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# Physical Activity and Well-being Status among Employees of University of Medical Sciences

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## Abstract

**Background:** Workplace physical activity plays an important role in employees' health. As university employees are a population at risk for a sedentary working pattern, this study aimed to investigate the physical activity status of employees of Iran University of Medical Sciences (IUMS) and its subsequent effects on their well-being.

**Methods:** This cross-sectional study included 472 employees from different units of IUMS in Tehran. The participants were selected by a multistage sampling method. Interviews were conducted by using an international physical activity questionnaire, a questionnaire for stages of behavioral change, the World Health Organization Well-being Questionnaire, and a demographic checklist from July to October 2019. Analysis of variance, t test, and logistic regression analysis were used. Data were analyzed using IBM SPSS (Version 21.0).

**Results:** Total physical activity in the study population was 6216.58 ± 5886.09 MET-minutes/week. The mean score of the well-being index was 54.72 ± 22.4; there was an association between sex and location of work with physical activity in domains ($p$<0.05). The highest prevalence rates for change of stage of physical activity were found in the maintenance stage for men and the contemplation stage for women. There was a significant difference between men and women's well-being index—men reported being more active and energetic than women ($p$<0.001). Results also revealed that having vigorous physical activity compared with a moderate level could increase the well-being index.

**Conclusion:** Physical activity behavior at the workplace was associated with well-being level. It could, therefore, be postulated that enhancing physical activity may be beneficial to improving well-being in an academic environment.

**Keywords:** Physical Activity, University Workplace, Trans-Theoretical Model, Well-Being

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## Introduction

It is now widely accepted that physical activity is a key feature of a healthy lifestyle, which positively influences

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***→ What is "already known" in this topic:***
- It is now widely accepted that physical activity is a key feature of a healthy lifestyle.
- Individuals who are physically active have reduced health-care expenditures, burnout, sick days, and feel more energized, satisfied, and active during work hours.

***→ What this article adds:***
- Total physical activity in employees who worked in the service unit was significantly higher than in other groups.
- Employees with high physical activity level had better well-being feeling than those with low physical activity level.
- Individuals who were in the preparation and maintenance stages of a physical activity behavior had more well-being feeling than the individuals in the contemplation stage.

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health conditions across the lifespan (1-3); also, regular physical activity is proven to help prevent and manage non-communicable diseases such as heart disease, stroke, diabetes, and several cancers (4, 5). It also helps prevent hypertension, maintain healthy body weight, and improve mental health, quality of life, and well-being (4, 5). Workplace health promotion programs are designed to improve the physical activity of workers. The World Health Organization and the World Economic Forum have indicated that the workplace is an ideal location to implement improving programs to reduce diabetes, obesity, and cardiovascular disease risk factors in employees (5). Previous researches have evaluated workplace health conditions in terms of nutrition (6), stress management (7), tobacco cessation (8), and physical activity (9-12). Of particular attention, the workplace has the potential of reaching a significant proportion of employed adults, and this group spends the main part of their time at work (13). Hence, the workplace is an ideal objective location to assess, conclude, and promote healthy behaviors of employee populations. Increasing employees' physical activity can create a healthier workforce, improve productivity, and decrease employees' risk of developing costly and debilitating chronic diseases (14). Results of studies showed that physically active employees have lower health care costs, show a lower level of burnout, require a lesser amount of sick leave, and feel more vigorous, satisfied, and active during working hours (15-17).

Previous studies revealed that engaging in physical activity could have a positive effect on depression and anxiety (2, 18) and physical activity can improve people's self-perception and self-esteem, mood, and subjective well-being, reduce stress, and improve sleep quality (19). The transtheoretical model is used to assess the physical activity behavior of individuals; each stage of this model could be related to the amount of one's physical activity. Well-being is a comprehensive concept and largely depends on living standards and it is an essential global issue that achieving better well-being is an important challenge for governments and organizations all around the world (19-21).Well-being is an example of a positive construct of mental health that may be promoted by physical activity (19). There was a strong emphasis on documenting physical activity at the international and national levels in the last decade in order to produce clinical guidelines to prevent difficulties (22). In addition, it appears that the advancement of well-being is emerging as a public health priority in several countries globally.

