

Full Length Research Paper

Physical activity levels among Fayoum governorate population (Egypt): Community-based survey

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Received 12 October, 2017; Accepted 29 January, 2018

Physical inactivity is one of the most important public health problems in the 21st century. It plays an active role in the prevention of both non-communicable diseases and premature death. A community-based survey was conducted to assess the level of physical activity among household population and to identify associated demographic factors of physical inactivity. A sample of 5000 households was selected by a multi-stage stratified cluster random sample. A standardized world health organization (WHO) structured questionnaire global physical activity questionnaire (GPAQ) was used in data collection. About 25.2% of the study population practiced a physical activity less than WHO recommended level for their ages. The study has shown statistically-significant insufficient physical activity level among females (31.3%), adolescent (42.6%), the old (57.1%), housewives (38.8%), and the low-income (32.5%), with a P-value of <0.001. The study concluded that Fayoum community practice physical activity less than recommended level by the WHO especially among females, adolescents, elderly, and the low-income households' population. Further studies should be recommended.

Key words: Physical inactivity, recreational activity, global physical activity questionnaire (GPAQ).

INTRODUCTION

Physical inactivity is one of the most important public health problems in the 21st century (Blair, 2009). Physical activity is defined as a bodily musculoskeletal movement which requires energy expenditure. It includes any movement done by the body during playing, traveling, working, and/or doing routine household duties (WHO, 2017). It differs from physical exercise in that the latter is defined as a body activity that maintains fitness and aims to improve health and overall wellness (Kylasov et al., 2011).

Physical activity plays an active role in the prevention of non-communicable diseases, such as coronary heart

disease, diabetes mellitus type II, dyslipidemia, obesity, breast and colon cancers in addition to the prevention of dementia, depression, and premature death (Abby et al., 2017). Physical inactivity had a negative impact on global mortalities as it is considered the fourth leading risk factor for global mortalities (CDC, 2014). Insufficient physical activity is defined as practicing physical activity less than 300 min per week of vigorous and moderate intensity with less than 60 min per day for five days per week (De Moraes et al., 2013).

The prevalence of physical inactivity increased in many countries, especially low and middle income with the

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lowest prevalence of 17% in Southeast Asia, and the highest prevalence of 43% in America (WHO, 2017). Physical activity has shown two main levels: the first is the vigorous-intensity activity that causes increases in breathing or heart rate to the limited participant who can't speak more than few words, like carrying or lifting heavy loads, digging, or construction work for at least 10 min continuously, and the second one is the moderate-intensity activity that causes slight increases in breathing or heart rate, and breaks sweat so that the participant is able to talk as brisk walking or carrying light loads for at least 10 min continuously. Sedentary behavior means sitting, watching television, traveling in a car, checking social media though it does not include sleeping hours (Hallal et al., 2012).

Physical activity is affected by different factors, such as age, sex, residence, weight, socio-economic status, family, and peer support (Teng et al., 2014). Physical activity starts from childhood with a gradual increase in frequency, intensity, and duration in order to achieve its positive impact on physical fitness, mental health and to increase self-esteem (WHO, 2016). Regular physical activity associated with proper nutrition improves bone mineralization and skeletal health (Ford et al., 2008).

Recommendations of World Health Organization for children and youth aged 5 to 17 were to spend at least 60 min of moderate to vigorous intensity physical activity per day. For adults aged 18 to 64 and the elderly aged 65 years old or above the recommendations were to spend at least 150 min of moderate-intensity aerobic physical activity, or 75 minutes of vigorous-intensity aerobic physical activity per week (WHO, 2010). Studies that assess the prevalence of global physical activity were deficient. The current study aims to estimate the prevalence of physical activity level in Fayoum community. It also aims to identify associated demographic factors of physical inactivity.

MATERIALS AND METHODS

Study design

This study is a cross-sectional, descriptive, community-based survey conducted to assess the physical activity of the household population in Fayoum governorate-Egypt. Egypt ranks 111th out of 187 countries in the Human Development Index (Human Development Index Report, 2015). Fayoum total population is 2,511,027 according to an Egyptian census conducted in 2006. Fayoum stands among the lowest ranking five governorates. In 2008, it reached the 20th position in Egypt's human development index and remained so for several years. Such a deteriorating situation correlates with some factors on top of which is the high illiteracy rate, poverty, strong traditional beliefs related to the rural community (Human Development Index Report, 2015).

