

Effect of physical activity on mental wellbeing among teachers of secondary school in Almadina city, Saudi Arabia

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ABSTRACT

Background: Physical activity has many beneficial effects on mental health. Benefit of physical activity appears proportional to the amount of activity rather than the intensity of physical activity. **Objectives:** The aim of this study was to assess the effect of physical activity on mental wellbeing of teachers of secondary school in Almadina city- 2019. **Subjects and Methods:** A descriptive cross sectional study was applied among a representative multi-stage random sample of secondary school teachers in Almadina. Two validated questionnaires, in addition to personal data were utilized to collect data; Short-form International Physical Activity Questionnaire (IPAQ) version 2.0 to evaluate physical activity and the Warwick-Edinburg Mental Wellbeing Scale (WEMWBS) to assess mental wellbeing both in Arabic language. **Results:** The study included 230 teachers. Their age ranged between 27 and 59 years with a mean \pm (SD) of 39.4 (\pm 7.6) years. Almost half of them were males (50.4%). Most of the teachers were either overweight (30%) or obese (40.9%). Almost half of teachers (48.3%) reported moderate level of physical activity whereas only 9.1% reported high level. Low level of physical activity was mentioned by 42.6% of the respondents. There was no significant difference between male and female teachers regarding physical activity level. The association between level of physical activity and body mass index was statistically significant, $P < 0.001$. Majority of the teachers expressed high mental wellbeing level while only 3.5% of them had low level of mental wellbeing. High level of mental well-being was observed among 95.6% of females compared to 85.3% of males, $P = 0.008$. There was a statistically significant positive association between levels of physical activity and mental well-being among teachers ($P = 0.002$). **Conclusion:** Level of practicing physical activities among secondary school teachers in Almadina is suboptimal, with no gender difference. Majority of the teachers have high mental well-being, particularly females. There is a positive association between levels of physical activity and mental wellbeing among teachers.

Keywords: International Physical Activity Questionnaire, physical activity, Saudi Arabia, students

Introduction

The World Health Organization (WHO) defines Health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.^[1]

There is a clear association between physical activity and general mental & physical wellbeing, Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.^[2]

There are many published studies reported physical activity has many beneficial effects on mental health. Benefit of physical activity appear proportional to the amount of activity, thus any increase in activity add some benefits,

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emphasizing the amount rather than the intensity of physical activity.^[3]

Since the teaching profession is characterized by a relatively high level of stress, which might be improved through regular participation in physical activity.^[4] Physical activity is associated with a number of biological changes that could have an impact on mental health. Physical activity (PA) is considered one of the most potent stimuli of neurogenesis of the many peripheral factors known to be triggered by PA. Serotonin, β -endorphin and adiponectin are best known for their stimulatory effects on hippocampal proliferation, these changes may have direct mood-enhancing effects.^[5]

The present study was carried out to assess the effect of physical activity on mental wellbeing of teachers of secondary school in Almadina city, Saudi Arabia, 2019.

Subjects and Methods

A descriptive cross sectional study was applied in Almadina city-the kingdom of Saudi Arabia. Kingdom of Saudi Arabia lies at the furthestmost southwestern part of Asian continent, and occupies approximately four-fifth of the Arabian Peninsula with a total area of The KSA is 2,250,000 square kilometers and total number of population is estimated to be 30,770,375 at 2014 (according to The last big national statistical survey).^[6] Almadina city is the second-holiest city in Islam after Mecca where prophet Muhammad (peace be upon him) spent the last ten years of his life and died there after completion of his mission and preaching Islam. The total number of population is estimated to be 1,180,770 at 2010 estimate.^[7]

The General Directorate of Education in Almadina province, Almadina city is divided into four educational administrative sectors: Northern, Western, Eastern, and Southern. The total number of high schools in Almadina is 185 schools^[8] and the number of classes is 2165 classes.^[9]

The study population included all teachers of high secondary schools (male and female); males were 2583, females were 3006 and the total number was 5589 teachers.^[10,11]

The number of high secondary school is 185 schools; the selection was done by multistage random sampling technique.

Stage 1: The secondary schools of Almadina is stratified into four educational administrative sectors (Northern, Western, Eastern, and Southern).

Stage 2: two schools from each sector was selected using simple random technique.

