

Physical activity, perceived benefits from exercise, and barriers among schoolteachers in Duhok, Irak

Rebar yahya Abdullah, Radhwan Hussein Ibrahim

Abstract

Introduction, Inadequate physical activity is a contributing factor to various non-communicable diseases. The benefits of regular exercise have been well demonstrated, and evidence shows that adults are becoming more sedentary and obese due to a lack of opportunities for and obstacles to exercise participation. **Objective:** The study aimed to identify physical exercise's perceived benefits and barriers among schoolteachers. **Methods:** The exercise benefits and barriers were assessed by conducting a cross-sectional design with 500 schoolteachers in Duhok City in Kurdistan Region, Iraq. Teachers enrolled using stratified simple random sampling from September 15th, 2021 to April 1st, 2022. Data on socio-demographic characteristics, perceived benefits and barriers of exercise, and physical activity levels were obtained. **Results:** Most schoolteachers (65.8%) had a low physical activity level. Exercise improves the appearance of the body as well as disposition; mental health, a functioning cardiovascular system, flexibility, and ability to sleep better at night were the most important

perceived benefits of exercise. Furthermore, "too few exercise places" was the most significant barrier to exercise, followed by other significant barriers including "inconvenient exercise facility schedules," "fatigue," "too far away from exercise places," "tiredness," "time limitations," "family responsibilities," and "being embarrassed to exercise." There was a significant difference between PA levels and exercise benefit, and the barrier score was $p < 0.0001$. **Conclusions:** Teachers have high perceptions of the physical and psychological benefits of exercise. However, perceived barriers have a higher impact on exercise habits and are linked to a lack of motivation and a lack of self-management to schedule physical exercise. **Keywords:** Physical Activity, Exercise, Benefits, Health, Barriers, School Teachers

1. Introduction

Physical activity (PA) is the movement of the body through skeletal muscle activity, leading to energy expenditure. It includes walking, gardening, jogging, climbing stairs, and playing soccer [1]. Promoting sufficient PA is a public health concern in developed and developing countries [2]. Physical inactivity is a contributing factor to Non-Communicable Diseases (NCDs) [3], exerting a negative impact on an individual's health and well-being [4], and is associated with less healthy lifestyles [5], whereas regular and sufficient levels of PA participation are a significant factor in lowering the risk of many NCDs like hypertension, colon cancer, obesity, diabetes mellitus, breast cancer, and osteoporosis, while also relieving the burden of mortality rates [6].

Despite the many benefits of physical activity, the population worldwide continues to suffer from a physical inactivity pandemic [7.8]. To

Rebar yahya Abdullah. PhD.Family and Community Health Nursing. Proffessor, Department of Community health and Maternity Nursing, College of Nursing, University of Duhok, City of Duhok, Kurdistan Region, Iraq. Email: Rebar.abdullah@uod.ac
ORCID: <https://orcid.org/0000-0001-5364-422X>

Radhwan Hussein Ibrahim. PhD.Community Health Nursing. Proffessor, University of Ninevah, Mosul, Iraq
ORCID: <https://orcid.org/0000-0002-6874-890X>

Received: July 13, 2023.

Accepted: August 27, 2023.

Conflict of interest: none.

combat the pandemic of physical inactivity, many countries have included physical activity in their national policies. However, the response is slow and ineffective [9]. Globally, there is a low PA level among adults aged 18 and over, about 28%. This means they do not get enough physical activity, as recommended by the WHO, which is 150 minutes of moderate-intensity activity or 75 minutes of vigorous-intensity activity per week. Physical inactivity has negative outcomes in various areas, such as the health care system, the economy, the environment, community well-being, and quality of life [6].

Research findings revealed that PA participation correlates with individual, interpersonal, and environmental levels [10]. Several theories argue that behavioral and psychological factors affect PA participation. The Health Promotion Model (HPM) is one of those theories that focuses on the importance of psychosocial factors like perceived benefits, barriers, and self-efficacy in determining PA participation. Studies have found that a person's self-perception of barriers, benefits, and self-efficacy is a better predictor of their behavior and has a greater impact on their health-related behaviors. [11]

The exercise benefits and barriers scale (EBBS) is a psychometric evaluation tool that can identify exercise barriers and benefit perceptions. It's been widely used by the authors [12, 13]. The EBBS is based on the Health Promotion Model, which evaluates activities that maintain or enhance well-being, such as physical activity. [13]. According to HPM, an individual's likelihood of engaging in healthy behaviors like physical activity is largely influenced by their perceived barriers and benefits. Positive or reinforcing behavioral consequences are based on perceived benefits. There are both intrinsic and extrinsic benefits, such as better health, less fatigue, and a sense of well-being (such as social acceptance or financial awards). A person may encounter perceived barriers to action such as inconvenience, unavailability, difficulty, expense, time, or personal cost when engaging in a specific behavior [14].

Teachers have a variety of challenges in their daily life and work. They must solve the problems of their students in different areas, including education, career development, and family life. Teachers are experiencing job burnout due to long-term mental stress and challenges that

affect their physical and mental health and diminish their quality of life. [15]. Physical activity is essential in this occupational group. Studies found that teachers' leisure-time PA was linked to their physical, mental, and job satisfaction [16]. Limited studies are available on PA determinants among teachers. The present study was designed to assess behavior-specific cognition factors, including perceived benefits and barriers to exercise among schoolteachers.

