

Designing and Psychometrics of a Questionnaire of Stretching Movement Assessment in the Workplace Based on the Trans-theoretical Model

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Abstract

Background: The trans-theoretical model is a model that is very sensitive to changes in the minor progress of behavior. Therefore, the trans-theoretical model is more practical than other patterns of behavior change, which have been considered all or no to measure physical activity. This study aimed to standardize and determine the validity and reliability of the tensile movement questionnaire at the University of Medical Sciences employees. **methods:** In this study, after searching the texts and the study of the same questionnaires and tools and among the available and related tools, the initial questionnaire was designed. First, the validity and content of the questionnaire were measured using experts' comments. Then, the ability to understand the questionnaire based on the opinions of 10 employees was investigated. Finally, to determine the reliability with the experimental-open test method, 30 employees, Cronbach's alpha, and the correlation coefficient were obtained using SPSS software. **Results:** After performing the necessary reforms with experts' opinions, finally, the questionnaire with increasing the number of questions of the field of self-efficacy from 6 to 7 questions, the reduction of the number of questions of the interests of stretching movements from 10 to 5 questions, increasing the number of questions of the barriers of stretching movements from 4 to 7 questions and increasing the number of questions of In the validation stage, each 40 of the questions had acceptable content validity (8.0 to 99.0). Also, at least 80% of the questions were diagnosed in terms of the target group acceptable. Cronbach's alpha coefficient and correlation coefficient were 86.0 and 7.0, respectively. **Conclusion:** A designed questionnaire based on the trans-theoretical model constructs to assess educational intervention to enhance the tensile movements of employees has acceptable reliability and validity.

Keywords: Trans-theoretical model; Stretching gestures; Validity; Reliability; Employees; Questionnaire

Introduction

One of the consequences of mechanized life and development of technology in the present century is motor poverty and the reduction of appropriate stretching movements among individuals that are among the most important problems of modern society.^{1, 2} The World Health

Organization is the first health characteristic of a society known as physical activity and physical mobility in society.³ Physical activity means moving the body by skeletal muscles, which requires energy consumption.^{4, 5} Over the past 30 years, inactivity has been shown as a primary and independent risk factor for all deaths of

Citation: Babaei Heydarabadi A, Abdullatif Khafae M, Afshari D, Cheraghian B, Rezaeian E. **Designing and Psychometrics of a Questionnaire of Stretching Movement Assessment in the Workplace Based on the Trans-theoretical Model.** Archives of Occupational Health. 2020; 4(3): 606-13.

Article History: Received: 19 January 2020; Revised: 15 March 2020; Accepted: 24 April 2020

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mortality and morbidity.³ Physical activity can reduce the risk of cardiovascular disease, diabetes, colon and breast cancer, and depression. In addition to adequate levels of physical activity, it helps to control weight.^{4, 6-8}

Physical activity is a complex behavior that is not easy to change, and even if the person in charge is successful, maintaining new behavior is difficult.⁹ These facts require the necessity of performing health interventions to enhance physical activity.¹⁰ In this regard, it should be noted that the most effective educational programs based on theory-oriented approaches are that they have been rooted in altered behavior patterns.¹¹ Physical activity in the workplace is not only useful in promoting the physical and mental health of employees, but also the economic benefits of reducing employees' absence.⁸ The evidence indicated that physical activity in the workplace could affect the reduction of neck pain and upper back areas in the employees and improve mood conditions such as mental strain, stress, fatigue, depression.¹² Today, researchers have developed a health education field to achieve the goal of changing behavior by using various theories of psychology and social sciences, which are efficient and useful.¹³