Study sample

The sample was a multi-stage stratified cluster random sample representative for all districts of Fayoum governorate (Tamiyya,

Sinnuris, Fayoum, Etsa, Abshaway, and Youssef Seddyq) districts (CAPMAS, 2013).

Study population

The study population sample was done in the following stages: cluster sampling for urban and rural areas in each district; the main primary health care facility in urban areas and health care unit in rural areas were the starting point to identify one population's blocks in each area. A street was randomly chosen in each selected block. Then, the first house was chosen once again randomly. Afterwards, every second house with all its households was included in the study.

Study size

The sample size was calculated according to Epi Info 2000. A sample size of 5000 was selected using a special formula based on the global prevalence of physical inactivity (17.7%) at a confidence interval of 95% and precision of 2%. The stratified and cluster sampling methods had been considered, and the calculated sample size was tripled to achieve the same precision. Finally, the sample increased by 10% to overcome problems related to non-responses and missing data. Ultimately, 5000 persons agreed to be interviewed and to participate in the study with a response rate of 91%.

Study tools

The study was conducted during a period of one year. The households were interviewed with a standardized world health organization (WHO) structured Arabic questionnaire and global physical activity questionnaire (GPAQ) (WHO, 2017). It consists of the following sections:

The first section involved socio-economic data, such as age, sex, residence, educational level, occupation, and income. The second section included questions of the physical activity duration, frequency, and intensity (vigorous or moderate) at work, traveling between places, and recreational physical activities. The third section inquired the duration of sedentary behavior. The last section investigated barriers to physical and recreational activity among the study population.

Statistical analysis

Data were collected, coded; double entered, and analyzed using statistical package for social sciences (SPSS) software (Version 18) under Windows 7. Mean and S.D. were calculated for quantitative variables in the form of simple descriptive analysis. Categorical data was analyzed in computing percentages, and differences were statistically tested by applying chi-square tests for comparisons between groups; P-value of ≤ 0.05 was considered statistically significant.

RESULTS

Demography

This study was conducted upon 5000 households in Fayoum governorate; 2718 (54.4%) were females and 2282 (45.6%) were males. They were divided into three

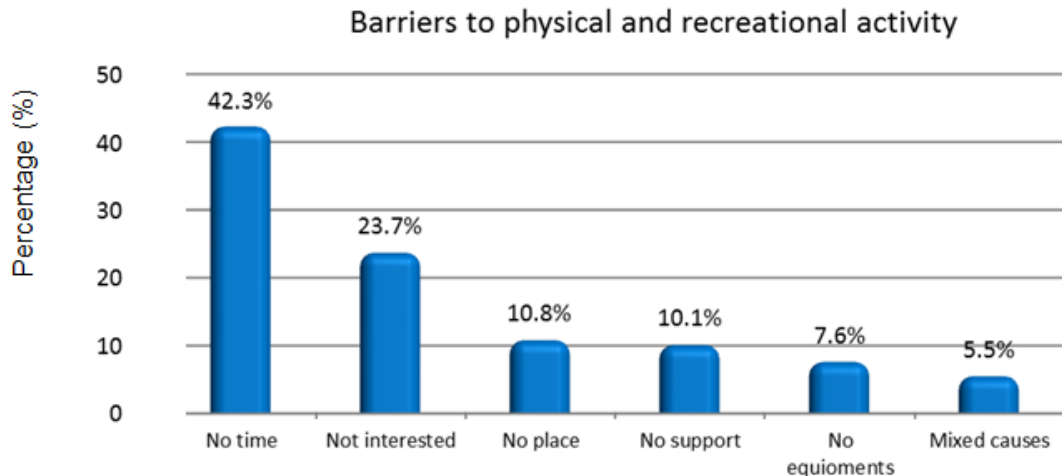


Figure 1. Barriers to physical and recreational activity among survey responders.

age groups: under 17 years old were 376 (7.5%), aged between 18 to 64 years old were 4526 (90.5%), and aged 65 years old and above were 98 (2%).