2. Materials and Methods

2.1. Study design and procedure

The cross-sectional design was adopted to assess perceived benefits from and barriers to exercise among public school teachers from September 15th, 2021, to April 1st, 2022.

2.2. Study participants and sampling

The current study was carried out in Duhok City, in the Kurdistan Region of Iraq. The sample consisted of elementary and high school teachers in the General Directory of Education in Duhok City. In total, 9,684 teachers were analyzed using the Cochran formula. A total of 370 schoolteachers were estimated. To account for the possibility of data loss or rejection, we increased the size of our sample to 500 teachers. A stratified-simple random sampling technique was adopted to select 500 teachers aged 18 to 64. The formal lists obtained from the General Directory of Education included the names of the teachers, schools, school type, and location. Following the selection of teachers, the author visited the schools where the selected teachers worked, obtained informed consent from the school administration and teachers, and invited teachers to engage in the current study. A consent form was signed by the teachers who agreed to participate. The author explained the study's purpose and answered questions about the study to the teachers.

2.3. Study instruments and measures

2.3.1. Socio-demographic characteristics

A questionnaire containing questions on age, gender, education level, monthly income, and

marital status was used to collect socio-demographic data for this study.

2.3.2. Exercise Perceived Benefits and Barriers (EBBS)

The scale was developed by Sechrist et al. (1987). It was used to assess exercise's perceived benefits and barriers [17]. The scale has 43 items. 29 items are statements on the benefits of exercise, and the remaining 14 items are on the barriers to exercise. The responses to these items ranged on a 4-point scale from Likert, from (4) strongly agree to (1) strongly disagree. The exercise benefits scores of items ranging from 29 to 116. The exercise barrier scores of items ranged from 14 to 56. The high score on the exercise benefit subscales indicated that the participants viewed exercise as having a high benefit perception. The high score on the exercise benefits indicated that the participants had high benefit perceptions of engaging in exercise. The high score on the exercise barriers indicated high barrier perceptions to engaging in exercise. The Cronbach alpha coefficient in this study for the EBBS scale was 0.71, the Exercise Benefits Scale was 0.83, and the Exercise Barriers Scale was 0.72.

2.3.3. Measuring PA

The long International Physical Activity Questionnaire (IPAQ) was utilized to identify the levels of a teacher's physical activity. The IPAQ assesses the duration and frequency of each physical activity category for sessions lasting 10 minutes or longer in the week prior to data collection. The IPAQ has four domains: work, transportation, household chores and gardening, and leisure time. The items are intended to provide a score for each domain for all types of physical activity, including vigorous, moderate, and walking activity. The total physical activity score across all domains was determined by adding the duration and frequency in minutes and days, respectively. It is possible to calculate domain-specific or activity-specific sub-scores.

METs values were utilized to analyze the IPAQ data (multiples of the resting metabolic rate). The IPAQ includes a scoring system that assigns an intensity code in terms of Metabolic Equivalents to every activity (METs). The metabolic equivalent time (MET) is the ratio of the resting metabolic rate to the activity-induced metabolic rate. The weighted MET minutes per week for each activity type are calculated as follows: Walking MET-min/week = 3, 3 x walking activity minutes

multiplied by the number of walking activity days. Moderate MET-min/week = 4.0 x minutes of moderate-intensity activity x moderate activity days; vigorous MET-min/week = 8.0 x minutes of vigorous-intensity activity x vigorous activity days. The total MET-minute/week value is determined by adding the scores for vigorous, moderate, and walking physical activity. The IPAQ categorized PA levels into three categories: vigorous, moderate, and low [18].

2.4. Eligibility criteria:

2.4.1. Inclusion criteria

Employed school teachers, ages 18 to 64, both genders.

2.4.2. Exclusion criteria

Those with an apparent physical disability or handicapping conditions, such as physiological conditions like wounds or fractures, that prevented them from performing their usual PA in the previous week.

2.5. Ethical aspects

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee at the Duhok General Directory of Health of (18082021-8-36, Date:18 August 2021). An agreement to use EBBS from the authors has been obtained. Each participant provided verbal and written informed consent before engaging in the current study.

2.6. Data analysis

The demographic data of the teachers was presented in mean or number and percentage (%). Exercise's perceived benefits and barriers were determined by the mean and standard deviation. The physical activity level was determined by number and percentage. The Likert 4-point scale was used to calculate standardized scores for each item in the benefits and barriers subscales for each participant. The mean of each EBBS item and the total mean of all benefits and barriers items were computed. The comparisons of benefits and barriers among teachers with different physical activity levels were examined in an ANOVA-one way. Post- hoc comparisons were examined using the Tukey test. The study findings are considered statistically significant if the p-value is 0.05 or less. JMP Pro 14.3.0 performed the statistical calculations.

3. Results

Table 1 reveals that most of the teachers were aged 30–39 (38.6%), 64.8% of them were female, and more than half (54.6%) of them were working in elementary schools. Most of the schoolteachers (83.2%) were married, and most of them (47% and 47.4%, respectively) had a diploma or a college educational attainment.

Most of them earned 500,000-1,500,000 Iraqi dinars as a monthly income (76.6%).