The trans-theoretical model is one of the behavior change models which can be designed for physical activity.¹⁴ The model is a model theory that is very sensitive to changes minor the progress of behavior. The meta-theory pattern of cognitive, emotional, and behavioral markers is appropriate to determine the low improvements in physical activity. Therefore, the trans-theoretical model is more practical than other patterns of behavior change that have a phenomenon of all or no comments for physical activity measurement.¹⁵ To be trusted by the study results and after the investigation of the use of the results, this study should follow a clear, clear, and fully scientific process. In each research, the research tool is a means through which the researcher collects the required information with the utmost accuracy

and the least amount of errors and continues to perform the relevant analysis, the required conclusions.¹⁵

Psychometrics is a theory-oriented tool for implementing and evaluating health education interventions, including important and necessary prerequisites.¹⁶

Therefore, before applying the measuring instruments, researchers need to make a relative assurance of the validity of the necessary measurement tools and the reliability of which the supplement is also considered. The purpose of validity is that the desired measurement tool can measure the characteristics and qualities that the tool is designed for? Without knowledge of the validity of the measurement tool, the accuracy of the data obtained is assured. But the reliability is dealing with the means of measuring the same results in the same conditions as the same size.¹⁷ According to what was said, considering the importance of stretching movements in the workplace, as well as a means related to this issue, and with a trans-theoretical pattern or with the staff target group, this research was conducted to design and psychometric of the questionnaire for the assessment of tensile movements based on trans-theoretical model in the employees' workplace in Ahvaz Jundishapur University of Medical Sciences.

Methods

In this study, the target group included the staff behind the desks, most of which were performed at the back of the table, and in the field of physical activity in each of the first three stages of change (pre-thinking, thinking, preparedness), had a mobile phone (to send SMS) Ahvaz Jundishapur University in the year 2018. The study was conducted by searching to find similar tools designed to investigate stretching movements with keywords of trans-theory model, physical activity, Validity, Reliability, Questionnaire, Employees in Google databases Scholar, SID, Iranmedex, Scopus, and Pumbed. Considering that the questionnaire was not found on the work of stretching in the workplace

according to the performed searches and only a questionnaire for the physical activity of an employee was present in all day hours, after studying the relevant compiled tools, 26 questions based on the constructs of change stages, self-efficacy, barriers and benefits of stretching movements and stretching of the pilot, including 1 question of change stages, 6 questions of self-efficacy, 10 questions perceived benefits, 4 questions Perceived barriers and 5 questions of the scope of behavior were designed.

For content validity to use expert opinions, the questionnaire was provided to 21 health education specialists and health promotion, epidemiology, public health, occupational health, physiotherapy, and exercise physiology. The questionnaires were original editing using the experts' comments and suggestions. They asked them to judge any question to the content obtained from that derived in three forms of useful, necessary, or unnecessary.

The following formula calculated experts' opinion as a content validity ratio (CVR¹):

$$CVR^1 = \frac{n_e - \frac{n}{2}}{\frac{n}{2}} \quad (1)$$

N: The number of professionals who are required to identify the question.

: NE is the total number of arbitrators.

The content validity index (CVI²), which indicates the final questionnaire, was calculated according to the following formula:

$$CVI^2 = \frac{\sum_N CVR}{retained\ number} \quad (2)$$

Then, the questions were designed for 10 employees to assess the face and perceived reliability. In this way, the questionnaire, such as the difficulty of expressions, does not mean, ambiguity in understanding sentences and/or dual impressions. At this stage, the questions were classified at two levels: maximum 5% acceptable error and a maximum of 15% acceptable error. Finally, to determine the reliability, using the test-retest method through the distribution of a questionnaire between 30

employees and repeating it to 15 days, Cronbach's alpha and correlation coefficient were analyzed using SPSS software.

Results

The primary questions designed regarding stretching movements based on trans-theoretical model constructs for employees are as follows that after applying experts' opinions regarding removal, addition or merging of some questions as well as questions and rating options, the number and type of questions of some domains were changed. The scope of the change steps: Included 1 question 5 was the option to show the status of a person about stretching gestures that remained unchanged.