Socio-economic section

As for their residency more than half of sample, that is, 2608 (52.2%) were inhabitants in rural areas while the other 2392 (47.8%) were from urban areas. In relation to their educational level 653 (13.1%) were illiterate, 2130 (42.6%) passed secondary level, and 2217 (44.3%) received university level. As for occupation, 1740 (34.8%) were employees; 814 (16.3%) worked as professionals, while 1158 (23.3%) were manual workers and 1288 (25.8%) were housewives. With respect to monthly income, more than one third of them 1704 (34.1%) earn less than 500 pounds; half of them 2512 (50.2%) earn between 500 to 2000 pounds monthly and 784 (15.7%) earn more than 2000 pounds monthly.

Inquiring about the time spent in different types of physical activity per week, about half of them which is 2560 (51.2%) mentioned that their work involves vigorous-intensity activity with mean (4.2 ± 1.8) days per week and mean duration of 215.8 ± 102.5 min per day. For moderate intensity activities, 3364 (67.3%) stated that their work involves moderate-intensity activity with a frequency mean (3.7 ± 1.9) days per week and mean duration of (286.5 ± 111.2) minutes per day.

Regarding travel between places, 3788 (75.8%) of households stated that they usually walk or use a bicycle for at least 10 minutes continuously with a frequency mean (4.9 ± 1.8) days per week and mean duration of 83.9 ± 54.7 min per day. Around one fourth of them practiced physical activity less than WHO recommended level for age 1261 (25.2%).

The survey included questions about recreational

activities. 1580 (31.6%) of households do vigorous-intensity sports fitness, with a frequency mean (1.9 ± 1.2) days per week and mean duration of 143.4 ± 74.1 min per day. While households who do moderate-intensity sports fitness were 1330 (26.6%) with a frequency mean (2.7 ± 1.7) days per week, and mean duration of 122.9 ± 65 min per day. In relation to sedentary behavior, the mean sedentary hours were 10.3 ± 2.8 h per day.

Recreational activities

In connection with barriers to physical and recreational activity among survey households, 2042 (42.3%) had no time to practice exercise, 1186 (23.7%) were not interested, 540 (10.8%) did not have suitable place, 504 (10.1%) needed family or friend support, 380 (7.6%) did not have gymnastic equipments and/or tools, and 276 (5.5%) of them had multiple different barriers (Figure 1).

Physical activities

There was statistically significant and high prevalence of vigorous-intensity physical activity at work among males (1638 (64.0%)) and adult age group (2402 (93.8%)). It is clear that the high prevalence was among rural areas inhabitants (1390 (54.3%)) more than it was among urban inhabitants (1170 (45.7%)), households with moderate education level (1165 (45.5%)), workers (959 (37.5%)) and who earn between 500 to 2000 pounds monthly (1388 (54.2%)). There was a statistically significant association between moderate-intensity physical activity at work and in travel between places and socio-demographic characteristics P-value (<0.05), with high prevalence among males 1884 (56%) and 2190 (57.8%) respectively; adult age group 3116 (92.6%) and

Table 1. Association between socio-demographic factors with physical activity at work and in travel between places among the study group.

