## Original Research Article

# Decisional Balance and Its Relationship with Stages of Change in Exercise Behavior among Employees of Gorgan: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** This study aimed to investigate the decisional balance for exercise and its relationship with stages of change in exercise behavior among employees in city of Gorgan, north of Iran. **Material and Methods**: This cross-sectional study was performed on 991 employees selected through random cluster sampling. Data were collected using the stages of change and decisional balance questionnaires. **Results**: a unit increase in the mean score of barriers decreased the possibility of moving to later stages by 49%, while a unit increase in the mean score of exercise benefits increased the possibility by 61%. There was a significant relationship between gender and stages of change ($P<0.001$) in a way that more female employees were in the early stages of exercise compared with males. **Conclusions:** The results of this study indicate that the disadvantages of exercise decrease through while subjects move toward later stages. Majority of the participant, specifically female employees, are in the early stages of exercise and are expected to have a sedentary lifestyle.

**KEYWORDS:** Exercise, Health Behavior, Stages of Change

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## INTRODUCTION

A sedentary lifestyle and lack of physical activity could lead to several diseases such as cardiovascular disease, breast and colon cancer, osteoarthritis, osteoporosis and depression. Physical inactivity has been identified as the fourth leading risk factor for global mortality (6% of all deaths) after hypertension (13%), smoking (9%), and hyperglycemia (6%) [1]. The World Health Organization (WHO) has recommended at least 300 minutes of moderate physical activity or 75 minutes of intense physical activity per week for people aged 18 to 64 years [2]. In 2007, the United States Department of Health and Human Services reported that almost less than half of adults in the US met the minimal guidelines for aerobic activity [3]. In 2010, the WHO reported that 37% of Iranian adults met recommended levels of physical activity [2]. Moreover, three studies in Iran showed that 80% of people have a sedentary lifestyle [4].

There has been a great deal of emphasize on the importance of determining effective factors on exercise and mechanisms that are involved in its continuation. The transtheoretical model (TTM) is an integrated and comprehensive theory of behavior change that has been widely used for promoting physical activity [5]. This model has been developed by Prochaska and

Diclemente as a comprehensive model and framework for understanding the health-related behaviors that could promote health. It not only provides a way to identify behavior change but also establishes a principle for assessing the readiness of people for change and behavior change interventions [6]. The model is based on the assumption that people do not make a black-and-white decision for changing their behavior. According to this model, behavior change is a gradual process divided into different stages [7]. Stages of change, self-efficacy/temptation and decisional balance are used to assess movement through different stages in TTM [8].

Iranian employees spend most of their time sitting at work, which increases the risk of weight gain, obesity, hypertension and their related diseases. Few studies in Iran have investigated the role of decisional balance and stages of change for exercise behavior. Identification of advantages and disadvantages of exercise and physical activity at different stages could be useful for decision making regarding exercise. This study aimed to investigate decisional balance and its relationship with stages of change among employees in city of Gorgan, Iran.

## MATERIALS AND METHODS

### *Study design and procedure*

This cross-sectional study was performed on all employees in city of Gorgan. The study protocol was approved by the Ethic Committee of Golestan University of Medical Science. Informed consent was obtained from participants. Subjects were enrolled via convenient sampling. No related study was found that has expressed the extent of relation power of two variables. Sample size was calculated based on the following: $\mathbf{N}=\frac{Z_{1-\frac{\alpha}{2}}^{2}\, p(1-p)}{d^{2}}=1067.$ In the formula, Z=1.96, $p$= 0.5, d=0.03.

### *Data collection*

Data were collected using stages of change and decisional balance questionnaire of regular physical activity developed by Marcus et al. [9] and Norman et al. [10]. This questionnaire consisted of five yes/no questions. Decisional balance for regular physical activity was assessed by the exercise decisional balance questionnaire developed by Nigg et al. [11]. The questionnaire included 10 questions about the benefits and barriers of regular physical activity based on a 5-point Likert scale. The sum of scores was divided by the number of questions, and the score for each person ranged from 1 to 5. Validity and reliability of the questionnaire was confirmed in a previous study [12]. Pregnant women or subjects with physical illness or disability were excluded from the study. The questionnaires were completed by two experts. All collected data remained confidential.

### *Data analysis*

Demographic data were analyzed using descriptive statistics. Shapiro-Wilk test was used to assess normality of the variables. Kruskal-Wallis test was used to evaluate the relationship of benefits and barriers of exercise with stages of change. Chi-square test was used to assess the association of gender, marital status, age, and education level with stages of change for regular physical activity. Logistic regression was used to evaluate the relationship between stages of change and benefits and barriers of regular physical activity. Ordered logistic regression was used to assess the relationship of stages of change with benefits and barriers of exercise. In this technique, stages of change were considered as respondent variable and benefits and barriers were considered as its predictive variables.

## RESULTS

The mean age of subjects was 35.91 (standard deviation= 7.92) years. In addition, 63.3% of subjects were male and 87.7% were married. The frequency distribution of subject in stages of change is shown in figure 1. Benefits of exercise increased significantly from the pre-contemplation to maintenance stage (P<0.001). However, it remained unchanged between the termination and maintenance stages (Figure 2).

