

## Knowledge and Practice of Physical Activity among National Cancer Institute workers, Cairo University

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### Abstract

**Background:** Physical activity (PA) is hypothesized to reduce the risk of several chronic diseases and enhance longevity. Low levels of activity have been associated with some but not all types of cancers. We expected that work experience at National Cancer Institute (NCI) might have a positive effect on knowledge about and practice of physical activity among its workers. **Aim:** To describe physical activity practice among workers (medical & nonmedical) in National Cancer Institute (NCI), Cairo University and to measure knowledge about different health benefits of physical activity and its role in cancer prevention and treatment. **Participants & method:** This is a cross-sectional survey with anonymous self-administered questionnaire for workers (medical and non-medical). Their level and pattern of physical activity were assessed using modified International Physical Activity Questionnaire version 8, their knowledge about health benefits of PA and its relation to cancer prevention and treatment were studied. The PA level was estimated as metabolic equivalent task (MET minutes/week). **Results:** The medical group of workers was significantly more knowledgeable about different health benefits of regular physical activity (PA), however the whole group were lacking adequate knowledge about role of PA in cancer prevention and treatment. No significant difference was found between the medical and non medical workers as regard the activity level. The most common barrier to participate in regular PA among the whole studied group was insufficient time. Significant variables affecting total score MET minute were age groups, work type, job hours per week, education level (years), presence or absence of children, sitting minutes/day. Only 23.5% of the whole studied groups participate in recreation and sport PA. **Conclusion:** There was lack of adequate knowledge about relation between PA and cancer prevention and its role in cancer treatment. **Recommendations:** Development and implementation of a health-related physical education program about benefits of PA practice. Additionally, suitable place and equipments should be made available at the NCI to stimulate workers for PA participation.

**Keywords:** Physical activity, Knowledge, Practice

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### Introduction

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Regular, adequate physical activities are major factors in the promotion and

maintenance of good health throughout the entire life course.

Overall, 2 million deaths are attributable to physical inactivity. At least 30 minutes of moderate-intensity physical activity 5 days per week reduces the risk

of several common non-communicable diseases in adults, cardiovascular disease, stroke, type II diabetes, insomnia, depression, colon cancer and breast cancer.<sup>(1,2)</sup>

Scientific evidence indicates that PA may reduce the risk of several types of cancer, including cancers of breast<sup>(3)</sup>, colon<sup>(4)</sup>, prostate and endometrium.<sup>(5)</sup>

Physically active people tend to have better mental health.<sup>(6)</sup> Compared with inactive people, the physically active had higher scores for positive self-concept, more self-esteem and more positive "moods" and "affects. These findings seem similar in both young people and adults. PA has also been used to treat mental health problems such as depression, in both the short and long term.<sup>(7)</sup>

Physical exercise is important for maintaining physical fitness and can contribute positively to maintaining a healthy weight, building and maintaining healthy bone density, muscle strength, and joint mobility, promoting physiological well-being, reducing surgical risks, reducing the risk of premature death<sup>(6)</sup> and strengthening the immune system.<sup>(8)</sup>

The most definitive epidemiological evidence for an association between PA and cancer exists for colon or colorectal cancer.<sup>(9,10)</sup> An estimated risk reduction has been found to be at least 20–30%, and up to 57% reduction in risk for colorectal cancer for both men and women.<sup>(10)</sup> There is also some evidence of an average risk reduction of 20–30% for endometrial cancer for women and 20–40% for breast cancer among post-menopausal women who participate in recreational activity. In addition, some research suggests an estimated average risk reduction of 10–30% for prostate cancer in physically active men.<sup>(10)</sup>

Preliminary evidence that PA may have a role in the prevention of lung, pancreatic, testicular and ovarian cancer also exists, however, the evidence is limited and more research is needed for a convincing association between these cancers and PA.<sup>(9,10)</sup>

Exercise significantly lowers insulin, glucose, triglycerides, and raises HDL cholesterol<sup>(11)</sup> which may also be associated with decreased cancer risk.<sup>(12)</sup>

Public health awareness of cancer and the potential of its risk reduction including PA continue to rise in the community. We believed that workers at NCI (National Cancer Institute) might be more active and knowledgeable about this issue being working at a place dealing with such a lethal health problem and might be influenced by their work experience. So we conducted this study aiming to describe PA practice and measure the knowledge about its health benefits and role in cancer prevention and treatment among workers in National Cancer Institute (NCI), Cairo University.