One issue that should be taken into account is that these studies should be conducted in different communities. The academic environment is one of the public communities where individuals with different knowledge levels, economic status, and social norms reside together. On the other hand, the health status of the university's staff will have an undeniable impact on achieving the goals of this organization. Iran University of Medical Sciences (IUMS) covers a complex of educational environments such as colleges, research centers, and health care provider units such as primary health care centers and hospitals. As university employees are a population at risk for a sedentary working pattern, the purpose of this study was to investigate the physical activity status of employees of IUMS, and its subsequent effects on their well-being.

## Methods

### *Study Sampling and Data Collection*

This was a cross-sectional study with a population consisting of all 11,901 employees of IUMS. According to the information obtained from the literature review, by considering 95% confidence interval, ($\alpha = 0.05$), ($\sigma = 560$) and accuracy coefficient ($d = 56$), the sample size was estimated to be 385 individuals. Considering the design effect of 1.2, the final sample size increased to 480 individual (23).

A total of 480 samples were selected using a multistage sampling method. The first stage was stratified sampling, in which each of the 5 main categories of job units, including university administrative/financial units, faculties, hospitals, health networks, and primary health care centers, research institutes, and research centers, were considered as a stratum.

At the second stage, the sample size assigned to each stratum was proportionally determined based on the number of employees in each included unit. Then, from a complete list of employees, the desired number of samples were selected by systematic random sampling from each of the selected units, and then the data were collected.

All of the individuals were over the age of 18 and had no mobility disorders that limited their physical activity. The ones who did not consent to participate in the study were excluded. There were not any limitations in sex type, work experience duration, and type of employment in the selection of participants.

About 30 minutes of face-to-face interviewing were conducted by using structured questionnaires (physical activity questionnaire, questionnaire for stages of behavioral change, and 5-item WHO Well-being questionnaire) and demographic checklist (including sex, age, educational status, marital status, location of work, and work shift were questioned), by three pre-trained interviewers according to the location of the workplace. To ensure the quality of the interviews, all the interviewers, had received extensive training prior to data collection. Finally, completed questionnaires were carefully checked by quality supervisors at the end of each day.

Respondents were assured that participation in the study was voluntary. All necessary informed consent was self-evidently complemented for each participant.

The study was approved by the Research Ethics Committee of Iran University of Medical Sciences, Tehran, Iran (IR.IUMS.REC.1397.733).

Due to the incompleteness of some questionnaires, 8 questionnaires were excluded from the study and finally the information of 472 employees was entered into statistical analysis. The overall response rate among those eligible was 98.33 % yielding a total of 472 participants.

### *Physical Activity Assessment*

Physical activity was evaluated by the standard International Physical Activity Questionnaire (IPAQ) (24).The re-



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liability and validity of the Persian version of this questionnaire which include 27 questions and 5 sections, confirmed by Vasheghani Farahani et.al (25).

The IPAQ is used to assess habitual PA during the past 7 days. There are two versions, the long form (27 items) and the short form (7 items).The long version of IPAQ was used in the present study which participants were asked to report the intensity, and duration of their work (7 items), domestic and gardening (6 items), leisure time (6 items), and transport-related physical activities (6 items) engaged in the past week. The questionnaire also includes two questions about the time spent on sitting as an indicator of sedentary behavior. The number of days per week and the time spent on walking per day as well as moderate and vigorous activities from all four domains are recorded (25).

Individuals are classified into three categories with low (600), moderate (600-3000), and high physical activity (>=3000) according to their MET scores (MET minutes represent the amount of energy expended carrying out physical activity) (26).