Stage 3: Cluster sampling, all teachers of the selected schools were invited to voluntarily participate in this study.

The study included all teachers of high secondary schools in Almadina city in 2019 (males and females). Administrators were excluded from this study.

The sample size was calculated by using Epi info-6 statistical software.

At confidence interval of 95%,

Error limit of 5%,

Considering expected frequency of physical activity of normal population as 19.0%.^[12]

Calculated sample size was 227 teachers.

The researcher used two validated questionnaires, in addition to personal data which contains (age, marital Status, specialty, number of working years, chronic disease that he/she has, height and weight of the participant).

Short-form International Physical Activity Questionnaire (IPAQ) version 2.0 was used to assess physical activity among teachers. It has been validated in 12 countries. These instruments have acceptable measurement properties for monitoring population levels of PA among 18–65-year-old adults in diverse settings. The questionnaire collects information on the time (i.e. number of days and average time per day) spent being physically active and measures vigorous-intensity activity, moderate-intensity activity, walking activity, and sitting in the last seven consecutive day period. The categorical score is divided into 3 categories; Category 1” Low” This is the lowest level of physical activity. Those individuals who not meet criteria for categories 2 or 3 are considered to have a ‘low’ physical activity level, Category 2” Moderate” is either of the following criteria, 3 or more days of vigorous-intensity activity of at least 20 minutes per day, or 5 days or more of moderate-intensity activity and/or walking of at least 30 minutes per day, or 5 days or more of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum total physical activity of at least 600MET-minutes/week, and Category 3 “High” is either of the following criteria, vigorous-intensity activity on at least 3 days or 7 days or more of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum total physical activity of at least 3000 MET-minutes/week. These activity categories may be treated separately to obtain the specific activity patterns or multiplied by their estimated value in Metabolic Equivalent of Tasks (METs) and summed to gain an overall estimate of physical activity in a week, these scoring system according to IPAQ scoring protocol.^[13] The following values were used for the analysis of IPAQ data: walking at work = 3.3 METs, moderate work = 4.0 METs and vigorous intensity activity = 8.0 METs.^[14]

Regarding mental wellbeing, it was assessed by The Warwick-Edinburg Mental Wellbeing Scale (WEMWBS). The

Arabic version of this scale used in this research was obtained from (WEMWBS).^[15] It measures positive aspects of mental health in the prior 2 weeks. It is an ordinal scale comprising 14-item scale has five response categories; (“None”- “rarely” – “sometimes” –” almost” - “All the time”). Responses were summed to identify the final score, 14–70, indicating low to high positive mental well-being. According to the scoring system, the results were interpreted as follow (score 0-22) Low wellbeing, (score 23-32) moderate wellbeing and (score 33-70) high wellbeing.^[16]

The meeting was held with teachers at their break times, the objective of the study was explained to them in details, after that the questionnaire was distributed to them “self-administered questionnaire”, where they filled the questionnaire and handled back in same setting. For female teachers, the researcher explained the objectives of the study in details to the trained female assistant who was in charge of female schools.

The data were coded, entered and analyzed by researcher using SPSS software statistical program version 22. Variables were plotted in tables and graphs. Categorical data were analyzed by using Chi-square test while numerical data were analyzed by ANOVA test to compare the means of more than two groups. The result was considered to be statistical significant if the *p* value was < 0.05.

Approval of the regional research and ethical team was obtained. Also, approval of Ministry of Education was obtained. Written consent was taken from all participants before study. Confidentiality of personal date was taking in consideration.

Results

Personal characteristics of the participants

The study included 230 teachers. Age was available in 220 teachers and ranged between 27 and 59 years with a mean \pm (SD) of 39.4 (\pm 7.6) years. The duration of work in teaching ranged between 4 and 31 years (13.1 ± 7.4 years). Almost half of them were males (50.4%). Majority of the respondents were married (81.4%). Islamic culture (21.5%) and Arabic language (21%) were the most frequent reported specialties. Prevalence of current smoking was 16.6%; Chronic diseases were reported by 36.6% of the teachers. Table 1

Most of the teachers were either overweight (30%) or obese (40.9%) whereas only 28.3% were normal subjects.