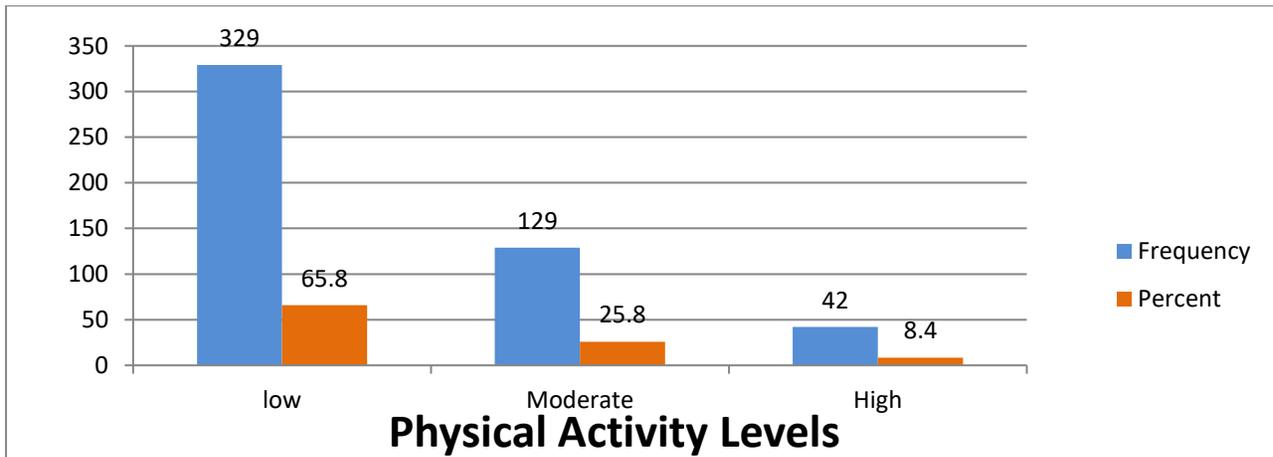
Figure 1 reveals that the majority (65.8%) of schoolteachers were less engaged in physical activities, followed by a 25.8% who were moderately active, while only 8.2% of them were highly active physically.

Table 1 Sociodemographic characteristics of teachers

Characteristics (n=500)		Frequency (%)	Mean(± SD)
Age	Less than 30 years	38 (7.6)	41.24 (7.948)
	30-39	193 (38.6)	
	40-49	184 (36.8)	
	50-More	85 (17)	
Gender	Male	176 (35.2)	
	Female	324 (64.8)	
School Type	Primary school	273 (54.6)	
	Intermediate school	121 (24.2)	
	Secondary school	106 (21.2)	
Marital Status	Single	80 (16.0)	
	Married	416 (83.2)	
	Divorce	4 (0.8)	
Educational Level	Primary school	3 (0.6)	
	Intermediate school	3 (0.6)	
	Secondary school	14 (2.8)	
	Diploma	235 (47)	
	College	237 (47.4)	
	Post Graduate (MSc, PhD)	8 (1.6)	
Income	<500000-1500000	383 (76.6)	
	>1500000-3000000	98 (19.6)	
	>3000000 and More	19 (3.8)	

SD=Standard Deviation

Figure 1. Prevalence of PA among teachers



The mean score for the Exercise Benefit Scale was 92.24 (SD = 9.72). "Exercise improves the way my body looks" (3.69), disposition (3.6), mental health (3.59), cardiovascular system (3.55), flexibility (3.52), and "it helps me sleep better at

night" (3.56), were the most important perceived benefits from exercise. Table 2 illustrates the means and standard deviations for each item of the Exercise Perceived Benefits.

Table 2. Exercise perceived benefits among schoolteachers

<i>Items</i>	<i>Mean</i>	<i>SD</i>
I enjoy physical exercise	2.72	1.095
Exercise decreases feelings of stress and tension for me	3.44	0.692
Exercise improves my mental health	3.59	0.581
I will prevent heart attacks by exercising	3.25	0.730
Exercise increases my muscle strength	3.48	0.602
Exercise gives me a sense of personal accomplishment	2.96	0.777
Exercise makes me feel relaxed	2.62	0.908
Exercising lets me have contact with friends & persons I enjoy	2.72	0.870
Exercise will keep me from having high blood pressure	3.32	0.679
Exercise increases my level of physical fitness	3.52	0.553
My muscle tone is improved with exercise	3.48	0.589
Exercising improves functioning of my cardiovascular system	3.55	0.510
I have improved feelings of wellbeing from exercise	3.28	0.510
Exercise increases my stamina	3.02	0.861
Exercise improves my flexibility	3.52	0.542
My disposition is improved by exercise	3.60	0.538
Exercise helps me sleep better at night	3.56	0.612
I will live longer if I exercise	2.61	0.929
Exercise helps me decrease my fatigue	3.06	0.700
Exercise is a good way for me to meet new people	2.64	1.647
My physical endurance is improved by exercising	3.41	0.568
Exercise improves my self-concept	2.60	0.781
Exercise increases my mental alertness	3.45	0.533
Exercise allows me to carry out normal activities without becoming tired	2.97	0.747
Exercise improves the quality of my work	3.03	0.747
Exercise is good entertainment for me	2.91	1.639
Exercise increases my acceptance by others	2.77	0.835
Exercise improves overall body function for me	3.49	0.564
Exercise improves the way my body looks	3.69	0.528

The mean total score for the Exercise Barriers Scale was 34.72 (SD = 6.31). "Too few places for exercise," was the most important perceived barrier to exercise with mean score 2.88. Other important barriers included inconvenient schedules in exercise facilities (2.84), fatigue by exercise (2.83), places to exercise are far away (2.76), tiredness by exercise (2.71), exercise takes too much time (2.64), takes too much time from family responsibilities (2.63), and embarrassment to exercise (2.54). The Participants had the lowest agreement level towards the "exercise clothes look funny" item, as shown in Table 3.