The stages of behavioral change (Trans-theoretical model) were used to assess the physical activity behavior of subjects. Participants were classified based on the five stages include pre-contemplation, contemplation, preparation, action, and maintenance (27). In the pre-contemplation stage, the person has no physical activity and does not intended to start in the next 6 months. In the contemplation status, although the person is physically inactive, but have intend to begin physical activity within the following 6 months. At the preparation stage, the subject has physical activity, but less than the recommended level. In the action phase, the person performs a regular physical activity for less than 6 months. However, the maintenance stage includes individuals to maintain regular physical activity for more than 6 months.

### Well-being Assessment

Well-being was measured using the 5-item World Health Organization Well-Being Index (WHO-5), which is a widely used questionnaire assessing the psychological well-being of individuals. These items are included: (1) I have felt cheerful and in good spirits; (2) I have felt calm and relaxed; (3) I have felt vigorous and active; (4) I woke up feeling fresh and rested; and (5) My every day has been filled with things that interest me. Each of the 5 items is scored from 5 (all of the time) to 0 (none of the time). Thus, the total score of subjective well-being ranges from 0 to 25. To obtain a percentage score as the index ranging from 0 to 100, the raw score is multiplied by 4. A percentage score of 0 represents the worst, whereas a score of 100 represents the best imaginable well-being. In some studies this index is categorized to ≤50% and >50%; which the index of ≤50% implies the decreased well-being (28).

### Statistical Analysis

Data analyses were performed using IBM SPSS (Version 21.0). The normality of data distribution was evaluated using the Kolmogorov-Smirnov test.

Descriptive statistics, including mean, frequency, and standard deviation were defined for all variables and expressed as mean ± standard deviation (29). Differences between the 2 groups were compared using a t test, and analysis of variance was used for comparison between more than 2 groups. A logistic regression analysis was used to evaluate the association between physical activity, physical activity behavior, and the well-being index. $P<0.05$ was considered statistically significant.

## Results

### Demographic Characteristics

The data of 472 participants (134 men and 338 women) were entered into the analysis. All participants were at least 18 years old. The mean age of the participants was 37.07 ± 9.48 years old. In our study, 336 (72.1%) were married and 130 (27.9%) unmarried. According to the workplace, 84 (19.1%) of participants worked in the primary health care units, 212 (48.2%) in the hospitals, 95 (21.6%) in the administrative/financial area, 14 (3.2%) in the faculties as academic members, and 35 (8%) in the service units. Among these, 308 (68%) worked at day, 6 (1.3%) at night, and 139 (30.7%) in a rotational situation (Table 1).

*Table 1.* Demographic Characteristics of Participants

| Variable | | Frequency |
|---|---|---|
| Age (year) | | 37.07 ± 9.48 |
| Sex | Male | 134 (28.4%) |
| | Female | 338 (71.6%) |
| Educational status | Bachelor's degree and lower | 336 (78.5%) |
| | Master's degree and higher | 100 (21.5%) |
| Marital status | Unmarried | 130 (27.5%) |
| | Married | 336 (71.2%) |
| | Others | 6 (1.3%) |
| Location of work | Primary health care centers | 84 (19.1%) |
| | Hospitals | 212 (48.2%) |
| | Administrative/financial unit | 95 (21.6%) |
| | Academic position (Faculties) | 14 (3.2%) |
| | Service unit | 35 (8%) |
| Work shifts | Day | 308 (68%) |
| | Night | 6 (1.3%) |
| | Rotational | 113 (30.7%) |

Data presented as Mean ± SD for continuous variables or frequency for categorical parameters.

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### *Physical Activity Status and Physical Activity Behavior Stage*

As data presented in Table 2, total physical activity in the study population was 6216.58 ± 5886.09 MET-minutes/week, and physical activity in walking, moderate, vigorous, and sitting was 2056.41 ± 2200.25, 2258.13 ± 2374.94, 2062.16 ± 3261.22, and 277.05 ± 169.89 MET-minutes/week, respectively (Table 2).

