

AWARENESS AND PRACTICE OF PHYSICAL ACTIVITY AMONG MALE MEDICAL UNDERGRADUATES AT MAJMAAH UNIVERSITY, SAUDI ARABIA

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ABSTRACT

Objective: To probe the level of awareness and practice of the WHO recommendation for physical activity among male medical undergraduates at Majmaah University, Saudi Arabia.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: College of Medicine, Majmaah University, Kingdom of Saudi Arabia from Oct to Dec 2018.

Methodology: The study was conducted amongst 150 undergraduate medical students using a self-validated questionnaire.

Results: A total of 53 (35.33%) participants were found to be physically inactive while only 18 (12%) participants were adherent to WHO recommendations of physical activity for health benefits. Only 31 (20.66%) participants were correctly aware of the WHO guidelines for physical activity with health benefits. Football (n=47) and table tennis (n=20) were the sports played by the majority i.e., in 67 (44.66%) participants. The physically active participants encouraged peers for physical activity and preferred social media as a mean of spreading awareness about physical activity.

Conclusion: The awareness and the level of adherence of our male medical undergraduate students of physical activity according to the WHO's guidelines are at par with the results of the national studies but much lower than the developed countries like the USA.

Keywords: Medical students, Physical activity, WHO guidelines for physical study.

How to Cite This Article: Farhan MA, Kazmi SY, Irfan A, Sami W, Faraz A, Ali MI. Awareness And Practice of Physical Activity Among Male Medical Undergraduates At Majmaah University, Saudi Arabia. *Pak Armed Forces Med J* 2021; 71(5): 1669-1675. doi: <https://doi.org/10.51253/pafmj.v71i5.3864>

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INTRODUCTION

By the turn of the new millennium, World health Organization (WHO) noticed an upsurge of non-communicable diseases (NCDs), including hypertension, diabetes mellitus, coronary artery diseases, obesity, metabolic syndrome, along with breast and colon cancer.¹ The rise of these NCDs is linked to increased preference of the worldwide populace for a sedentary lifestyle. These NCDs are preventable by a change in lifestyle with the use of physical activity (PA).²

PA is defined as "any bodily movement produced by skeletal muscles that result in energy expenditure." The term exercise, on the other hand, is a subdivision of PA that may be expressed as a planned, structured, and repetitive PA for the purpose of improvement or maintenance of one or more components of physical fitness.³

PA is associated not only with a subjective feeling of wellbeing but also with the objective risk reduction of NCDs. For the prevention of NCDs, WHO proposes PA guidelines addressing the general population for three age groups: 5-17 years, 18-64 years, and 65 years

& older. For the age group 18-64 years, WHO recommends that "individuals should engage for a minimum of 150 minutes of moderate-intensity aerobic PA per week or 75 minutes of vigorous-intensity aerobic PA in a week or an equal combination of two in a bout of at least 10 minutes. Also, muscle-strengthening activities should be undertaken for two or more days per week".⁴

Since the introduction of WHO guidelines for PA, numerous studies were carried out to determine the level of PA in various subsets of the population in different countries. For example, a study conducted in 2014 on 475 healthy adults in Germany found that only 14% adhered to the WHO guidelines.⁵ Similarly, in a sample size of 51 adult students of the University of Manitoba, Canada, 69% of individuals perceived themselves as moderate to vigorous-intensity PA achievers, yet only 34.6% of participants were following the WHO's guidelines when muscle-strengthening activities were also considered.⁶ Around 64.5% of USA adults are physically active that met the WHO PA criteria, whereas, in various European countries, the PA levels among the population were much lower.^{7,8}

Kingdom of Saudi Arabia (KSA) had seen colossal economic development in the recent past. This transformation had attracted Saudi nationals to adopt