## Methods

This cross-sectional survey study involved all workers attending the day of interview and accepting participation in the study in all departments of the NCI during the year 2013 using an anonymous self-administered or interviewer questionnaire adopted from international physical activity questionnaire (IPAQ) long form 8<sup>th</sup> version including personal data and assessment of physical activity through four domains: work-related, transportation, leisure-time activity and housework/gardening. In each of the four domains the number of days per week and time per day spent in both moderate and vigorous activity were

recorded, the prior week was considered as reference. Walking time was recorded for the first three domains. Sitting time was recorded as an indicator of sedentary behavior. Assessment of Knowledge about different health benefits of regular PA was added, as well as, its relation to cancer prevention and treatment and Barriers preventing participation in PA. Last, the anthropometric measurements: body mass index ( $\text{kg}/\text{m}^2$ ) and fat percentage were discussed.

A pilot study was conducted on 20 workers to assess the questionnaire (clarity, time consumption and different responses) and some questions (those about domains of PA and knowledge of different health benefits) were modified accordingly by writing them in a more simplified manner to be understood by all workers especially house keepers.

The IPAQ allows continuous assessment of PA. The continuous score allows the estimation of the energy expenditure expressed in Metabolic Equivalent Task (MET) minutes/weeks. One MET represents the rate of oxygen consumption ( $\text{VO}_2$ ) of a seated individual at rest, equivalent to approximately  $3.5 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ . Those with MET minute of zero were considered not active.

- Walking MET-minutes/week =  $3.3 \times$  walking minutes  $\times$  walking days
- Moderate MET-minutes/week =  $4.0 \times$  moderate-intensity activity minutes  $\times$  moderate days
- Vigorous MET-minutes/week =  $8.0 \times$  vigorous-intensity activity minutes  $\times$  vigorous-intensity days
- Total physical activity MET-minutes/week = sum of Walking + Moderate + Vigorous MET minutes/week scores.

Participant with low level of PA was defined as those practicing  $< 300$  min/week of at least moderate physical activity. Those with high level of PA are practicing  $\geq 300$  min/week of at least moderate physical activity based on recommendations of physical activity thresholds that result in health benefits described by Craig et al.<sup>(13)</sup>

Least moderate PA was defined as having either of the following criteria:

- Three or more days of vigorous activity of at least 20 min/day **or**
- Five or more days of moderate intensity activity and/or walking of at least 30 min/day **or**
- Five or more days of any combination of walking, moderate or vigorous intensity activities achieving a minimum of at least 600 MET-minutes/week.<sup>(13)</sup>

The studied group was classified into medical and non-medical groups according to their occupation. The medical group involved physicians, nurses and pharmacists, while the non-medical group involved other workers.

The anthropometric measurements were carried out at the end of the interview. The body weight was measured using a weighing machine, model ZT-120. Height was measured using a portable plastic tape measure, with a mill metric scale, placed on a smooth and flat surface, with the individuals wearing light clothes and barefoot. Body mass index (BMI) (measured by dividing the weight in kilograms by the square of the height in meters) and classified as: normal with  $\text{BMI} < 25 \text{ kg}/\text{m}^2$ ; overweight, with  $\text{BMI} 25\text{-}29.9 \text{ kg}/\text{m}^2$ ; and obese, with  $\text{BMI} \geq 30 \text{ kg}/\text{m}^2$ . The fat percentage was also assessed as an obesity measurement, using fat loss monitor (Omron). The fat loss monitor sends an extremely weak electrical

current through the body to determine the amount of fat tissue.

### Statistical Analysis:

Data were analyzed using SPSS win statistical package version 17. Numerical data were described as means and standard deviations (SD) or medians and ranges whenever appropriate. While qualitative data were described as frequencies and percentages. Numerical data were explored for normality using Kolmogorov-Smirnov test and Shapiro-Wilk test. Comparisons between the two groups for normally distributed numerical variables were done using the Student's t-test while for non-parametric numeric variables Mann-Whitney test was used. Associations between qualitative data were done using Chi-square test or Fisher's exact test as appropriate. Stepwise logistic regression was applied to the significant variables within the univariate analysis using the forward likelihood ratio method. The odds ratio (OR) and its confidence intervals (CI) were calculated to estimate the risk. Probability (p-value) equal or less than 0.05 is considered significant.

### Results

Number of participants was 450; only 400 (207 medical workers and 193 non-medical workers) responded to the questionnaire (89.0%). The mean age of the studied workers was 35.1±9.2 years. About 55.0% of the studied groups were between 16 to 34 years. Females represented 61.5%, 66.8% were married and 60.0% had more than 12 years of education. Most of the participants, 80.3%, worked on average 21-40 Job hours per week (Table1). The medical workers were significantly more knowledgeable ( $p < 0.05$ ) about different health benefits of regular physical

activity that non-medical workers. Only 42.0% of the medical workers, 17.1 % of the non-medical workers knew the benefit of PA for cancer prevention. Almost 24.0 % of the medical workers and 8.3 % of the non-medical workers knew the role of PA in cancer treatment (Table 2). Seventy one percent of the participants were active. No significant difference between the medical and non-medical workers as regard the activity level was detected,  $p = 0.511$  (Table 3). Insufficient time was the most common cause hindering physical activity among the whole studied group (57.5%). Medical workers spent significantly more time to study than non-medical workers ( $P < 0.001$ ). The most common barrier among non-medical workers was unavailability of suitable places, 59.1%, which was significantly more common than medical workers, 28.5%, ( $p < 0.001$ ). Significant variables affecting total score MET minute were age groups, working type, job hours per week, education level (years), presence or absence of children, sitting minutes/day.