As shown in Table 2, there were no significant relation with sex for our analyses of walking ($p$=0.109), sitting status of physical activity ($p$=0.792), or moderate physical activity level ($p$=0.312). However, we observed a significant difference between men and women regarding physical activity in a vigorous state ($p$=0.029) (Table 2). To age parameter, total physical activity in walking and sitting states were not significantly different between participants aged ≤35 years and >35. However, in moderate or vigorous activities, differences between the 2 groups were significant, $p$=0.069 and $p$=0.063, respectively.

There was an association between sex and location of work with physical activity in each domain (i.e. work time, transport, domestic, and leisure time). These associations remained statistically significant for the work time, domestic and leisure time domains for men compared with women ($p$<0.05). Total physical activity in employees who worked at the service unit was significantly higher than in other groups ($p$<0.05). However, there were no significant differences between primary health care units, hospitals, administrative/financial units, faculties academic members, and service units in physical activity at different day times ($p$>0.05) (Table 2).

Based on the results shown in the Table 2, there were no significant differences between marital status and total physical activity in walking, sitting, moderate, and vigorous states ($p$>0.05). Moreover, there were no significant differences between marital status and physical activity in each domain (i.e., work time, transport, and domestic and leisure time physical activity) ($p$>0.05) (Table 3). Also, we did not find any association between work shift and total physical activity in walking, moderate, and vigorous states ($p$>0.05) (Table 2) and physical activity in each domain (i.e. work time, transport, domestic and leisure time) ($p$>0.05) (Table 3); but there was an association between shift work and sitting ($p$<0.05), participants who worked in night shift had more sitting state than others (Table 2).

Overall, 13.4% of the participants were reported in the pre-contemplation stage, 31.5% in the contemplation stage, 18.5% in the preparation phase, 15.2% in the action stage, and 21.4% in the maintenance stage of physical activity behavior. Women were significantly more likely than men to be in the stages of precontemplation, contemplation, preparation, and action ($p$<0.05), whereas men were significantly more likely to be in the maintenance stage ($p$<0.05) (Table 3).

*Table 2.* Descriptive Characteristics of Physical Activity Level by Demographic Variables

| | | Total physical activity* | Walking | Moderate | Vigorous | Sitting |
|---|---|---|---|---|---|---|
| Total | | 6216.58±5886.09 | 2056.41±2200.25 | 2258.13±2374.94 | 2062.16±3261.22 | 277.05±169.89 |
| Sex | Male | 6847.37±6923.82 | 2342.83±2439.86 | 2082.09±2446.32 | 2589.35±3603.82 | 273.65±195.06 |
| | Female | 5968.95±5416.9 | 1947.5±2095.13 | 2329.52±2345.46 | 1855.39±3097.92 | 278.12±159.74 |
| *P*-value[1] | | 0.233 | 0.109 | 0.312 | 0.029 | 0.792 |
| Age (year) | ≤ 35 | 6379.25±5569.03 | 2247.25±2125.03 | 2273.27±2336.59 | 1953.2±2949.89 | 396.07±196.35 |
| | > 35 | 5718.13±5822.03 | 1859.13±2210.03 | 2134.08±2262.56 | 1977.82±3398.52 | 265.41±145.53 |
| *P*-value[1] | | 0.245 | 0.069 | 0.534 | 0.940 | 0.063 |
| Location of work | Primary health care centers | 6156.66±6172.53 | 1848.0±2192.82 | 2596.5±2731.53 | 2596.5±2731.53 | 2287.34±1167.03 |
| | Hospitals | 6479.93±5399.84 | 2212.23±2158.59 | 2441.56±2254.99 | 2441.56±2254.99 | 1765.72±1150.65 |
| | Administrative/financial unit | 5535.7±6104.55 | 1743.04±2045.29 | 1943.59±2405.07 | 1943.59±2405.07 | 2290.52±1144.92 |
| | Academic position (Faculties) | 2949±2732.64 | 1171.5±1117.51 | 728.21±1278.47 | 728.21±1278.47 | 2502.85±1121.12 |
| | Service unit | 10345.78±7872.74 | 3506.25±3065.95 | 2893.71±2539.37 | 2893.71±2539.4 | 931.76±954.05 |
| *P*-value[2] | | <0.001 | 0.001 | 0.017 | 0.017 | < 0.001 |
| Marital status | Unmarried | 6078.86±6089.11 | 2179.91±2302.41 | 2044.37±2459.04 | 2016.05±3176.32 | 280.79±168.58 |
| | Married | 6146.57±5673.12 | 1990.07±2165.79 | 2303.67±2307.2 | 2016.63±3234.74 | 275.08±170.43 |
| *P*-value[1] | | 0.917 | 0.43 | 0.295 | 0.952 | 0.743 |
| Work shifts | Day | 6099.94±6058.23 | 1956.88±2126.05 | 2222.21±2418.62 | 2080.2±3268.58 | 291.15±166.56 |
| | Night | 3103.01±2747.44 | 1457.5±1653.48 | 1322.56±1295.57 | 26.66±65.13 | 486.78±328.9 [a] |
| | Rotational | 6542.13±5696.18 | 2228.83±2120.07 | 2359.12±2347.98 | 1956.2±2958.26 | 229.06±128.97[b] |
| *P*-value[2] | | 0.393 | 0.378 | 0.585 | 0.278 | <0.001 |