Self-efficacy: There were 6 questions that I am sure of the scale of 5 Likert options, including quite sure, I do not know, I'm not sure, and I'm not sure of it. I'm not sure of the 5-score range for a very reliable one, and I was finally set up to 7 questions. The scope of interest of stretching gestures: there were 10 questions that from the scale of 5 Likert options, including totally agree, I agree, I have no idea, disagree, and entirely disagree. The score range of 5 to agree and 1 was set to disagree totally and fell to 5 questions.

The scope of the obstacles stretching: there were four questions from the scale of 5 Likert options, including totally agree, I agree, I have no idea, disagree, and quite disagree. The score range of 5 to totally agree and 1 was designated for totally disagree. And rose to 7 questions.

The scope of behavior: Includes 5 questions, 6 options per week, 4 times per week, 3 times per week, 2 times per week, 1 time per week, and lack of stretching gestures was included. The score range was set from 5 for 5 times per week and zero for failing to perform and finally rose to 20 questions. Then all questions were earned in the content validity index, score greater than 0.8, and score higher than 0.9 content validity ratio. The validity index and content validity ratio for the total questionnaire were 0.96 and 0.99, respectively. Table 1 shows the final questions of the questionnaire.

Table 1. Questions about the stretching of tensile movements in workplaces based on stretching movements

Area	Row	Questions
Steps of change	1	Do you already have regular stretching gestures in your work environment? (One turn of stretching on the day with seven repetitions and for five seconds)
	2	Even if I am very tired, I can have a stretching movement in the workplace.
Self-efficiency	3	Even if I have many lags in doing so, I can have a stretching move in the workplace.
	4	Even if I feel that stretching gestures are a useless task, I can have stretching in the workplace.
	5	Even if I have a lot of stress under psychological pressure, I can have a stretching action in the workplace.
	6	Even if I feel that there is no need to do stretching due to the proportional weight, I can have a stretching movement in the workplace.
	7	Even if I feel like I would be a colleague, I can have a stretch of movement in the workplace.
	8	Even if there is no appropriate environment, I find a way, and I can have stretching in the workplace.
Benefits of stretching gestures	9	If I regularly have stretching gestures in the workplace, I feel more vitality and happiness.
	10	If I regularly have stretching gestures in the workplace, I feel less stress.
	11	If I have regular stretching movements in the workplace, I will not experience bodily pain (back pain, neck pain, pain, and knee pain).
	12	If I have regular stretching movements in the workplace, I will be less overweight or obese.
	13	If I regularly have stretch gestures in the workplace, I will find a sense of more confidence.
	14	Colleagues may mock me for stretching the tension.
Stretching Obstacles	15	Because of my colleagues' negative attitude toward stretching the tension, I would be embarrassed to do the stretching of the work in the workplace.
	16	I don't have enough time to make regular stretching gestures.
	17	I do not have enough skills to perform stretching gestures in the work environment.
	18	There is no appropriate environment in the workplace for stretching gestures.
	19	I am not interested in doing the tensile movements because of having no incentive to work.
	20	Due to a lack of job security and a negative attitude and opposition to senior executives, it is impossible to perform stretching movements.
Behavior	21	Do you have any hands-on gestures during the past working week in the workplace?
	22	Do you have any foot-related stretch gestures during the last working week in the workplace?
	23	Do you have any stretch gestures associated with head and neck during the past work week?
	24	Do you have any stretch gestures associated with your shoulders during the past work week?
	25	Have you done the trunk stretching (tummy and waist) during the past work week?
	26	During the last working week in the workplace, you move the head up, down, sides, and diagonally?
	27	During the past work week at work, have you risen your shoulders as much as possible?
	28	During the past work week in the workplace, put the fingers behind, hook, and pull the elbows back?
	29	During the past work week in the workplace, you have returned hands to the sides with the shoulders of the palms?
	30	During the last working week in the workplace, pressure the palms in front of the chest and gently bend the wrists to the left and right?
	31	During the past work week at work, have you moved one hand forward and pulled your fingers down and back with the other hand?
	32	During the past work week in the workplace, I was taken back to the top hook mode and pulled up?
	33	During the last working week in the workplace, sit on the seat and gently place the trunk behind the seat while the hands are in front?
	34	During the past work week in the workplace, the hands were multiplied by the chest, and lift the abdominal muscles of the trunk and close the shoulders to the knees?
	35	During the last working week in the workplace, sit the edge of the seat, and put the hand behind the body on the seat and put the body rotated?
	36	During the last working week in the workplace, with the hands of the thigh and approaching the knee to the chest?
	37	During the last working week in the workplace, put the hands on the waist, push the elbow back and the waist to the front?
	38	During the last working week in the workplace, you have taken a leg up and out and then returned it to the center and down?
	39	During the past work week at work, the edge of the seat sits, put the hands forward, and has been paused on the seat?
	40	During the past work week in the workplace, while the foot paws are contacted by the ground as high as a possible heel?