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Received: 12 Feb 2020; revision received: 04 May 2020; accepted: 14 May 2020

westernized ways of living with a resultant decline in the overall level of PA. In fact, recent national studies reflect this decreasing PA trend evident by an upsurge of NCDs in the past few decades. In one study on a sample size of 10,735 Saudis adults across the whole KSA, only 12.9% of the participants met the WHO standard of moderate-intensity PA with health benefits.⁹ This general decline PA tendency is also reperused in the university students in KSA, whereas in 2014, a study conducted on 1257 students in a medical university of KSA showed that only 14.8% of the participants were highly active physically.¹⁰ We examined the regional and local studies carried out earlier and found that investigators relied on information of physical activity based upon the response about leisure time activities, gym workouts, occupation-related physical activity, whereas very few researchers strictly considered WHO's guidelines of PA in their studies. Therefore, the present study was conducted with the objective to determine the level of awareness and practice of the WHO's recommendation for physical activity among male medical undergraduates of the College of Medicine, Majmaah University, KSA.

METHODOLOGY

A cross-sectional analytic study of a three-month duration was conducted at the College of Medicine, Majmaah University, KSA, from October to December 2018. The level of precision formula was used to calculate the sample size $n = z^2(pq)/e^2$ where n =required sample size, p =prevalence, e =margin of error, z = standard normal distribution, confidence interval=95%.¹¹ After placing the following values (where, $p=0.12$, $e=0.05$, $q=0.88$ ($1-p$), $z=1.96$), the sample size of 163 was yielded.¹⁰ Non probability consecutive sampling technique was used.

Inclusion Criteria: Male medical undergraduate students from all five years were included in the study. The complete enumeration sampling method was used for data gathering. The participation was purely voluntary, and only those medical students were included who consented for the study.

Exclusion Criteria: Participants was who were suffering from any medical or surgical condition that might preclude them from taking part in PA.

Ethical approval of the study was obtained from the Majmaah Research Institutional Ethics Committee of Basic & Health Science, Research Center Majmaah (approval no: MUREC-Nov 29/COM-2017/ 24). A self-validated questionnaire was used to collect the data from the study subjects. The first part of

questionnaire included demographic information, while the second part comprised questions related to physical activity. A trained research fellow was assigned the task to collect the data from the students. After taking verbal consent, the purpose of the study was explained to the students, and different parameters were clarified. The participants were asked to fill the form based on a recall of their PA of the past one-week. The identity of the participants was kept confidential. There were ten questions addressing the PA, which were all closedend, e.g., "On an average, how much physical activity do you perform each week (in minutes)?" The response to this question was noted, and the study participants were categorized as Inactive (performing PA <70 min/week), insufficiently active (PA duration 70-150 min/week), active (PA duration 150-300 min/week), and highly active (PA duration >300 min/week).¹²

The English version of the questionnaire was translated into Arabic language by professional translators. The Arabic version of the questionnaire was retranslated to the English language by a third party, and then both questionnaires were matched to rule out any significant disagreement.

The data were entered and analyzed using SPSS-25. Frequencies and percentages are reported for qualitative variables, whereas quantitative variables have been expressed as mean with standard deviation. Pearson chi-square and Fisher Exact test were applied to observe associations between qualitative variables. Ordinal Logistic Regression with a Backward Conditional Approach was applied to see the effect of physical activity on other study parameters. The p -value of ≤ 0.05 was considered statistically significant.

RESULTS

The number of male medical undergraduate students at the time of the study was 172, and all of them were included. A total of 156 students (90.69%) returned the form, out of which six were incomplete and were excluded from the study. Therefore, the final sample size of our study was 150.

The mean age of the participants was 22.56 ± 4.31 years. The self-declared physical inactivity (PinA) among our participants was 29.3% ($n=44$), whereas 29 study participants (19.33%) considered themselves to be active or highly active. The level of PA was highest in the first year, and it decreased considerably in the subsequent years of studies. When the duration of PA per week was considered, thirty-seven out of 150 students (24.66%) were performing moderate to vigorous

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degree PA of more than 150 minutes per week (Table-I). The students who met the WHO's criteria of performing more than 150 minutes of moderate degree PA plus muscle-strengthening exercise twice a week were only 18 (12%).

Table-I: Weekly time spent in physical activity and use of muscle stretching exercise.