* Metabolic equivalent minutes (MET)-minutes/week.
[1] Student t test.
[2] One-wav ANOVA.



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*Table 3.* Descriptive Characteristics of Physical Activity Domains in Day Time According to Demographic Variables

| Physical activity in different daytime* | | Work time PA | Transport PA | Domestic PA | Leisure time PA |
|---|---|---|---|---|---|
| Total | | 3153.79±4071.7 | 4299.68±3625.56 | 1458.67±2091.35 | 1005.17±1948.1 |
| Sex | Male | 3815.53±4457.62 | 4503.16±3484.46 | 974.22±1952.21 | 1300.91±2163.11 |
| | Female | 2893.11±3895.76 | 4220.76±3680.97 | 1653.35±2111.65 | 887.94±1846.4 |
| *P*-value[1] | | 0.0293 | 0.441 | 0.001 | 0.039 |
| Location of work | Primary health care centers | 2190.86±3302.37 | 4266.92±3614.78 | 1936.45±2700.58 | 1235.98±2062.29 |
| | Hospitals | 3548.54±3871.41 | 4150.64±3581.21 | 1512.89±1893.99 | 1038.14±2227.32 |
| | Administrative/financial area | 2745.09±4178.36 | 4400.9±3809.56 | 1241.96±2005.97 | 982.49±1642.95 |
| | Academic position (Faculties) | 1155.03±2194.77 | 3591.64±2191.13 | 556.07±968.3 | 693.39±939.48 |
| | Service unit | 6466.6±5952.13[abcd] | 5673.63±4225.36 | 1183.14±1973.39 | 916.8±1627.4 |
| *P*-value[2] | | < 0.001 | 0.235 | 0.069 | 0.842 |
| Marital status | Unmarried | 2898.46±3474.11 | 4559.36±3534.61 | 1351.55±2468.38 | 1190.23±2243.09 |
| | Married | 3184.03±4226.14 | 4159.68±3624.61 | 1470.75±1892.84 | 917.58±1773.19 |
| *P*-value[1] | | 0.511 | 0.283 | 0.587 | 0.173 |
| Work shifts | Day | 2969.49±4133.67 | 4444.26±3721.46 | 1513.92±2196.1 | 964.15±1717.28 |
| | Night | 1481.5±2759.7 | 4615.10±2738.36 | 421.66±419.16 | 357.2±355.42 |
| | Rotational | 3418.77±3801.59 | 4011.46±3227.72 | 1448.01±1981.13 | 1023.57±2153.06 |
| *P*-value[2] | | 0.344 | 0.490 | 0.456 | 0.713 |

*MET-minutes/week.
[1] Student t test.
[2] One-way ANOVA.