Physical activity

Figure 1 summarizes the level of physical activity among secondary school teachers. Almost half of them (48.3%) reported moderate level of physical activity whereas only 9.1% of them reported high level of physical activity. Low level of physical activity was mentioned by 42.6% of the respondents. Walking was practiced by most of the respondents (71.7%) whereas

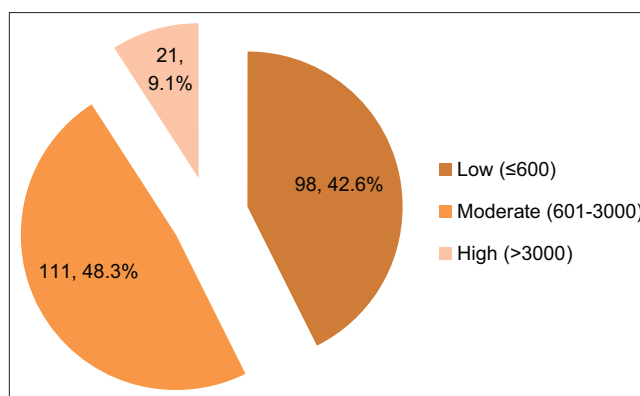


Figure 1: Level of physical activity (MET min/week) among secondary school teachers, Almadinah

Table 1: Personal characteristics of the participants (n=230)

Variables	Range	
Age (years) [n=220]		
Range	27-59	
Mean \pm SD	39.4 \pm 7.6	
Duration of working (years) [n=189]		
Range	4-31	
Mean \pm SD	13.1 \pm 7.4	
	Frequency	Percentage
Gender		
Male	116	50.4
Female	114	49.6
Marital status [n=220]		
Single	30	13.6
Married	179	81.4
Divorced	8	3.6
Widowed	3	1.4
Specialty [n=186]		
Chemistry	16	8.6
Physics	12	6.5
Islamic culture	40	21.5
Mathematics	32	17.2
Arabic language	39	21.0
Sociology	19	10.2
Sports	5	2.7
Others	23	12.4
Smoking status [n=229]		
Smoker	38	16.6
Non-smoker	189	82.5
Ex-smoker	2	0.9
History of chronic diseases [n=227]		
Yes	83	36.6
No	144	63.4

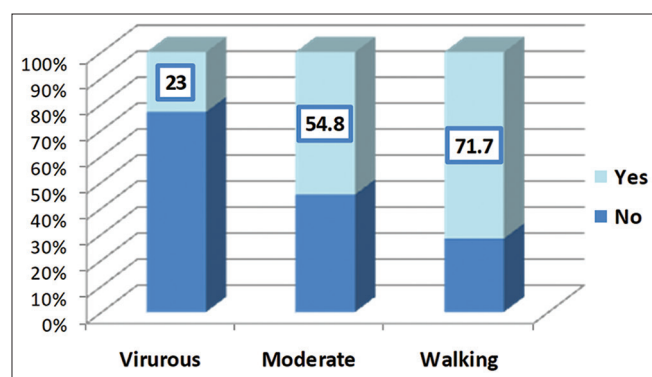
moderate and vigorous activities were practiced by 54.8% and 23% of them, respectively as illustrated in Figure 2.

There was no statistically significant difference between male and female teachers regarding type of physical activity. Table 2 showed that high level of physical activity was practiced by younger teachers compared to low level of physical activity which practiced by older teachers (35.3 ± 8.1 versus 40.8 ± 7.4 years). The difference was statistically significant,

Table 2: Personal characteristics associated with level of physical activity among secondary school teachers, Almadinah