Overall weekly time spent in physical activity		Muscle Stretching Exercise
Minutes per week	Frequency n (%)	n (%)
<70 (Inactive)	53 (35.33)	9 (6)
70-150 (Insufficiently Active)	60 (40)	16 (10.66)
>150 (Active & Highly Active)	37 (24.66)	18 (12)
Total	150 (100)	43 (28.66)

participants 18 (48.6%) who were active and highly active were going to the gym, whereas, majority of the participants who were insufficiently active 44 (73.3%) and inactive 43 (81.1%) were not going to gym ($p=0.008$).

Results presented in Table-III, showed that a significant association was observed between physical activity and performing the aerobic exercise ($p<0.001$) showing that majority of the participants 25 (67.6%) who were active and highly active were performing aerobic exercise, followed by active group 23 (38.3%). Moreover, a significant association was observed between performing physical activity and encouraging peers ($p=0.007$), showing that most of the participants who were highly active also encouraged their peers

Table-II: Relationship between physical activeness and various factors (n=150).

	Physical Activeness			Total	p-value
	Inactive n (%)	Insufficiently Active n (%)	Active & Highly Active n (%)		
Age					
<30 years	53 (100)	59 (98.3)	36 (97.3)	148	$\chi^2 = 1.29$ $p=0.524$
30-40 years	-	1 (1.7)	1 (2.7)	2	
Sports					
Football	11 (20.8)	20 (33.3)	16 (43.2)	47	$\chi^2 = 51.56$ $p<0.001$
Table Tennis	6 (11.3)	11 (18.3)	3 (8.1)	20	
Brisk Walk	2 (3.8)	9 (15.0)	7 (18.9)	18	
Swimming	4 (7.5)	4 (6.7)	3 (8.1)	11	
Housework	2 (3.8)	6 (10.0)	2 (5.4)	10	
Jogging / Running	2 (3.8)	7 (11.7)	5 (13.5)	14	
Cricket	1 (1.9)	1 (1.7)	-	2	
None	25 (47.2)	2 (3.3)	1 (2.7)	28	
Gym					
Yes	10 (18.9)	16 (26.7)	18 (48.6)	44	$\chi^2 = 9.66$ $p=0.008$
No	43 (81.1)	44 (73.3)	19 (51.4)	106	
Awareness all-Cause Mortality & PiA					
<10%	16 (30.2)	5 (8.3)	2 (5.4)	23	$\chi^2 = 20.68$ $p=0.005$
10-20%	4 (7.5)	11 (18.3)	2 (5.4)	17	
20-30%	17 (32.1)	16 (26.7)	12 (32.4)	45	
30-40%	10 (18.9)	16 (26.7)	13 (35.1)	39	
40-50%	6 (11.3)	12 (20.0)	8 (21.6)	26	
Awareness WHO Guideline of PA					
Yes	21 (39.6)	23 (38.3)	19 (51.4)	63	$\chi^2 = 1.78$ $p=0.410$
No	32 (60.4)	37 (61.7)	18 (48.6)	87	

Results presented in Table-II, showed a significant association between physical activity and playing sports ($p<0.001$). We can see that the majority of the participants who were active and highly active were playing football, doing the brisk walk, swimming, and jogging/running. Playing football was still the preferred sport in the group of students who were insufficiently active or inactive. However, table tennis was the second most liked sports in this group. Most of the

35 (94.6%), followed by those who were active 49 (81.7%). However, no significant association was observed between the level of physical activity and awareness about the WHO criteria for achieving health benefits from PA ($p=0.410$) and source of information for disseminating the health benefits to the general masses ($p=0.784$).

About the type of PA performed by the participants, playing football was the most popular PA

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(n=47), followed by playing table tennis (n=20), brisk walking (n=18), jogging (n=14), swimming (n=11), and playing cricket (n=2). For the question "Are you aware of any guidelines for physical activities (e.g., WHO Guidelines)," 85 participants (57.43%) had not heard about the WHO criteria for PA, while only 31 out of the remaining 63 participants who knew about these guidelines could correctly define them.