Variable	Physical activity level in work								
	Vigorous intensity			Moderate intensity			Travel between places		
	Yes No (%)	No No (%)	P-value	Yes No (%)	No No (%)	P-value	Yes No (%)	No No (%)	P-value
Sex									
Male	1638 (64)	1080 (44.3)	<0.001	1884 (56)	834 (51)	<0.001	2190 (57.8%)	528 (43.6%)	<0.001
Female	922 (36)	1360 (55.7)		1480 (44)	802 (49)		1598 (42.2%)	684 (56.4%)	
Age groups									
<18 years	122 (4.8)	254 (10.4)	<0.001	220 (6.5)	156 (9.5)	0.001	286 (7.6%)	90 (7.4%)	0.003
18-64 years	2402 (93.8)	2124 (87)		3116 (92.6)	1410 (86.2)		3442 (90.9%)	1084 (89.4%)	
≥ 65years	36 (1.4)	62 (2.5)		28 (0.8)	70 (4.3)		60 (1.6%)	38 (3.1%)	
Residence									
Rural	1390 (54.3)	1218(49.9)	0.002	1748 (52)	860 (52.6)	0.695	1982 (52.3%)	626 (51.7%)	0.692
Urban	1170 (45.7)	1222 (50.1)		1616 (48)	776 (47.4)		1806 (47.7%)	586 (48.3%)	
Educational level									
Illiterate	399 (15.6)	254 (38.9)	<0.001	387 (11.5)	266 (16.3)	<0.001	443 (11.7%)	210 (17.3%)	<0.001
Moderate	1165 (45.5)	965 (45.3)		1437 (42.7)	693 (42.4)		1610 (42.5%)	520 (42.9%)	
High	996 (38.9)	1221 (55.1)		1540 (45.8)	677 (41.4)		1735 (45.8%)	482 (39.8%)	
Occupation									
Worker	959 (37.5)	199 (8.2)	<0.001	801 (23.8)	357 (21.8)	<0.001	945 (24.9%)	213 (17.6%)	<0.001
House wife	476 (18.6)	812 (33.3)		748 (22.2)	540 (33)		841 (22.2%)	447 (36.9%)	
Employer	765 (29.9)	975 (40)		1230 (36.6)	510 (31.2)		1372 (36.2%)	368 (30.4%)	
Professional	360 (14.1)	454 (18.6)		585 (17.4)	229 (14)		630 (16.6%)	184 (15.2%)	
Income									
<500 pounds	774 (30.2)	930 (38.1)	<0.001	1080 (32.1)	624 (38.1)	<0.001	1204 (31.8%)	500 (41.3%)	<0.001
500-2000 pounds	1388 (54.2)	1124 (46.1)		1690 (50.2)	822 (50.2)		1966 (51.9%)	546 (45%)	
>2000 pounds	398 (15.5)	386 (15.8)		594 (17.7)	190 (11.6)		618 (16.3%)	166 (13.7%)	

3442 (90.9%) respectively; highly educated 1540 (45.8%) and 1735 (45.8%) respectively;

employers 1230 (36.6%) and 1372 (36.2%) respectively and who earn between 500 and 2000

pounds monthly 1690 (50.2%) and 1966 (51.9%) respectively (Table 1). On the contrary, there was

Table 2. Socio-demographic characteristics regarding recreational activities practice among the study group.

Variable	Recreational activities					
	Vigorous intensity sport			Moderate intensity sport		
	Yes No (%)	No No (%)	Sig.	Yes No (%)	No No (%)	Sig.
Sex						
Male	1204 (76.2)	1514 (44.3)	<0.001	948 (71.3)	1770 (48.2)	<0.001
Female	376 (23.8)	19.6 (55.7)		382 (28.7)	1900 (51.8)	
Age groups						
<18 years	166 (10.5)	210 (6.1)	<0.001	132 (9.9)	244 (6.6)	<0.001
18-64 years	1408 (89.1)	3118 (91.2)		1194 (89.8)	3332 (90.8)	
≥ 65years	6 (0.4)	92 (2.7)		4 (0.3)	94 (2.6)	
Residence						
Rural	784 (49.6)	1824 (53.3)	0.015	650 (48.9)	1958 (53.4)	0.005
Urban	796 (50.4)	1596 (46.7)		680 (51.1)	1712 (46.6)	
Educational level						
Illiterate	86 (5.4)	567 (16.6)	<0.001	76 (5.7)	577 (15.7)	<0.001
Moderate	618 (39.1)	1512 (44.2)		532 (40)	1598 (43.5)	
High	876 (55.4)	1341 (39.2)		722 (54.3)	1495 (40.7)	
Occupation						
Worker	424 (26.8)	734 (21.5)	<0.001	337 (25.3)	821 (22.4)	<0.001
House wife	211(13.4)	1077 (31.5)		217 (16.3)	1071 (29.2)	
Employer	607 (38.4)	1133 (33.1)		490 (36.8)	1250 (34.1)	
Professional	338 (21.4)	476 (13.9)		286 (21.5)	528 (14.4)	
Income						
<500 pounds	500 (31.6)	1204 (35.2)	<0.001	422 (31.7)	1282 (34.9)	<0.001
500-2000 pounds	776 (49.1)	1736 (50.8)		656 (49.3)	1856 (50.6)	
>2000 pounds	304 (19.2)	480 (14)		252 (18.9)	532 (14.5)	