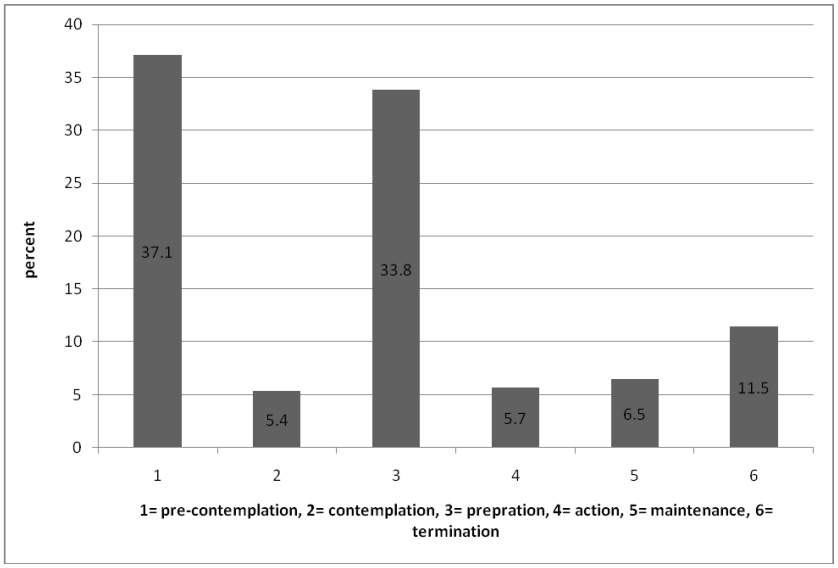


**Figure 1: The frequency distribution of subjects in stages of change for exercise behavior**

According to the results of the Kruskal-Wallis test, physical activity barriers decreased significantly from the pre-contemplation stage to the termination stage (Figure 2). There was no significant relationship between pre-contemplation and contemplation stages of change regarding exercise barriers. However, the mean score of pre-contemplation stage was significantly different from that of preparation (P<0.001), action (P<0.001), maintenance (P<0.001) and termination (P< 0.001) stages. A statistically significant difference was found between the contemplation stage and later stages of change (P< 0.001). Moreover, the preparation stage had a significant relationship with maintenance and termination (P<0.001). Mean score of action was also significantly different from that of the termination stage (P<0.001).

Based on the results of the Kruskal-Wallis test, there was no significant relationship between the pre-contemplation and contemplation stages. The mean score of pre-contemplation stage was significantly different from that of the preparation, action, maintenance and termination stages (P<0.001). Moreover, there was a significant relationship between the pre-contemplation and termination stages (P<0.001).

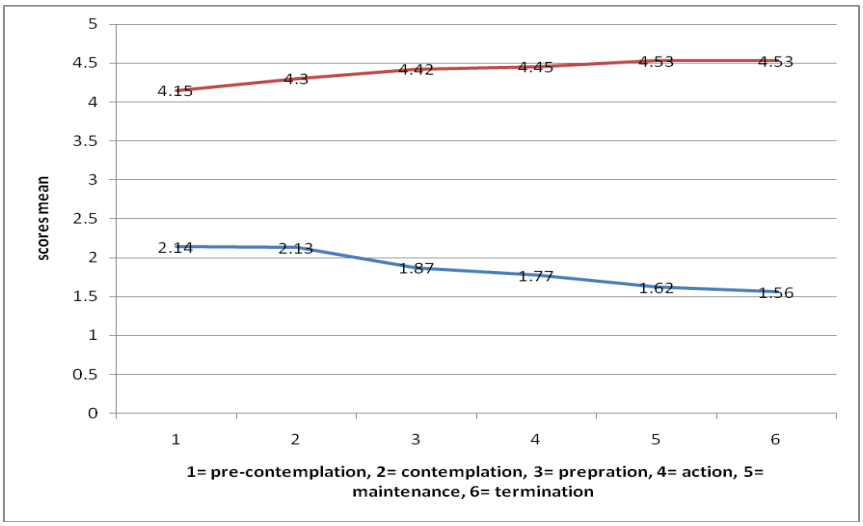


**Figure 2: The mean scores of benefits and barriers of exercise in stages of change**

As shown in table 1, benefits and barriers of exercise had significant relationships with the variables for stages of change.

**Table 1: Ordered logistic regression analysis of the relationship between stages of change and exercise barriers and benefits**

| Stages of change | Estimation | Estimation error | Wald-Chi-Square | df | P-value |
|---|---|---|---|---|---|
| Pre-Contemplation | 0.22 | 0.5124 | 0.18 | 1 | 0.66 |
| Contemplation | 0.466 | 0.5128 | 0.82 | 1 | 0.364 |
| Preparation | 2.06 | 0.5162 | 16.06 | 1 | 0.001 |
| Action | 2.43 | 0.5175 | 22.1 | 1 | 0.001 |
| Maintenance | 2.98 | 0.52 | 32.95 | 1 | 0.001 |
| Barriers of exercise | -0.661 | 0.091 | 52.75 | 1 | 0.001 |
| Benefits of exercise | 0.478 | 0.099 | 23.09 | 1 | 0.001 |

The chi-square test showed a significant relationship between gender and stages of change for exercise behavior ($P<0.001$) in a way that most male employees were in the action, maintenance and termination stages compared with female employees (Table 2).