Ninety-two participants were aware of the aerobic physical activity while fifty-three were doing it. In reply to the question "In your opinion, how much PinA increases the risk of all-cause mortality compared to those who engage according to the WHO criteria of PA?", forty-five participants (30%) knew the correct all-cause mortality risk due to PinA, while 105 participants (70%) were oblivious to the correct risk

Table-III: Relationship between physical activeness and various factors (n=150).

Physical Activeness					
	Inactive n (%)	Insufficiently Active n (%)	Active & Highly Active n (%)	Total	p-value
Source of Information					
TV	5 (9.4)	8 (13.3)	6 (16.2)	19	X ² = 4.73 p=0.784
Social Media	36 (67.9)	39 (65.0)	26 (70.3)	101	
Print Media	2 (3.8)	1 (1.7)	0 (0.0)	3	
Community Campaigns	9 (17.0)	9 (15)	3 (8.1)	21	
Signposting	1 (1.9)	3 (5)	2 (5.4)	6	
Aerobic Exercise					
Yes	6 (11.3)	23 (38.3)	25 (67.6)	54	X ² = 30.15 p<0.001
No	47 (88.7)	37 (61.7)	12 (32.4)	96	
Encourage Peers					
Yes	36 (67.9)	49 (81.7)	35 (94.6)	120	X ² = 9.80 p=0.007
No	17 (32.1)	11 (18.3)	2 (5.4)	30	

Table-IV: Association between physical activity and factors using ordinal logistic regression with backward conditional approach.

	β	Wald	p-value	Odds Ratio	95% CI for Odds	
					Lower	Upper
Age						
<30 years	-4.1	1.66	0.198	1.995	0.691	2.353
Sports						
Foot Ball	2.63	7.72	0.005*	1.777	1.974	4.498
Brisk Walk	4.29	17.1	<0.001*	2.118	2.261	6.33
Housework	2.65	5.77	0.016*	0.443	0.125	0.886
Jogging / Running	2.92	7.41	0.006*	1.851	1.581	3.662
Foot Ball	1.94	3.73	0.053	1.992	0.471	2.118
Brisk Walk	2.06	3.39	0.065	0.765	0.112	1.901
Housework	-0.5	0.05	0.819	0.356	0.021	0.993
Avail Gym						
Yes	0.1	0.03	0.554	1.711	0.186	3.881
Awareness Death Risk						
<10%	-0.2	0.03	0.884	1.777	0.662	2.927
10-20%	0.48	0.27	0.598	2.118	1.369	3.335
20-30%	5.76	23.6	0.004*	2.669	1.981	4.881
30-40%	0.63	0.69	0.405	1.851	1.215	2.061
Awareness WHO Criteria						
Yes	0.08	0.03	0.853	0.337	0.119	2.917
Source of Information						
TV	-1.1	0.69	0.404	0.119	0.041	2.182
Social Media	-1.1	0.73	0.393	1.81	0.991	2.441
Print Media	-1.1	0.24	0.623	2.44	0.13	3.089
Community Campaigns	-2	2.17	0.14	1.942	0.271	2.001
Aerobic Exercise						
Yes	1.09	3.82	0.005*	2.611	1.933	4.061
Encourage Peers						
Yes	0.51	0.71	0.021*	3.774	2.172	5.995

associated with PinA. In response to the question "How would you like to spread the information about physical activity?" most of the students (n=122) believed that social media and community-wide campaigns could be the most effective way of disseminating awareness about physical activity. To another question "Do you encourage community and peers for physical activity?", 120 (80%) participants replied in affirmative.