no statistically significant association with residence. There was a significant association between socio-demographic characteristics and both the vigorous and moderate intensity recreational activities with P-value (<0.05). Being males, adult age groups, inhabitants in urban areas, and the highly educated who earn between 500 and 2000 pounds monthly were highly associated with practice vigorous and moderate intensity recreational activities with a P value of (0.001, 0.001, 0, 005, 0.001, 0.001, 0.001) respectively (Table 2). In terms of WHO recommendation level for physical activity practice, there was a statistical significance in connection with insufficient physical activity level among females, adolescent, the old, housewives, and the low-income who earn less than 500 pounds per month with an overall P value of (0.001). On the other hand, there was no statistically significant association between insufficient

physical activity level with residence and education level P value of (0.454; 0.878) respectively (Table 3).

DISCUSSION

The current study is a pioneering one as it is the first to assess the prevalence of physical activity in Fayoum governorate. It was conducted on 5000 household's community-based survey, with different gender, age, education level, residence, occupation, and income.

With respect to the WHO recommendations on the average level of physical activity practice for different age group, at least 60 min of moderate to vigorous-intensity physical and daily activity were for those below 17 years old; 150 min of moderate-intensity or 75 min of vigorous-intensity aerobic physical activity throughout the week

Table 3. World health organization recommended level of physical activity practice among different study groups.

Variable	WHO recommended level of physical activity		Sig.
	Not adequate	Adequate	
	No (%)	No (%)	
Sex			
Male	546 (20.1)	2172 (79.9)	<0.001
Female	715 (31.3)	1567 (68.7)	
Age groups			
<18 years	160 (42.6)	216 (57.4)	<0.001
18-64 years	1045 (23.1)	3481 (76.9)	
≥ 65years	56 (57.1)	42 (42.9)	
Residence			
Rural	646 (24.8)	1962 (75.2)	0.454
Urban	615 (25.7)	1777 (74.3)	
Educational level			
Illiterate	160 (24.5)	493 (75.5)	0.878
Moderate	541 (25.4)	1589 (74.6)	
High	560 (25.3)	1657 (74.7)	
Occupation			
Worker	102 (8.8)	1056 (91.2)	<0.001
House wife	500 (38.8)	788 (61.2)	
Employer	463 (26.6)	1277 (73.4)	
Professional	196 (24.1)	618 (75.9)	
Income			
<500 pounds	554 (32.5)	1150 (67.5)	<0.001
500-2000 pounds	548 (21.8)	196.4 (78.2)	
>2000 pounds	159 (20.3)	625 (79.7)	

were for both adult age between 18 to 64 years old and elderly people above 65 years old (WHO, 2010).

The current study has shown that about one-fourth of households practice physical activity less than WHO recommended level for age 25.2%. This was much less than the results of a study conducted in Armenia with 53% were physically inactive, and less than Saudi Arabia which was 40.6% (Liana, 2008; AL-Hazza, 2007). However, it was higher than a study conducted in China which concluded that only 0.1% did not meet WHO recommendations (Paul et al., 2005).

The current study shows that insufficient physical activity was high among females more than males. This finding corroborates with studies conducted in Brazil (Gabriela et al., 2013; David, 2015) and in India, which concluded that males were more physically active than females (Gupta et al., 2012) Yet, it disagreed with a study conducted in Nepal which reported that males had a

higher prevalence of physical inactivity more than females (Abhinav and Alexandra, 2014).