Teachers with high PA had significantly higher scores on the Exercise Benefits Scale than

those with moderate and low PA. The EBBS scores of teachers with high PA were considerably higher than those with moderate and low PA (mean 101.48, $P < 0.0001$). Higher physical activity level was linked with a higher exercise benefit perception and a lower exercise barrier perception. The participants' perceived exercise benefit score mean was found to be 98.35 for moderately active teachers, 101.48 for highly active teachers and 88.41 for inactive teachers. Perceived barrier scores were found to be higher in low physically active teachers than in moderate and highly active teachers (36.77, 30.03, and 31.86, respectively). The difference between PA levels was found to be significant ($P = 0.0001$), as shown in table 4.

Table 3. Exercise perceived barriers among schoolteachers

<i>Items</i>	<i>Mean</i>	<i>SD</i>
Exercise takes too much of my time	2.64	0.934
Exercise tires me	2.71	0.1008
Places for me to exercise are too far away	2.76	0.979
I am too embarrassed to exercise	2.54	1.176
It costs too much money to exercise	2.34	0.877
Exercise facilities do not have convenient schedules for me	2.84	0.892
I am fatigued by exercise	2.83	0.900
My spouse (or significant other) does not encourage exercise	2.28	1.032
Exercise takes too much time from family relationships	2.29	0.861
I think people in exercise clothes look funny	1.55	0.798
My family members do not encourage me to exercise	2.13	0.976
Exercise takes too much time from my family responsibilities	2.63	1.066
Exercise is hard work for me	2.32	1.054
There are too few places for me to exercise	2.88	0.953

Table 4. Association between perceived benefits, barriers, and physical activity among teachers

Variables	Physical Activity		P-value (two-sided)
	Non active Low	Active Moderate High	
Perceived Exercise Benefits score Mean	88.41	98.53 101.48 (Mean =100)	<0.0001**
Perceived Exercise Barriers score Mean	36.77	30.03 31.86 (Mean =30.79)	<0.0001**

*p value <0.05 considered significant, ** p value < 0.001 highly significant

4. Discussion

Sufficient PA is a key element in achieving physiological and psychological well-being and improving quality of life [19]. The sedentary style of many occupations and duties is today's workplace feature [20]. Schoolteachers, due to the demands of their jobs; most of them have adopted a sedentary lifestyle. Teachers' responsibilities are no longer limited to classroom instruction. They must prepare for lessons as well as participate in extracurricular activities, conduct non-teaching duties, pursue continuous professional development, and respond to management requirements. Teachers may experience mental and physical health issues because of these additional stressors [21, 22].

The high prevalence of insufficient PA (65.8%) was found in this study among schoolteachers; somewhat near results to this level were reported in other previous studies among schoolteachers 71.9% [23], 46.3% [21], and 50% [22]. Globally, inadequate physical activity is a health issue among adults, according to the findings of a WHO survey executed in 2013 in Kuwait, which estimated that around 63% of adults are physically inactive [24]. A systematic review reported that according to the data-based WHO-STEPPS surveys, physical inactivity proportions were 67.6% in Saudi Arabia, 40.7% in Algeria, 51.3% in Mauritania, 86.8% in Sudan, 62.6% in Kuwait, 32.1% in Egypt [25], and Iraq, 49.3% [26]. Inactivity levels rise because of changing transportation patterns, increased technology use for work and entertainment, cultural values, and increased sedentary behavior. This has a negative influence on the healthcare system, environment, economic growth, community health, and overall quality of life [1] and is linked to less healthy lifestyles [5, 27].

Understanding exercise barriers is critical to preventing NCDs and increasing fitness [28]. Physical activity rates may be declining because of significant barriers that make engagement in physical activity difficult [29]. Social and cultural beliefs can have an impact on people's lifestyle choices as well as their attitudes and perceptions regarding physical activity. Exercise barriers can be classified as social, cultural, economic, psychological, and even environmental [30].

Many researchers have studied barriers to

physical exercise across the globe. In the current study, the teachers had varying numbers of barriers to engaging in physical exercise. The strongest exercise barriers were: too few places to exercise; inconvenient schedules in exercise facilities; fatigued by exercise; too far away from exercise places; tiredness from exercise; exercise taking too much time; family responsibilities; and embarrassed to exercise.

Physical barriers, such as a lack of space or facilities, have been recognized as the most common physical exercise barrier among schoolteachers. Physical and psychosocial environmental factors can both influence individuals' physical activity participation. Physical barriers in the environment include inadequate sidewalk coverage, few parks, green spaces, or walking and biking trails, which are PA barriers [31]. Results from other studies and scientific resources among adults and university students support this statement, finding that a lack of accessible or suitable exercise resources was the main PA barrier [32]. The lack of safe recreational places was recognized as a major barrier to PA in the United States and Europe [24]. Create and maintain conditions that promote and protect all people's rights to equal access to safe places and spaces for regular participation in PA in their cities and communities [1].