Playing foot ball (OR=1.113 [95% CI: 1.974-4.498], Wald $\chi^2(7)=7.72$, $p=0.005$), doing brisk walk (OR=2.118 [95% CI: 2.261-6.330], Wald $\chi^2(7)=17.1$, $p<0.001$), housework (OR=0.443 [95% CI: 0.125-0.886], Wald $\chi^2(7)=5.77$, $p=0.016$) and performing jogging/running (OR=1.851 [95% CI: 1.581-3.662], Wald $\chi^2(7)=7.41$, $p=0.006$) were significant predictors of being highly active. Performing aerobic exercise (OR=2.611 [95% CI: 1.933-4.061], Wald $\chi^2(1)=3.82$, $p=0.005$) and encouraging peers (OR=3.774 [95% CI: 2.172-5.995], Wald $\chi^2(1)=0.71$, $p=0.021$) were significant predictors of being highly active. The results were presented in Table-IV.

DISCUSSION

Aerobic PA involves the body's large muscles moving in a rhythmic fashion for an uninterrupted time period. Examples include a brisk walk, jogging, bicycling, swimming, etc. Muscle-strengthening PA involves working or holding of the body's muscles against some resistance. Examples include resistance exercises and weightlifting.¹³

The moderate-intensity PA is the one in which there is a small increase in breathing and heart rate, e.g., brisk walking, whereas vigorous-intensity PA involves hard physical exertion with a significant increase in breathing and heart rate for example playing football, running etc.^{14,15}

The results showed that 44 (29.72%) medical undergraduates perceived themselves to be physically inactive, while 53 participants (35.33%) were performing PA less than 70 minutes per week. This is in contrast to a similar study carried out in 2014-15 on 450 healthcare students of Majmaah University with physical inactivity approaching 62.4%.¹⁶ Another study carried out on female students in King Khalid University Abha in 2012-13 using the General Practice Physical Activity Questionnaire (GPPAQ), where 58% of students were found to be physically inactive.¹⁷ The reasons for a low level of PinA in our study could be explained because, in the above-mentioned studies, physical inactivity was calculated based on the use of either GPPAQ or a self-validated questionnaire that do not correspond strictly to the WHO's criteria of PinA.

And also, that the PinA in female students related to the medical profession approaches 60% as found in various national studies;¹⁸ therefore, this factor could also cater to the present results as female students were not included in the study.

The level of adherence of our study participants to the WHO's guidelines of PA with significant health benefits was only 12%. A study conducted in Riyadh in adolescents in high school KSA revealed that 70 students (15.5%) were involved in a moderate degree PA five times or more per week.¹⁹ Similarly, another study conducted on the general population of 18-65 years in the Al-Hassa region, KSA on a sample size of 2176 Saudi adults, the level of PA with health benefits was 10.4%.²⁰ Among university health college students at King Khalid University, KSA a study revealed adherence to WHO recommendations PA level of 14.8% & 13.4% for moderate and vigorous-intensity PA respectively.¹⁰ Another study at Majmaah University, KSA, conducted on a sample size of 450 medical students; about 37.6% of students were engaged in regular PA, while only 7.3% of students exercised five times per week. This study does not cater for the two days of resistance exercise per week criteria of WHO recommendation; hence, the actual percentage might be lower. We considered the minimum two days muscle strengthening WHO criteria for PA that other studies did not contemplate. Although 24.66% of participants in our study adhered to the PA duration criteria of performing >150 minutes of moderate to vigorous-intensity PA per week, yet only 12% were also performing recommended muscle strengthening exercise.

The type of sports participation in our participants showed that majority of them preferred to play football even by the group stratified as insufficiently active and inactive 47 (31%), followed by table tennis 20 (13.33%), brisk walking 18 (12%), and swimming 11 (7.3%). This finding is in conformity to the other local studies where football is the most preferred sport by the youth of KSA.²¹ Football is the sport loved by the whole Arab world, and the KSA government promotes this sport among the youth by the construction of numerous football grounds in each municipality. Visiting gym was a trend seen most frequently by the active and highly active group, while the converse inclination was noted among the insufficiently active and inactive fraction.