Based on the results of the chi-square test, there was no significant difference between the stages of change for exercise behavior and variables including marital status, education and having a second job.

**Table 2: The frequency distribution of employees based on stages of change**

| Gender | Pre-contemplation | | Contemplation | | Preparation | | Action | | Maintenance | | Termination | | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | |
| Male | 202 | 32.4 | 30 | 4.7 | 218 | 34.8 | 35 | 5.7 | 47 | 7.6 | 91 | 14.7 | 0.001 |
| Female | 166 | 44.8 | 24 | 6.5 | 119 | 33.2 | 21 | 5.7 | 17 | 4.6 | 22 | 6 | |

## DISCUSSION

In our study, majority of employees (76.3%) were in the early stages of exercise behavior including pre-contemplation, contemplation and preparation. This indicates that most employees were physically inactive. Given the proven benefits of regular physical activity for improving mental health and job performance and prevention of civilization diseases, it is necessary to motivate employees to adopt an active lifestyle. The efficacy of this model in terms of regular physical activity has been demonstrated by several studies [13,14]. However, the stages of change for regular physical activity are different due to diversity of populations and sampling methods. Studies of Mahmoodabab et al. in Yazd [15] and Dumith et al. in Brazil [16] showed that 73.6% of employees are in the early stages of exercise, which is consistent with our findings. In addition, one-third of participants in our study were in the preparation stage. Moving these subjects toward the action stage seems more likely compared to those in the early stages (pre-contemplation and contemplation). We found a non-significant increase in the mean scores of exercise benefits from the pre-contemplation to the termination stage. In addition, there was a non-significant increase from the preparation stage to the termination stage, which could be due to the high score of total perceived benefits of exercise. According to the TTM, perceived benefits increase as subjects move through later stages. Consistent with our results and principals of the TTM, in study of Mahmoodabab et al., perceived benefits of exercise increased significantly as subjects moved toward the later stages [15]. In the present study, the greatest increase in perceived benefits was found between the pre-contemplation and contemplation stage, which is consistent with the findings of Marshall and Biddle in 2001 [17]. This finding confirms that the movement of subjects from the pre-contemplation stage to the contemplation stage requires more motivation by highlighting the benefits of exercise over exercise barriers. The exercise barriers had a linear relationship with the stages of change from the pre-contemplation to termination stage, which is consistent with the results of Mahmoodabab et al. [15]. On the other hand, the highest decrease was observed from the contemplation to the preparation stage. A meta- analysis by Marshall and Biddle explained that perceived disadvantages and costs of exercise reduce during movement through stages of change. They also reported that the greatest and slightest decreases occur between the pre-contemplation-contemplation stages and the action-maintenance stages, respectively [17]. These results are not consistent with our findings.

According to the TTM, it is expected that the mean scores of perceived benefits and barriers will become equal in the contemplation stage. However, this trend

was not observed in the present study. Some researchers believe that other factors such as attitude and subjective norms should also be considered in movement through stages of change. It is also recommend that continuous patterns such as theory of planned behavior should be used to explain the movement through the stages of exercise. Sutton et al. found that some constructs of the TTM including benefits and barriers of exercise do not have a considerable impact on the movement from the early stages of change [18,19].

The mean score of exercise barriers was negative in the present study. A unit increase in the score of exercise barriers (regardless of the stage) decreased the chance of movement toward the next stage by 49%. It can also be concluded that the chance of moving to a higher level increases by 0.34-fold when the barriers do not increase. Contrary to the exercise barriers, the coefficient of exercise benefits was positive. This means that a person chance of moving to the next stage increased by 61%.

There was a statistically significant relationship between gender and the stages of change for exercise. Compared to male employees, females were more in the early stages and less in the active stages of exercise such as maintenance and termination. Similar to our findings, some studies on Iranian students showed that female students are more in the early and passive stages of exercise compared to male students [20-22]. These results indicate that female employees are at higher risk of developing disease related to a sedentary lifestyle. Another study in Iran showed that 80% of women aged ≥50 years have some degrees of osteoporosis [23]. Since the onset of this disease is in the early adolescence and continues to increase with age, appropriate physical activity interventions should be implemented to prevent the disease.

Since this was a cross-sectional study that implemented convenience sampling, it is recommended to conduct longitudinal studies in other areas of the country to assess the validity of our results.

## CONCLUSIONS

Based on our findings, the benefits of exercise are significantly associated with the exercise barriers. The exercise barriers decrease as subjects move through the stages of change. Moreover, most female employees are in the early stages of change and are expected to have a sedentary lifestyle. Highlighting the exercise benefits and eliminating the exercise barriers are effective in movement of subjects to the later stages.

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