Regarding far away exercise places, fatigue, and tiredness from exercise, similar barriers have been shown in other studies. These barriers were found to be significant barriers affecting exercise participation among medicine and nursing students [34]. Moreover, tiredness perception was the strongest barrier among physically inactive schoolteachers [22]. Exercise tiredness was the most cited barrier in previous studies [33], and was related to physical inactivity among adults aged 20 and older [35]. The perception of tiredness may indicate a lack of motivation for engaging in physical activity. In fact, motivation affects physical activity [36]. In addition, research findings revealed that being far away from exercise places or lacking accessibility to nearby exercise facilities or places among both men and women was found to be the third strongest barrier to exercise. This may be because these exercise facilities are in the centers of cities and urban areas, away from residential areas [33].

Lovell et al. 2010 stated that physical exertion as a perceived fatigue barrier was the effective barrier among UK university females. Fatigue is also strongly related to motivation [12]. Moreover, studies showed that fatigue was a common exercise barrier [37]. The fatigue barrier could be due to an individual's energy perception of physical exercise as difficult, heavy, and strenuous. Physical exercise is regarded as an effort that requires the expenditure of energy [38]. According to previous research, 77.5 percent of male teachers and 58.03 percent of female teachers in Lebanon do not participate in any physical activities, primarily due to extreme fatigue or a lack of time [39].

Time limitation barriers such as exercise taking too much time, taking time from family responsibilities, and inconvenient schedules of exercise facilities were also important barriers due to the imbalance between personal and professional life among teachers, because they spend some of their free time on professional activities like lesson preparation and grading of papers. Thus, work overload is the primary barrier to free time for PA among employees [23]. Evidence showed that not having time is more frequent among married individuals (both males and females) due to difficulties in scheduling exercise, especially after having children, due to childcare and family responsibilities [33]. Thus, increasing financial and familial responsibilities decrease the priority of PA engagement [40]. The current study's time limitation was consistent with other studies' findings [33, 41]. Barriers were caused by a busy schedule or daily life [41], or by lessons, family responsibilities, and social activities [42]. Individuals' levels of physical activity are affected by various factors, including societal factors and economic problems. The need to organize both a job and a household may contribute to the perception of barriers [22]. In addition to the previous barriers to exercise, embarrassment was also a common barrier, especially in Middle Eastern countries, particularly among women, due to cultural barriers [28, 29, 12].

The results of the current study revealed that schoolteachers are likely to be the professional group with the most knowledge regarding the benefits of physical activity. The most significant exercise benefits perceived by teachers were that exercise improves appearance, disposition, mental health, and cardiovascular functioning. These

benefits were also found in previous studies [33], followed by 'improvements in my flexibility' and 'helping me sleep better at night', which have also been identified in earlier studies [12].

Improved physical appearance was the most frequently mentioned exercise benefit in previous research findings. Study results from UK and KSA college students revealed that most of the perceived benefits from exercise are related to physical appearance [29].

Evidence reveals that the participation of teachers in leisure-time PA is linked with their physical, mental, and work-related health and well-being, as well as job satisfaction [43,44]. Furthermore, teachers who participate in moderate or vigorous intensity PA may have a more accurate self-perception of their existing workability concerning the physical job requirements [16].

The perception of the exercise benefits 'flexibility' and 'sleeping better at night' is consistent with other study results [12]. The improvement of flexibility is shown in earlier studies [22, 12]. Furthermore, one of the most important perceived exercise benefits in several studies was improved sleep [45, 12]. Recent research has found that PA can buffer the negative effects of stress on health outcomes and improve sleep quality [46].

Providing knowledge, increasing awareness, and motivating teachers to live an active lifestyle can improve their health [43]. Regular exercise improves physical and mental health [47], strengthens the immune system, and prevents heart disease, type 2 diabetes, and obesity. It can improve a person's physical appearance or body image, which increases self-esteem [48].

Other perceived benefits of exercise in the current study have been found in many previous studies as well. Exercise improves overall body function [12], increases muscle strength [33, 22], increases mental alertness [33, 43, 49], and decreases stress and tension [33, 12]. Neurotransmitters in the brain, such as endorphins, which are released during exercise, are linked to lower pain and stress levels. Physically active individuals perceived these benefits and maintained their healthy lifestyle [22], improving physical endurance [22, 33] and improving the feeling of well-being [12]. Serotonins also rise during exercise, which increases awareness and excites the body, maybe one of reasons for exercise being perceived as a beneficial factor and thus as a

motivator [22]. Exercise also helps to prevent heart attacks [12, 33], and many NCDs can be prevented by engaging in regular PA. In contrast, physical inactivity causes an increased risk of hypertension, stroke, diabetes, and other diseases [22].

PA patterns are important for optimizing health, and they are influenced by perceived benefits and barriers [12]. There is a strong correlation between the physical and cognitive benefits of exercise and the frequency of exercise. Adherence is largely determined by an individual's perception of the benefits as well as the barriers regarding physical activity [22].