Around half of adolescents and elderly in the current study did not meet the WHO recommendation level of physical activity. These results were less than the prevalence among elderly in Brazil (80%) (Saulo, et al., 2013), the prevalence of physical inactivity increased over time by aging (Anna et al., 2011). More than half of adolescents did not meet the recommended levels of physical activity, and this proportion tended to increase in Brazil (Samuel et al., 2010; Gabriela et al., 2013). This could be explained in that adolescents and elderly are the dependent age group who were not officially working, as working consider the main domain of physical activity. As for adolescents, they are deeply immersed in an era of electronics, and digitalized devices, screen time dramatically increased among children and adolescents.

This negatively affects physical and recreational

activities. This also matched with a study conducted in Brail, which concluded that electronic equipment negatively affected moderate-to-vigorous physical activity of children and adolescents (Gerson et al., 2015).

One-fourth of adults did not achieve the minimal level of recommended physical activity. Adults show a high prevalence of practicing vigorous to moderate intensity physical activity at work and recreational activities in addition to traveling activity. In Vietnam, around 50% of adult achieved the minimal level of recommended physical activity, and it was mainly achieved through work (Oanh, et al., 2008).

Regarding the educational level, there was a positive association with the physical activity as a high percentage of highly educated personnel stated that they practiced moderate intensity physical activity at work and traveling physically activity in addition to vigorous to moderate-intensity recreational activities, while others with moderate education level practice vigorous intensity physical activity. These results were similar to other studies conducted in some developed countries (Bauman et al., 2012) and matched with Asian HDSS report (Hakimi et al., 2009) as well.

Occupation and low income were associated with physical activity as it was approved by the current study that workers did vigorous-intensity physical activity at work. As for employees, those practiced moderate intensity and traveling physical activity and vigorous to moderate-intensity recreational activities. These results were similar to the finding in India, China, and Vietnam who stated that work was the main domain to achieve physical activity (Ranjit et al., 2014). Yet, it does not agree with the study done in Zurich (Switzerland) which found that many factors were associated with being physically active: one of these was the occupation and personal income (Bauman, et al., 2012).

The current study revealed that rural communities show a high level of vigorous-intensity activities at work, but urban community practice vigorous to moderate-intensity recreational activities. It almost agreed with the results of the worldwide survey which concluded that urban and wealthier countries presented a higher prevalence of physical inactivity (Samuel et al., 2011).

Another study conducted in India concluded that the prevalence of inactivity was higher in urban areas compared to rural areas (Ranjit et al., 2014). As rural areas depend mainly on manual work in agriculture and show a lack of transportation facilities, rural inhabitants have to do vigorous to moderate activities in their work and they also suffer a deficiency in recreational activities. On the other hand, urban areas have facilities to recreational activity and good transportations.

The current study noted that the most common barriers to physical and recreational activities lied in the fact that there was no time to practice exercise, followed by an inactive feeling, no suitable place, no family or friend support, and no gymnastic equipment and tools as well. It

is similar to the finding of a study conducted in Germany (Anna et al., 2011). Social support, self-efficacy, and regulation promote physical activity (Chae et al., 2014).

CONCLUSION AND RECOMMENDATIONS

In Fayoum community, the prevalence of physical activity less than recommended by WHO increased among females, adolescents, the elderly, and low-income households. To overcome the high prevalence of physical inactivity, there is a need to develop a multi-sector approach to raise the awareness of the importance of physical activity, its positive impact on health, and global recommendations of physical activity developed by WHO, with particular emphasis on setting a global strategy for a healthy diet.

LIMITATIONS OF THE STUDY

There are several limitations to this study. The study design used a cross-sectional survey design. It was difficult to establish a causal relationship. Self-reported information in the study could be less reliable in detecting physical activities and shows recall bias. The current study did not explore other associated factors, such as the social and environmental factors in detail.

ETHICAL CONSIDERATIONS

This study was reviewed and approved by the Faculty of Medicine Research Ethical Committee. It was conducted after explaining the study objectives and confidentiality which was expressed to the households. Verbal consent was obtained from households before distributing the questionnaire. Each participant had the right not to participate in the study or withdraw at any time.

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