### Well-being Assessment

According to results, the mean score of the well-being index components, including 1, 2, 3, 4, and 5 items, was 12.11 ± 5.04, 11.32 ± 5.24, 11.58 ± 5.22, 10.38 ± 5.58, and 9.59 ± 5.29, respectively; and the total well-being index was 54.72 ± 22.4. The results of the Well-being index showed that most participants had well-being feelings most of the time. There was a significant difference between men (58.34 ± 20.84) and women's (53.3 ± 22.86) well-being index ($p$=0.028) (Table 4).

### Association Between Physical Activity and Well-being

We presented the relationship of physical activity levels, with well-being index and physical activity behavior stages in Table 5. The results showed that 48% of those with well-being >50% had high physical activity level and 36.2% of those with well-being ≤50 had low physical activity level; however, there were no significant differences between physical activity levels and the well-being index ($p$=0.114).

Moreover, the results revealed that persons with high physical activity levels were more in the maintenance phase and those with low physical activity levels were more in the contemplation phase, and there were significant differences between physical activity levels and physical activity behavior stages ($p$=0.032) (Table 5).

To estimate the association between physical activity levels and physical activity behavior stages with the well-being index, a simple binary logistic regression model was used.

The results of the logistic regression showed that individuals with a high level of physical activity were 1.598 times more than the individuals with a low level of physical activity have feelings of well-being (odds ratio [OR], 1.598; 95% CI, 1.02-2.488). After adjustment for sex, marital status, work shifts, location, and the duration of physical activity, this relation remains statistically significant (OR, 1.685; 95% CI, 1.035-2.742).

Moreover, it was found that those who were in the preparation stage of a physical activity behavior (OR, 2.58; 95% CI, 1.302-5.115) and maintenance stage of a physical activity behavior (OR, 3.932; 95% CI, 1.97-7.849) had 2.58 and 3.932 times more well-being feelings than the individuals

*Table 4.* Stages of Behavior Change (physical activity) Based on Trans-theoretical Model and Well-being Index of Participants According to 5-Item World Health Organization

| Stages of behavior change (PA) | Total | Male | Female | *P*-value |
|---|---|---|---|---|
| Pre-contemplation | 61 (13.4%) | 11 (8.7%) | 50 (15.3%) | 0.001 |
| Contemplation | 143 (31.5%) | 33 (26%) | 110 (33.6%) | |
| Preparation | 84 (18.5%) | 23 (18.1%) | 61 (18.7%) | |
| Action | 69 (15.2%) | 17 (13.4%) | 52 (15.9%) | |
| Maintenance | 97 (21.4%) | 43 (33.9%)* | 54 (16.5%) | |
| Well-being index | Total | Male | Female | *P*-value * |
| well-being index score | 54.72±22.4 | 58.34±20.84 | 53.3±22.86 | 0.028 |

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*Table 5.* Relation Between Physical Activity Levels With Well-being Index and Physical Activity Behavior Stages

| | | Physical Activity Level | | | *P*-value |
|---|---|---|---|---|---|
| | | High | Moderate | Low | |
| Well-being index | Well-being ≤ 50 | 69 (39.7%) | 42 (24.1%) | 63 (36.2%) | 0.114 |
| | Well-being > 50 | 133 (48%) | 68 (24.5%) | 76 (27.5%) | |
| Physical activity behavior stage | Pre-contemplation stage | 21 (36.8%) | 17 (29.8%) | 19 (33.3%) | 0.032 |
| | Contemplation stage | 52 (38%) | 30 (21.9%) | 55 (40.1%) | |
| | Preparation stage | 35 (42.2%) | 19 (22.9%) | 29 (34.9%) | |
| | Action stage | 35 (53.8%) | 14 (21.5%) | 16 (24.6%) | |
| | Maintenance stage | 53 (56.4%) | 23 (24.5%) | 18 (19.1%) | |