	Level of physical activity			P*
	Low n=98 n (%)	Moderate n=111 n (%)	High n=21 n (%)	
Gender				
Male (n=116)	54 (46.6)	52 (44.8)	10 (8.6)	0.474
Female (n=114)	44 (38.5)	59 (51.8)	11 (9.6)	
Age (mean±SD)	40.8±7.4	39.0±7.4	35.3±8.1	0.009**
Working duration (mean±SD)	15.4±7.7	11.8±7.0	8.8±6.1	<0.001
Marital status [n=220]				
Single (n=30)	8 (26.7)	15 (50.0)	7 (23.3)	0.024
Married (n=179)	77 (43.8)	87 (49.4)	12 (6.8)	
Divorced/widowed (n=11)	6 (54.5)	5 (45.5)	0 (0.0)	
Specialty [n=186]				
Chemistry (n=16)	8 (50.0)	7 (43.8)	1 (6.2)	0.819
Physics (n=12)	5 (41.7)	6 (50.0)	1 (8.3)	
Islamic culture (n=40)	12 (30.0)	24 (60.0)	4 (10.0)	
Mathematics (n=32)	16 (50.0)	12 (37.5)	4 (12.5)	
Arabic language (n=39)	19 (47.8)	18 (46.2)	2 (5.1)	
Sociology (n=19)	9 (47.4)	9 (47.4)	1 (5.3)	
Sports (n=5)	1 (20.0)	3 (60.0)	1 (20.0)	
Others (n=23)	9 (39.1)	10 (43.5)	4 (17.4)	
Smoking status [n=227]				
Smoker (n=38)	19 (50.0)	18 (47.4)	1 (2.6)	0.234
Non-smoker (n=189)	76 (40.2)	93 (49.2)	20 (10.6)	
Type of smoking [n=37]				
Cigarettes (n=15)	8 (53.3)	6 (40.0)	1 (6.7)	0.755
Shisha (n=7)	4 (57.1)	3 (42.9)	0 (0.0)	
Both (n=15)	7 (46.7)	8 (53.3)	0 (0.0)	
History of chronic diseases [n=227]				
Yes (n=86)	44 (53.0)	35 (42.2)	4 (4.8)	0.028
No (n=144)	52 (36.1)	76 (52.8)	16 (11.1)	

*Chi-square test, **ANOVA test

**Figure 2:** Types of physical activities practiced by secondary school teachers, Almadinah

$P = 0.009$. Similarly, high level of physical activity was practiced by teachers of lower working experience compared to low level of physical activity which practiced by those of longer experience (8.8 ± 6.1 versus 15.4 ± 7.7 years). The difference was statistically significant, $P < 0.001$. Single teachers were more likely to report high level of physical activity compared to married teachers and those divorced/widowed (23.3% versus 6.8% and zero, respectively), $P = 0.024$. Patients with no history of chronic diseases reported higher significant level of high physical activity compared to those with history of chronic diseases (11.1% versus 4.8%), $P = 0.028$. Teachers' gender,

specialty and smoking status were not significantly associated with level of physical activity.

Table 3 demonstrates that 15.4% of normal subjects compared to 3.2% of obese subjects and none of underweight teachers reported high level of physical activity. This association between level of physical activity and body mass index was statistically significant, $P < 0.001$.

Mental wellbeing

Figure 3 shows that majority of the teachers expressed high mental wellbeing level while only 3.5% of them had low level of mental wellbeing.

Table 4 demonstrated that high level of mental well-being was observed among 95.6% of females compared to 85.3% of males. This difference was statistically significant, $P = 0.008$. Single teachers were more likely to report high level of mental well-being compared to married teachers and those divorced/widowed (100% versus 89.9% and 81.8%, respectively), $P = 0.031$. Patients with no history of chronic diseases reported higher significant level of high mental well-being compared to those with history of chronic diseases (84.4% versus 83.1%), $P = 0.015$. Teachers' age, working duration, specialty and smoking status were not significantly associated with level of mental well-being.

All normal subjects compared to 78.7% of obese subjects and 50% of underweight teachers reported high level of well-being. This association between level of well-being and body mass index was statistically significant, $P < 0.001$. Table 5

Association between levels of physical activity and mental well being

From Table 6 it is evident that there was a statistically significant association between levels of physical activity and mental well-being among teachers ($P = 0.002$) as none of teachers with low mental well-being level reported high level of physical activity compared to 10.1% of those having high level of well-being reported high level of physical activity.

Table 3: Association between level of physical activity and body mass index among secondary school teachers, Almadinah

	Level of physical activity			P*
	Low n=98 n (%)	Moderate n=111 n (%)	High n=21 n (%)	
BMI				
Underweight (n=2)	2 (100)	0 (0.0)	0 (0.0)	<0.001
Normal (n=65)	20 (30.8)	35 (53.8)	10 (15.4)	
Overweight (n=69)	19 (27.5)	42 (60.9)	8 (11.6)	
Obese (n=94)	57 (60.6)	34 (36.2)	3 (3.2)	

*Chi-square test

Discussion

Important medical entities such as the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommended physical activity to the general because of its considerable important role in improving public health.^[17]

World Health Organization (WHO) estimated the prevalence of physical inactivity among Saudi adults as 80%.^[18] However, the present survey reported better level as 42.6% of the secondary school teachers reported low physical activity level. This is could be attributed to the fact that we included only teachers rather than the general population in the present study.