The study results about adherence to recommended PA levels were consistent with the local studies but were disappointingly lower when compared to

developed countries like the USA, where around 84% of medical students engaged in PA levels.²² The main factors responsible for low adherence of PA standards in KSA compared to the developed world were lack of awareness of health benefits of PA and various factors related to a sedentary lifestyle, e.g., subsidized oil prices, lack of abundance of public transport with a resultant higher number of cars per family, cheap eatery in the market, availability of fast food at doorsteps, etc.²⁰

Regarding the awareness about the WHO's recommendation of PA, 63 students (42%) heard about the WHO's guidelines of PA for health benefits while only 31 (20.33%) could correctly describe it. The corresponding level of awareness in University healthcare college students at Cairo University, Egypt, was 11.9%,²³ while it was lower in other countries like the UK 18% & India 9.3%.²⁴ These results about awareness of WHO's PA guidelines were a little higher at 20.33% because the study participants were medical students who were taught the topic in the fourth year MBBS program in the block of Youth, elderly, and society module.

The all-cause mortality associated with PinA approaches 20-30% when compared with those individuals who were physically active as per the WHO's guidelines of PA²⁵. We asked this question from the participants, and the results showed that 45 participants (30%) correctly identified the increase in the risk. This awareness was due to the fact that the topic of PA was being given exclusive coverage in the curriculum of the college of medicine Majmaah University, KSA.

The comparative statistics showed that the participants who were physically active and highly active were performing aerobic exercise and were also more likely to encourage peers for PA. Majmaah is a small city with an educational hub, and the city municipality is devoted to providing the best services of PA to the general public. There are a number of gyms and sports arenas everywhere in the city, and university campuses have sports facilities like table tennis rooms where students spend their free time in sports activities. The overall environment is dynamic for PA and this is the reason for the medical undergraduates who encourage peers for PA. The participants believed that social media and community campaigns were the best media for the spread of awareness of PA benefits to the public. The medical undergraduates are regularly involved in community campaigns as part of their pre-clinical and clinical modules, namely public health &

epidemiology course, family medicine, internal medicine, etc. This was encouraging that the students of the college of medicine Majmaah University wished to disseminate the awareness to the public through modern electronic sources as well as through community campaigns.

Considering the lack of awareness about the health benefits of PA and the high level of PinA in the public of KSA, it is essential that the topic of PA and its benefits should be addressed in the country like KSA where the NCDs are on the rise. More effort is required by the education sector to incorporate the topic of PA in the curriculum of primary and secondary schools in KSA. Moreover, the playing facilities in the educational campuses should be increased, and special marks should be allocated for extra-curricular sports activities. In the Majmaah University campus, the facilities of the gym are lacking, and efforts should be undertaken for providing the facilities so that the students engage themselves in a moderate degree of PA in the free time in the college. More indoor sports arenas should be allocated for activities like table tennis, badminton, handball, volleyball, etc.

LIMITATION OF STUDY

Our study sample size was small, and this could result in a type 2 error. The study did not include female participants because there were administrative and social difficulties in liaising with the female students in their campus. The study was a cross-sectional one, and the participants' data was based on self-reporting, which could result in recall bias. Moreover, the study questionnaire was tailored according to the researchers' requirements, and authors did not follow the previously used questionnaires, e.g., IPAQ or GPAQ, etc. because those questionnaires covered a lot of information not related to the objectives of the study. For this reason, the study results about PA might not exactly equate with similar studies carried out earlier. Also, the present study was limited to the college of medicine; therefore, the results could not be generalized and extrapolated at the national level.

RECOMMENDATIONS

To disseminate the information about the health benefits of PA in the general public of KSA, a herculean effort from health and education sectors is required through integration of the topic of PA and its health benefits in the curriculum of the schools and universities, utilization of the social media, and initiation of community campaigns by the universities.

CONCLUSION

Although the awareness and the level of adherence of our male medical undergraduate students to PA according to the WHO's guidelines was at par with the results of the national studies yet it was much lower than the developed countries like the USA. The preference to engage in sports activities and gym workouts by the study participant group is encouraging.

Conflict of Interest: None.

Authors' Contribution

MAF: Conception, design, SYK: Data design, AI: Data design, WS: Interpretation of data, AF: Data acquisition, MIA: Data approval

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