Stepwise logistic regression revealed that the factors independently affecting the total physical activity were sex, BMI, and sitting time. Females were 5.74 (95% CI: 2.43-13.52) times more active than males. Normal body mass index participants were 3.59 (95% CI: 1.09-11.81) times more likely to be active than those who were overweight and 4.63 (95% CI: 1.38-15.55) times more than obese participants. Participants sitting less than or equal to 360 minutes per day are 5.28 (95% CI: 2.42-11.51) times more likely to be active than more than 360 minutes per day (Table 4).

### Discussion

As public awareness of cancer and the potential for risk reduction continues to

rise, we must structure policies that effectively utilize our current knowledge of cancer prevention and that reinforce healthy behavior changes. The current study was conducted on 400 workers in the NCI. We believe that this work-place might have an effect on PA practice and knowledge of the workers in this institute. Because this institute responsible for management of cancer, a lethal health problem, that may be modified by practicing PA.

In our study few respondents 15.3% knew that PA may reduce colon cancer risk. Awareness was especially low among the non-medical group. This is consistent with an American study conducted by Elliot et al.<sup>(14)</sup> who found that 15.0% of studied adults knew that PA may reduce colon cancer risk. Awareness was especially low among less educated groups. Keighley et al.<sup>(15)</sup> found that 30.0% of their studied groups knew that PA may reduce colon cancer risk. Among the medical group in the current study, few respondents (18.4%) knew that PA may reduce breast cancer risk. This is slightly higher than the study conducted by Lawlor et al.<sup>(16)</sup> who found only a minority (14.0%) of general practitioners knew that PA may reduce breast cancer risk. In this study 32.0% of the whole group believes that PA reduces some types of cancer, however 52.5% of this group don't know what type of cancer physical activity helps to prevent.

The results of the Health Information National Trend Survey indicate that more than two-thirds (69.9%) of U.S. adults believe that PA can help reduce the risk of getting some types of cancer. However, 68.2% of adults holding this belief do not know which specific types of cancer PA helps to prevent.<sup>(17)</sup> Combined with the results of the current

study, these findings suggest that although many individuals are aware that PA helps to prevent cancer, there is poor awareness of the type of cancers for which PA provides a protective effect.

Among the entire group in the current study about 71.0 % were active. Inactivity increases with age. This result is consistent with a study conducted by Søggaard et al.<sup>(18)</sup>, who found that approximately 70.0% of their studied group in Norway, where inactivity increased with increasing age. In the current study PA decreased in the older age group. The most active age group was 16-34 years and least active group was 55 or more,  $p=0.03$ . The finding that physical inactivity increased in the older age group is not surprising; it goes in concordance with other studies.<sup>(19,20,21)</sup>

In our study, females were 5.7 times more active than males (95% CI: 2.4-13.5). On the contrary Li et al.<sup>(22)</sup> and Pedro et al.<sup>(23)</sup> found that PA is more frequent among males, probably due to higher activity at work outside the household and participation in competitive sports in Chinese and Brazilian young adults respectively. The finding in the present study reported that females were more moderately active than males may be due to the used IPAQ instrument which assesses all components of PA, including moderate-intensity activities done at home, such as carrying loads (e.g. babies), scrubbing floors, sweeping and vacuuming. These types of PA are more likely to be performed by female respondents.

In our study, time spent sitting was an independent factor affecting total level of PA. Those sitting  $\leq 360$  minutes/day were more active than those sitting  $> 360$  minutes/day,  $p=0.030$ . This finding disagrees with Suija et al.<sup>(24)</sup> who didn't find significant relationship between

the level of PA and time spent sitting. The association between high BMI and lower levels of total PA found in our data was expected, since the total PA levels are associated with higher total energy expenditure. The normal body mass index of participants were 3.6 times more likely to be active than overweight (95% CI: 1.1-11.8) and 4.6 times more than obese participants (95% CI: 1.4-15.6). This result is in concordance with other studies.<sup>(25, 26, 27)</sup>