Current study revealed that teachers who do moderate to vigorous physical activities constitute 77.8% of the total teachers. In another study carried out among Saudi physicians, 65.2% of them reported moderate to vigorous physical activities.^[19]

Results of the present study proved the association between BMI and level physical activity as high physical activity was more reported among normal subjects than overweight and obese teachers. The same has been reported by others.^[20,21]

Numerous studies reported that adult males are physically active than females.^[22-25] However, and in accordance with results of the

Table 4: Personal characteristics associated with level of mental well-being among secondary school teachers, Almadinah

	Level of mental well-being			P*	
	Low n=8 n (%)	Moderate n=14 n (%)	High n=208 n (%)		
Gender					
Male (n=116)	8 (6.9)	9 (7.8)	99 (85.3)	0.008	
Female (n=114)	0 (0.0)	5 (4.4)	109 (95.6)		
Age (mean±SD)	41.6±7.8	43.7.0±3.9	39.0±7.7	0.063**	
Working duration (mean±SD)	16.8±8.7	16.7±5.1	12.8±7.5	0.177**	
Marital status [n=220]					
Single (n=30)	0 (0.0)	0 (0.0)	30 (100)	0.031	
Married (n=179)	6 (3.4)	12 (6.7)	161 (89.9)		
Divorced/widowed (n=11)	2 (18.2)	0 (0.0)	9 (81.8)		
Specialty [n=186]					
Chemistry (n=16)	0 (0.0)	1 (6.3)	15 (93.8)	0.867	
Physics (n=12)	0 (0.0)	1 (8.3)	11 (91.7)		
Islamic culture (n=40)	2 (5.0)	0 (0.0)	38 (95.0)		
Mathematics (n=32)	2 (6.3)	3 (9.4)	27 (84.4)		
Arabic language (n=39)	1 (2.6)	2 (5.1)	36 (92.3)		
Sociology (n=19)	1 (5.3)	2 (10.5)	16 (84.2)		
Sports (n=5)	0 (0.0)	0 (0.0)	5 (100)		
Others (n=23)	0 (0.0)	1 (4.3)	22 (95.7)		
Smoking status [n=227]					
Smoker (n=38)	3 (7.9)	4 (10.5)	3 (81.6)		0.119
Non-smoker (n=189)	5 (2.6)	10 (5.3)	174 (92.1)		
Type of smoking [n=37]					
Cigarettes (n=15)	0 (0.0)	2 (13.3)	13 (86.7)	0.288	
Shisha (n=7)	0 (0.0)	1 (14.3)	6 (85.7)		
Both (n=15)	3 (20.0)	1 (6.7)	11 (73.3)		
History of chronic diseases [n=227]					
Yes (n=86)	6 (7.2)	8 (9.6)	69 (83.1)	0.015	
No (n=144)	2 (1.4)	6 (4.2)	136 (84.4)		

*Chi-square test, **ANOVA test

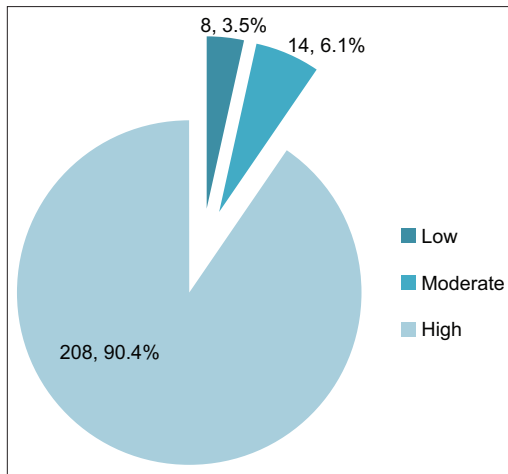


Figure 3: Level of mental well-being among secondary school teachers, Almadinah

Table 5: Association between level of mental well-being and body mass index among secondary school teachers, Almadinah