A significant difference was found between teachers with high PA and those with moderate or low PA in terms of exercise benefits and barriers. Evidence suggested that those teachers who had a positive attitude toward exercise made, as a result, healthier lifestyle choices (exercise) [43]. These findings support previous findings that people become more physically active when they perceive more benefits to exercise [12], which motivate exercise and lifestyle change [50]. In this study, physically active teachers (those with a moderate or high PA) are more likely to stick with their exercise activities because they experience more exercise benefits and encounter fewer barriers than their less physically active counterparts (those with low PA). As a result, the more physically active teachers are more likely to live an active lifestyle. This is comparable to the findings of another study conducted on teachers, which revealed that physically active teachers had significantly higher perceived benefits than perceived barriers, leading to the conclusion that a higher physical activity level is associated with greater perceived benefits and fewer perceived exercise barriers [22]. Perceived barriers decrease as the physical activity level increases [51]. However, based on the current study results, it appears that teachers' high scores for the benefits of physical activity do not always reflect their actual practice. As a result, despite their positive attitudes and beliefs, most teachers were not engaging in enough PA. There is a lack of PA participation in the community, despite widespread awareness of the benefits of physical activity [22]. Healthcare providers and educators may benefit from a better understanding of exercise's perceived benefits and barriers to develop successful strategies that increase PA among teachers.

5. Conclusions

According to this study's findings, schoolteachers are aware of the significant health benefits of regular PA but still face significant barriers. The perceptions of schoolteachers towards exercise appear to be reflected in their exercise engagement. Since risk factors for NCDs are common in adult age, health promotion programs should be designed to target this important segment of the population, including interventions that may help teachers to decrease the perceived barriers and further highlight the benefits of regular exercise, in order to inform schoolteachers of the various advantages of physical activity and encourage them to establish a physically active lifestyle.

Author's contributions

Conception: RHI and RYA. Performance of work: RYA. Interpretation or Analysis of Data: RHI Preparation of the Manuscript: RYA. Revision for Important Intellectual Content: RHI and RYA. All authors have read and approved the manuscript.

Funding:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments:

We would like to express our appreciation to all the teachers in Duhok City who participated in this study.

References

- [1] WHO. Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World. World Health Organization; 2018. <https://apps.who.int/iris/handle/10665/272722>. [Last accessed 2023Jan15].
- [2] WHO. World Health Organization Events addressing public health priorities. Promoting physical activity: a regional call for action available at: <https://www.emro.who.int/emhj-vol-20-2014/volume-20-7/who-events-addressing-public-health-priorities-promoting-physical-activity-a-regional-call-for-action.html>. [Last accessed 2023 Jan 15].

- [3] Dalibalta S, Majdalawieh A, Yousef S, Gusbi M, Wilson JJ, Tully MA, Davison G. Objectively quantified physical activity and sedentary behaviour in a young UAE population. *BMJ Open Sport Exerc Med*. 2021 Jan 7;7(1):e000957. doi: 10.1136/bmjsem-2020-000957.
- [4] Alzamil HA, Alhakhbany MA, Alfadda NA, Almusallam SM, Al-Hazzaa HM. A Profile of Physical Activity, Sedentary Behaviors, Sleep, and Dietary Habits of Saudi College Female Students. *J Family Community Med*. 2019 Jan-Apr;26(1):1-8. doi: 10.4103/jfcm.JFCM_58_18.
- [5] Iannotti RJ, Kogan MD, Janssen I, Boyce WF. Patterns of adolescent physical activity, screen-based media use, and positive and negative health indicators in the U.S. and Canada. *J Adolesc Health*. 2009; 44(5):493-499. doi:10.1016/j.jadohealth.2008.10.142
- [6] World Health Organization. Physical activity [Internet]. Physical activity. World Health Organization; 2022. Available from: <https://www.who.int/news-room/fact-sheets/detail/physical-activity> . [Last accessed 2023Jan15].
- [7] Kohl HW 3rd, Craig CL, Lambert EV, Inoue S, Alkandari JR, Leetongin G, et al. The pandemic of physical inactivity: global action for public health. *Lancet*. 2012;380(9838):294–305. [http://dx.doi.org/10.1016/S0140-6736\(12\)60898-8](http://dx.doi.org/10.1016/S0140-6736(12)60898-8)
- [8] Huerta JM, Chirilaque MD, Tormo MJ, Buckland G, Ardanaz E, Arriola L, Gavrilá D, Salmerón D, Cirera L, Carpe B, Molina-Montes E, Chamosa S, Travier N, Quirós JR, Barricarte A, Agudo A, Sánchez MJ, Navarro C. Work, household, and leisure-time physical activity and risk of mortality in the EPIC-Spain cohort. *Prev Med*. 2016 Apr;85:106-112. doi: 10.1016/j.ypmed.2016.02.009.
- [9] Sallis JF, Bull F, Guthold R, Heath GW, Inoue S, Kelly P, Oyeyemi AL, Perez LG, Richards J, Hallal PC; Lancet Physical Activity Series 2 Executive Committee. Progress in physical activity over the Olympic quadrennium. *Lancet*. 2016 Sep 24;388(10051):1325-36. doi: 10.1016/S0140-6736(16)30581-5.
- [10] Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW; Lancet Physical Activity Series Working Group. Correlates of physical activity: why are some people physically active and others not? *Lancet*. 2012 Jul 21;380(9838):258-71. doi: 10.1016/S0140-6736(12)60735-1.
- [11] Rahimian M, Mohammadi M, Mehry A, Rakhshani MH. The predictors of physical activity among health volunteers based on pender's health promotion model. *J Res Health* . 2018;8(4):305–12. <http://dx.doi.org/10.29252/jrh.8.4.305>.
- [12] Lovell GP, El Ansari W, Parker JK. Perceived exercise benefits and barriers of non-exercising female university students in the United Kingdom. *Int J Environ Res Public Health*. 2010;7(3):784-798. doi:10.3390/ijerph7030784
- [13] Victor JF, Ximenes LB, Almeida PC de. Reliability and validity of the Exercise Benefits/Barriers scale in the elderly. *Acta Paul Enferm [Internet]*. 2012;25(spe1):48–53. <http://dx.doi.org/10.1590/s0103-21002012000800008>.
- [14] Pender NJ, Murdaugh C, Parsons MA. *Health Promotion in Nursing Practice*. 4th Edition, Prentice-Hall Health, Inc., USA, (2002); 140-145.
- [15] Franklin CGS, Kim JS, Ryan TN, Kelly MS, Montgomery KL. Teacher involvement in school mental health interventions: A systematic review. *Child Youth Serv Rev*. 2012;34(5):973–82. <http://dx.doi.org/10.1016/j.childyouth.2012.01.027>
- [16] Grabara M, Nawrocka A, Powerska-Didkowska A. The relationship between physical activity and work ability - A cross-sectional study of teachers. *Int J Occup Med Environ Health*. 2018;31(1):1-9. doi:10.13075/ijomh.1896.01043.
- [17] Sechrist KR, Walker SN, Pender NJ. Development and psychometric evaluation of the exercise benefits/barriers scale. *Res Nurs Health*. 1987;10(6):357-365. doi:10.1002/nur.4770100603.
- [18] International Physical Activity Questionnaire. Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ). IPAQ Research Committee /Google Scholar. 2005. Available at <http://www.ipaq.ki.se/Google Scholar>.
- [19] Khateeb E, AlKharji T, AlQutub S. Physical activity and perceived barriers among doctors working in King Abdulaziz Hospital, Jeddah, 2018. *Int J Community Med Public Health*. 2019;6(5):1843. <http://dx.doi.org/10.18203/2394-6040.ijcmph20191553>
- [20] Bakhtari Aghdam F, Sahrnavard H, Jahangiry L, Asghari Jafarabadi M, Koushaa A. The effect of a physical activity intervention on sedentary behavior in female teachers: A randomized,