In the current study the perceived barriers to increase PA were: insufficient time (57.5%), extra job (51.0 %), caring of children (15.8%), spending time to study (15.5%), caring of parents (3%), unavailability of suitable places (43.3%), PA not important (4.5%), not used to do PA (1.3%). **Booth et al.**<sup>(28)</sup> found that the most frequently cited barriers to more-regular participation in the youngest age group were insufficient time, lack of motivation and child care responsibilities. Among those aged 60 to 78 years, injury or poor health were the most frequently cited barriers to activity in Australian population. Many studies have shown that time constraint was one of the reasons for adolescents to avoid physical activity.<sup>(29,30,31)</sup>

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Table (1): Sociodemographic characteristics of medical and non-medical workers

Characteristic	Total (N= 400)	Medical (N=207)	Non-Medical (N=193)	p-value
	N (%)	N (%)	N (%)	
<b>Age (years)</b>				
<b>Mean ± SD</b>	35.1 ± 9.2	33.7 ± 8.2	36.5 ± 9.9	0.003
<b>Age groups</b>				
16 to 34	218 (54.5)	129 (59.2)	89 (40.8)	0.005
35 to 54	169 (42.3)	72 (42.6)	97 (57.4)	
55 or more	13 (3.3)	6 (46.2)	7 (53.8)	
<b>Sex</b>				
Male	154 (38.5)	82 (53.2)	72 (46.8)	0.636
Female	246 (61.5)	125 (50.8)	121 (49.2)	
<b>Marital status</b>				
Single	124 (31.1)	68 (54.8)	56 (45.2)	0.500
Divorced	5 (1.5)	2 (40.0)	3 (60.0)	
Widow	4 (1.0)	2 (50.0)	2 (50.0)	
Not married	133 (33.8)	72 (45.9)	61 (54.1)	
Married	267 (66.8)	135 (50.6)	132 (49.4)	
<b>Education level (years)</b>				
≤12	160 (40.0)	51 (31.9)	109 (68.1)	<0.001
>12	240 (60.0)	156 (65.0)	84 (35.0)	
<b>Working type</b>				
No PA	237 (59.3)	107 (45.1)	130 (54.9)	0.001
PA	163 (40.8)	100 (61.3)	63 (38.7)	
<b>Working hours per week</b>				
≤ 20	38 (9.5)	33 (86.8)	5 (13.2)	<0.001
21–40	321 (80.3)	150 (46.7)	171 (53.2)	
≥41	41 (10.3)	24 (58.5)	17 (41.5)	

SD: standard deviation, PA: physical activity

**Table (2): Knowledge about value of regular physical activity in cancer prevention and treatment among medical and non-medical workers**

Characteristic	Medical (N=207)	Non- medical (N=193)	p-value
	N (%)	N (%)	
<b>Cancer prevention</b>	87 (42.0)	33 (17.1)	<0.001
<b>Type of cancer which decrease by regular physical activity</b>			
Breast	38 (18.4)	5 (2.0)	
Colon	32 (15.3)	3 (1.6)	
Prostate	15 (7.2)	2 (1.6)	
Lung	12 (2.8)	5 (2.6)	
Stomach	11 (5.3)	3 (2.1)	
Bone	11 (5.3)	4 (2.1)	
Bladder	10 (4.8)	3 (1.6)	
Brain	8 (3.9)	2 (1.0)	
Liver	8 (3.9)	2 (1.0)	
Other cancer	2 (1.0)	0 (0.0)	
Pancreas	1 (0.5)	0 (0.0)	
Leukemia and lymphoma	1 (0.5)	0 (0.0)	
No cancer effect	5 (2.4)	4 (2.1)	
<b>Role on cancer treatment</b>	49 (23.7)	16 (8.3)	<0.001
<b>Type of cancer at which physical activity play role in treatment</b>			
All cancer	39 (18.8)	15 (7.8)	
Breast	8 (3.9)	1 (0.5)	
Lung	1 (0.5)	0 (0.0)	
Colon	1 (0.5)	0 (0.0)	

**Table (3): Level of physical activity among medical and non medical workers**

Level of physical activity	Total (N= 400) N (%)	Medical (N=207) N (%)	Non-Medical (N=193) N (%)	p-value
Not active (< 300 min/week)	116 (29.0)	57 (27.5)	59 (30.6)	0.511
Active (≥ 300 min/week)	284 (71.0)	150 (72.5)	134 (69.4)	

**Table (4): Multivariate analysis of factors affecting total activity**

	B	SE	P-value	OR	95% CI for OR	
					Lower	Upper
Sex	1.747	0.438	<0.001	5.74	2.43	13.52
BMI			0.044			
Overweight	1.279	0.607	0.035	3.59	1.09	11.81
Obese	1.532	0.619	0.013	4.63	1.38	15.55
Sitting minutes/day	1.664	0.398	<0.001	5.28	2.42	11.51
Constant	-5.185	0.696	<0.001	0.01		

PA: physical activity, BMI: body mass index, B: regression coefficient, SE: standard error, OR; odds ratio, CI: confidence interval