*Table 6.* logistic Regression Model (Crude and Adjusted Odd's Ratio) of Well-being Based on Physical Activity Levels and Physical Activity Behavior Stages Before and After Adjusting for Sex, Marital Status, Work Shifts and Location, and the Duration of Physical Activity

| Physical activity levels/ Physical activity behavior stages (Reference group) | Crude OR | *P*-value | Adjusted OR | *P*-value |
|---|---|---|---|---|
| Physical activity levels (ref group: the low P) | | | | |
| High PA | 1.598 (1.02-2.488) | 0.034 | 1.685 (1.035-2.742) | 0.036 |
| Moderate PA | 1.342 (0.806-2.234) | 0.250 | 1.074 (0.618-1.865) | 0.843 |
| Physical activity behavior stages (ref group: Pre-contemplation stage) | | | | |
| Contemplation stage | 1.426 (0.778-2.613) | 0.250 | 1.118 (0.62-2.276) | 0.612 |
| Preparation stage | 2.58 (1.302-5.115) | 0.007 | 2.249 (1.082-4.676) | 0.035 |
| Action stage | 1.90 (0.942-3.835) | 0.073 | 1.491 (0.699-3.181) | 0.388 |
| Maintenance stage | 3.932 (1.97-7.849) | 0.001 | 3.355 (1.576-7.142) | 0.002 |

*According to the WHO, the Well-being index was classified as 2 groups: well-being ≤50; well-being >50.

who were in the contemplation stage. When the regression formula was adjusted for the demographic and worksite variables, the same statistically significant relations were observed between the behavior stages variables and well-being (Table 6).

## Discussion

We have investigated the mean physical activity level, physical activity behavior, and well-being index in different work domains. The level of total, moderate, and vigorous physical activity, and walking were higher in employees who worked in service units. Moreover, the sitting state was higher in academic positions. Our finding demonstrated that the total well-being index in men was higher than in women. Participants in the maintenance stage had higher physical activity than others.

Results from a survey revealed that employees who get at least 150 minutes physical activity per week had about 3.5 times lower rate of absence from work than the others (30). In the United States, physical inactivity was responsible for 11% of health care costs between 2006 and 2011, which is repersentative of a significant impose on society (15). Understanding the behaviors related to physical activity could benefit to improve clinical guidelines and develop programs and recommendations aimed at retaining high quality employees (31). A review of several studies that examined physical activity in the workplace found that comprehensive, multi-component workplace health promotion programs with physical activity components resulted in progressive effects, including significant improvements in health outcomes, reduced absence from work, decreases in sick leave, and positive returns on investments (32).

The academic environment may be an appropriate community for investigation, identification, and planning interventions regarding physical activity situations. Due to the differences in some factors such as level of education, economic status, and social norms, physical activity-related behaviors are expected to vary among individuals who work in this workplace. Thus, in this study, we aimed to evaluate physical activity behavior and also its association with well-being in IUMS, as one of Iran's leading universities.

The results of this study is consistent with others in that men were mostly in the maintenance stage and women in the sedentary (preparation, contemplation, and pre-contemplation) stages. Results of a study on Iranian nursing and midwifery students revealed that many of them were in the inactive stage. In this survey, participants were mostly women (86%), 29% of them were in the contemplation stage (33), which is close to our data, 33%.