	Level of mental well-being			P*
	Low n=8 n (%)	Moderate, n=14, n (%)	High n=208 n (%)	
Body mass index				
Underweight (n=2)	1 (50.0)	0 (0.0)	1 (50.0)	<0.001
Normal (n=65)	0 (0.0)	0 (0.0)	65 (100)	
Overweight (n=69)	0 (0.0)	1 (1.4)	68 (98.6)	
Obese (n=94)	7 (7.4)	13 (13.8)	74 (78.7)	

*Chi-square test

Table 6: Association between level of physical activity and mental well-being level among secondary school teachers, Almadinah

Level of mental well-being	Level of physical activity			P*
	Low n=98 n (%)	Moderate n=111 n (%)	High n=21 n (%)	
Low (n=8)	8 (100)	0 (0.0)	0 (0.0)	0.002
Moderate (n=14)	10 (71.4)	4 (28.6)	0 (15.4)	
High (n=208)	80 (38.5)	107 (51.4)	21 (10.1)	

*Chi-square test

present study, no gender differences were observed in a study carried out by Hallal *et al.*^[26] 2003 in Brazil. This finding could reflect the change in the behavior of Saudi women, particularly educated ones towards changing in their life style by practicing physical activities as vigorous as males.

A number of studies internationally have found teachers are at relatively high risk of common mental disorders and work related stress compared to other workers.^[27-30] In disagreement with these studies, our findings show that majority of teachers had high level of mental wellbeing. Further study is recommended to explain this high level of mental well-being among our cohort of teachers. Many factors related to mental health have been

identified in the literature, both generally in the workplace and related specifically to teaching.^[31-33] In the present study, we didn't discuss these factors.

Mental well-being was higher in female than male teachers in the present study. It had been reported in a recent study that there were some differences between males and females in the association between dissatisfaction at work and wellbeing as this association was stronger among males.^[28] The reasons for the difference between male and female teachers in this regards requires further investigations.

In accordance with other cross-sectional studies^[34,35] and longitudinal studies,^[36] the present study observed a strong relationship between physical activity level and mental well-being. Knowler *et al.* (2002)^[37] reported that physical activity improves psychological as well as cognitive function. Also, an inverse association has been reported between physical activity and depressive symptomatology^[38,39] and emotional well-being.^[40]

The exact explanation of this association is still unclear. However, recently, it has been documented that physical activity is considered one of the most potent stimuli of neurogenesis of the many peripheral mediators such as Serotonin, β -endorphin and adiponectin that are well known for their stimulatory effects on hippocampal proliferation and these changes may have direct mood-enhancing impacts.^[5]

Understanding of the impacts of physical activity on mental well-being could have a clinical significance by altering the practice of a psychologist or psychiatrist in their trials to improve patients' quality of life, also it can be utilized as an auxiliary tool in the prevention and treatment of some psychiatric disorders.^[17]

Assessing the mental health of teachers is essential in avoiding longer term adverse outcomes among this vulnerable population.^[41] Furthermore, an association between poor mental health and bad work-related outcomes such as absenteeism,^[42-44] ill-health retirement^[45] and underperforming due to illness (are reported in literatures.^[44,46,47] These outcomes are very essential for the students that they teach.^[48]

Three important limitations of the present study should be mentioned. First, we did not include details of the teaching history which could affect the mental well-being. Second, the cross-sectional design of the study is considered a limitation as it proves only association and not causality between the dependent variable and independent variables. Third, conducting the study among secondary school teachers only could impact the generalizability of results over teachers of other levels.

In conclusion, Level of practicing physical activities among secondary school teachers in Almadina is suboptimal, with no gender difference. Walking is the commonest practiced physical activity. Majority of the teachers have high mental well-being, particularly females. Normal subjects reported higher levels of

physical activity and mental wellbeing compared to overweight and obese subjects. There is a positive association between levels of physical activity and mental wellbeing among teachers.

Based on the study's findings, the following are recommended.

1. Health education of teachers regarding the importance of physical activity for their mental well-being as well as the dangerousness of inactivity and obesity.
2. Specifications of days for practicing physical activities in the schools with teachers' participation.
3. Encourage physical activities at schools among teachers and students.
4. Further research is recommended including details of teaching history and relations within the schools.
5. Conducting the same study among teachers of other levels (elementary and intermediate) to have an overview of the situation in Almadinah.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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