- controlled trial. *Health Scope*. 2016; 7(1). <http://dx.doi.org/10.5812/jhealthscope.68267>
- [21] Brito WF, Santos CL dos, Marcolongo A do A, Campos MD, Bocalini DS, Antonio EL, et al. Nível de atividade física em professores da rede estadual de ensino. *Rev Saude Publica*. 2012;46(1):104–9. <http://dx.doi.org/10.1590/s0034-89102012000100013>
- [22] Shaikh, A.A., Dandekar, S.P., Hatolkar, R.S. Perceived benefits and barriers to exercise of physically active and non-active school teachers in an education society from Pune: an analysis using EBBS. *International Journal of Health Sciences and Research*.2020; 10(6):201-206.
- [23] Dias DF, Loch MR, González AD, Andrade SM de, Mesas AE. Insufficient free-time physical activity and occupational factors in Brazilian public school teachers. *Rev Saude Publica*. 2017;51(0):68. <http://dx.doi.org/10.1590/S1518-8787.2017051006217>
- [24] Al-Baho AK, Al-Naar A, Al-Shuaib H, Panicker JK, Gaber S. Levels of physical activity among Kuwaiti adults and perceived barriers. *Open Public Health J*. 2016;9(1):77–87. <http://dx.doi.org/10.2174/1874944501609010077>
- [25] Sharara E, Akik C, Ghattas H, Makhlof Obermeyer C. Physical inactivity, gender and culture in Arab countries: a systematic assessment of the literature. *BMC Public Health*. 2018;18(1). doi:10.1186/s12889-018-5472-z
- [26] World Health Organization. Regional Office for the Eastern Mediterranean. Country factsheet insufficient physical activity: Iraq. Published online 2015. Accessed January 15, 2023. <https://apps.who.int/iris/handle/10665/204245>
- [27] Bahathig A, Saad A, Yusop M. Relationship between Physical Activity, Sedentary Behavior, and Anthropometric Measurements among Saudi Female Adolescents: A Cross-Sectional Study. *Int J Environ Res Public Health*. 2021;18(16). <http://dx.doi.org/10.3390/ijerph18168461>
- [28] Al-Otaibi HH. Measuring stages of change, perceived barriers and self efficacy for physical activity in Saudi Arabia. *Asian Pac J Cancer Prev*. 2013;14(2):1009-1016. doi:10.7314/apjcp.2013.14.2.1009
- [29] Alsahli MS. Benefits and barriers to physical activity among Saudi female university students in the Kingdom of Saudi Arabia and the United States [dissertation], Master of Science in health and human performance. Middle Tennessee State University, Published by ProQuest LLC. 2016
- [30] Mansfield ED, Ducharme N, Koski KG. Individual, social and environmental factors influencing physical activity levels and behaviours of multiethnic socio-economically disadvantaged urban mothers in Canada: a mixed methods approach. *Int J Behav Nutr Phys Act*. 2012;9(1):42. <http://dx.doi.org/10.1186/1479-5868-9-42>
- [31] Elshahat S, O'Rorke M, Adlakha D. Built environment correlates of physical activity in low- and middle-income countries: A systematic review. *PLoS One*. 2020; 15(3):e0230454. doi:10.1371/journal.pone.0230454
- [32] Melebari DM, Khan AA. Assessing Physical Activity and Perceived Barriers Among Physicians in Primary Healthcare in Makkah City, Saudi Arabia. *Cureus*. 2022;14(3):e23605. doi:10.7759/cureus.23605
- [33] Gabal HMS, Wahdan MM, Eldin WS. Perceived benefits and barriers towards exercise among healthcare providers in Ain Shams University Hospitals, Egypt. *J Egypt Public Health Assoc*. 2020;95(1):19. doi:10.1186/s42506-020-00042-1
- [34] Patra L, Mini GK, Mathews E, Thankappan KR. Doctors' self-reported physical activity, their counselling practices and their correlates in urban Trivandrum, South India: should a full-service doctor be a physically active doctor?. *Br J Sports Med*. 2015;49(6):413-416. doi:10.1136/bjsports-2012-091995
- [35] Reichert FF, Barros AJ, Domingues MR, Hallal PC. The role of perceived personal barriers to engagement in leisure-time physical activity. *Am J Public Health*. 2007;97(3):515-519. doi:10.2105/AJPH.2005.070144
- [36] Cook MA, Gazmararian J. The association between long work hours and leisure-time physical activity and obesity. *Prev Med Rep*. 2018 Apr 7;10:271-277. doi: 10.1016/j.pmedr.2018.04.006.
- [37] Phillips M, Flemming N, Tsintzas K. An exploratory study of physical activity and perceived barriers to exercise in ambulant people with neuromuscular disease compared with unaffected controls. *Clin Rehabil*. 2009;23(8):746-755. doi:10.1177/0269215509334838
- [38] de Vries JD, Claessens BJC, van Hooff MLM, Geurts SAE, van den Bossche SNJ, Kompier MAJ. Disentangling longitudinal relations between physical activity, work-related fatigue, and task

