016), the most frequently mentioned barriers to physical activity were having numerous tasks to complete, time insufficiency, and unfavorable weather conditions. Also, Müller and Silva (2013) assessed adolescents from rural areas and found that lack of time due to studies and homework was the main barrier .

CONCLUSION

Most of the Study Participants lack physical activity. Only one-fourth of study participants practice physical activity, mainly walking, weightlifting/bodybuilding, and playing football. Less than half practiced activities regularly. The lack of time, interest, suitable places, and health limitations are the primary barriers to physical activity, which is essential to preserving both mental and physical well-being. So, encouraging people to engage in physical activity is crucial for promoting a healthy lifestyle in the general population.

LIMITATION

To the best of our knowledge, this study is the first in Makkah to investigate the prevalence and patterns of physical activity. It also examines the correlation be t ween physical activity and socio-demographic fac-tors, although it is essential to acknowledge that the study has few limitations. The study collected data through an online questionnaire, which may have affected its validity. Additionally, in the narrow age group most of our responders were younger than 30 years and students. and finally, since this study was performed only in one city, its findings cannot be generalized to other cities in Saudi Arabia. Our study is the first study conducted in Makkah city and examines the relation between sociodemographic data and physical activity. Therefore, further research is necessary to obtain more insights on this subject.

AUTHOR CONTRIBUTION

Each author made an equal contribution to both the research and manuscript development. They have thoroughly reviewed and approved the final draft, taking responsibility for the content and manuscript's similarity index.

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The article was proofread by Sibia .

ETHICAL APPROVAL

The study was approved by Umm Al-Qura University Institutional Research Board (IRB) (Approval No. HAPO-02-K-012-2023-02-1451) before initiating the research activities. The survey responses were gathered anonymously, and we did not obtain any personal or identifying information from the participants. To ensure confidentiality, we maintained the privacy of all the responses collected.

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DECLARATIONS

Conflict of interest: The authors have no relevant financial or non-financial interests to disclose. The authors declare no conflict of interest.

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