Results from a cross-sectional descriptive study on exercise behavior among female students from Hamadan University of Medical Sciences revealed that most of the students were in the contemplation stage, and not sufficiently active (34). Irwin et al by analyzing a total of 35,747 university students (20,179 women and 15,568 men) from 27 countries (Australia, Canada, China, Germany, Nigeria, United States, and 21 European countries) found that women were among the least active students (35). Our study showed that intense physical activity at the workplace for men was significantly higher than for women. In fact, the literature is consistent in presenting that men have more practicing physical activity than women (36, 37). According to a cross-sectional study comprised of adult participants from Tehran, Momenan et al reported that the prevalence of physical inactivity was 69.8% and only 30.3% of women had adequate physical activity (38). Our results also indicated that men were more active in their leisure time than women. These findings are inconsistent with those of

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a study on college students enrolled in health education, analyzed via the trans-theoretical model. Results demonstrated that compared with women, men are not only intended to spend less sitting time but also are more likely to perform frequent movements to avoid or interrupt extended sitting time (39).

The inverse relationship between mental health problems with physical activity is widely accepted. However, research on the association between physical activity and positive mental health outcomes is limited. Thus, our secondary objective was to investigate the possible relationships between physical activity and well-being. The results of our study revealed that having vigorous physical activity compared with a low level can increase well-being by 1.59 times. Consistent with our result, a study in young adults reported that when compared with moderate physical activity, vigorous exercise has been associated with reduced stress, increased mental health, and fewer symptoms of depression (40). Children and adolescents who suffer from mental health problems, along with moderate to vigorous physical activity of <60 minutes a day, are more prone to poor quality of life (41). Previous studies have shown that interventions that modify health-related parameters such as physical activity and well-being, can indirectly elicit improvements in quality of life (42). As well, results of a recent study suggested that vigorous physical activity was associated, both directly and indirectly, with mental well-being and physical and psychological quality of life (43). In accordance with earlier researches, the current results demonstrated that women were more likely to experience poorer physical activity and well-being than men.

According to our findings, employees in the preparation and maintenance stages of physical exercise behavior felt 2.25 and 3.35 times better wellbeing feeling than those in the pre-contemplation stage. To the best of our knowledge, this relationship has not been addressed in other relevant studies. It seems that at the preparation stage, the motivation at the beginning of activity probably improves the well-being feelings of the individuals. At the maintenance stage, the good impact of regular physical exercise for more than 6 months has been discovered, which may increase employee well-being feelings. Previous researches from several countries showed that physical activity for leisure time appears to have a stronger association with mental health than other domains of physical activity (44, 45); consistent with this, our results indicated that men were more energetic and active than women in the leisure domain, which could explain their greater well-being feelings.

It could be suggested that improving well-being indicators by increasing vigorous physical activity may be beneficial. These results should be considered for future evidence-based approaches and policies on targeting physical activity interventions to promote well-being and other positive constructs of mental health especially in women.

Interventions aimed at people and communities, for example, that use social support, rewards, and modifying societal norms to promote favored behavior changes are advised (46). Policy, regulatory, and environmental development measures may be beneficial in encouraging employees to engage in physical activity at work. The Policy Regulatory and Environmental Development interventions could be effective in promoting physical activity at the workplace (47).

These findings may provide important information on changing physical activity behaviors to improve employees' well-being. Nonetheless, while this study has a number of strengths, limitations should also be considered. First, because the present study was cross-sectional, no cause-effect connections between physical exercise and well-being could be established. Second, the study participants were all employees of a medical university, which may limit the applicability of the findings to employees of other organizations.

## Conclusion

The findings of this study showed that men have more vigorous physical activity than women, and employees with high physical activity levels had better well-being feelings than those with low physical activity levels. The findings of this study are significant in terms of understanding the link between workplace physical exercise and degrees of well-being. As a result, it may be hypothesized that increasing physical exercise, particularly among women, would be beneficial for improving academic well-being.

### *Compliance with Ethical Standards*

This study was approved by the ethics committee of Iran University of Medical Sciences (Ethics code: IR.IUMS.REC.1397.733); and the Preventive Medicine and Public Health Research Center financially supported this research

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### *Conflict of Interests*

The authors declare that they have no competing interests.

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