- demands. *Int Arch Occup Environ Health*. 2016;89(1):89–101. <http://dx.doi.org/10.1007/s00420-015-1054-x>
- [39] Girgis, E. "Physical Activity and the Prevalence of Obesity and Overweight Conditions among Elementary and High School Teachers in Lebanon". *International Journal of Education and Social Sciences*. 2017; 4(3).
- [40] Porch TC, Bell CN, Bowie JV, Usher T, Kelly EA, LaVeist TA, et al. The role of marital status in physical activity among African American and White men. *Am J Mens Health*. 2016;10(6):526–32. <http://dx.doi.org/10.1177/1557988315576936>
- [41] El Gilany AH, Badawi K, El Khawaga G, Awadalla N. Physical activity profile of students in Mansoura University, Egypt. *East Mediterr Health J*. 2011;17(08):694–702. <http://dx.doi.org/10.26719/2011.17.8.694>
- [42] Kubayi NA, Surujlal J. Perceived benefits of and barriers to exercise participation among secondary school students. *Mediterr J Soc Sci*. 2014; <http://dx.doi.org/10.5901/mjss.2014.v5n20p121>
- [43] Bogaert I, De Martelaer K, Deforche B, Clarys P, Zinzen E. Associations between different types of physical activity and teachers' perceived mental, physical, and work-related health. *BMC Public Health*. 2014;14(1):534. <http://dx.doi.org/10.1186/1471-2458-14-534>
- [44] Chiu TW, Lau KT, Ho CW, Ma MC, Yeung TF, Cheung PM. A study on the prevalence of and risk factors for neck pain in secondary school teachers. *Public Health*. 2006;120(6):563–5. <http://dx.doi.org/10.1016/j.puhe.2006.01.007>
- [45] De Vries JD, van Hooff ML, Geurts SA, Kompier MA. Exercise as an Intervention to Reduce Study-Related Fatigue among University Students: A Two-Arm Parallel Randomized Controlled Trial. *PLoS One*. 2016;11(3):e0152137. doi:10.1371/journal.pone.0152137
- [46] Wunsch K, Kasten N, Fuchs R. The effect of physical activity on sleep quality, well-being, and affect in academic stress periods. *Nat Sci Sleep*. 2017; 9:117-126. doi:10.2147/NSS.S132078
- [47] Tyson P, Wilson K, Crone D, Brailsford R, Laws K. Physical activity and mental health in a student population. *J Ment Health*. 2010;19(6):492–9. <http://dx.doi.org/10.3109/09638230902968308>
- [48] Khalaf A, Al Hashmi I, Al Omari O. The Relationship between Body Appreciation and Self-Esteem and Associated Factors among Omani University Students: An Online Cross-Sectional Survey. *J Obes*. 2021; 2021:5523184. doi:10.1155/2021/5523184.
- [49] Bernard P, Doré I, Romain A-J, Hains-Monfette G, Kingsbury C, Sabiston C. Dose response association of objective physical activity with mental health in a representative national sample of adults: A cross-sectional study. *PLoS One*. 2018; 13(10):e0204682. <http://dx.doi.org/10.1371/journal.pone.0204682>
- [50] Malone LA, Barfield JP, Brasher JD. Perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions within action or maintenance stages of exercise. *Disabil Health J*. 2012; 5(4):254–60. <http://dx.doi.org/10.1016/j.dhjo.2012.05.004>
- [51] Girgin N, Okudan B. The COVID-19 pandemic and perceived exercise benefits and barriers: A cross-sectional study on Turkish society perceptions of physical activity. *Aust J Gen Pract*. 2021;50(5):322-327. doi:10.31128/AJGP-08-20-5572