Table 2. The Results of the field survey to measure the face validity and readability ability of the questionnaire

Question of questionnaire area	The number of questions that their face validity is at least acceptable		Total
	Criterion with a maximum of 5% error	Criterion with a maximum of 15% error	
	Number (percent)	Number (percent)	Number (percent)
Demographic	8(%100)	8(%100)	8(%100)
Steps of change	1(%100)	1(%100)	1(%100)
Self-efficiency	3(%42.85)	1(%14.28)	7(%100)
benefits	2(%40)	1(%20)	5(%100)
obstacles	1(%14.28)	3(%42.85)	7(%100)
behavior	5(%25)	20(%100)	20(%100)
Total	24(%50)	33(%68.75)	48(%100)

Table 3. The Results of the field survey to assess the reliability and repeatability of the questionnaire

Question of questionnaire area	Number of questions	Cronbach alpha	Correlation coefficient P/(R)
Self-efficiency	7	0.83	(<i>P</i> -value= 0.002) 0.54
benefits	5	0.9	(<i>P</i> -value<0.001) 0.84
obstacles	7	0.69	(<i>P</i> -value=0.05) 0.36
behavior	20	-	(<i>P</i> -value=0.009) 0.47
Total	39	0.86	(<i>P</i> -value<0.001) 0.7

**P*-value>0.05

In the next stage, the results of employees' viewpoints for face validity, such as the difficulty of expressions, ambiguity in the understanding of sentences, etc. in two levels of 5% error and a maximum of 15 percent errors were mentioned in table 2.

Then, internal consistency and repeatability were performed:

In the self-efficacy assessment tool, Cronbach's alpha 0.83, in the tool measuring the interest of tensile movements 9.0, was obtained in the instrument of measuring barriers of tensile movements 69.0 and Cronbach's alpha in general 86.0. According to Cronbach's alpha coefficients, each field's internal consistency and the whole questionnaire are acceptable. To ensure the reliability of the findings using the test-re-test, the correlation coefficients obtained indicate optimal reliability in each field and the entire questionnaire Table 3.

Discussion

This study aimed to design and psychometric of the questionnaire of tensile movements in the workplace based on the trans-theoretical model.

Several studies have been conducted with the purpose of the psychometric of the researcher-made questionnaire and the tools to evaluate educational interventions.¹⁸⁻²⁰ The tendency to use theory-based studies to improve the level of physical activity in the world is increasing. Today, there is less intervention without the use of the pattern or theory.²¹ Interventions that use behavioral sciences theories in public health and health promotion are much more effective than interventions that have no theoretical base.²² One of the main theoretical frameworks to understand health behavior change is the trans-theory model. The constructs of the model which are used to compile the questionnaire are as follows: The structure of change steps indicates that health behavior is caused over time and passes through five stages. This five-stage include pre-thinking (a person to change behavior over the next six months), thinking (a person to change behavior over the next six months), readiness (person to change behavior in a future month of planning, the action (person over the past six months has a significant change in behavior of action) and maintenance (the person is

expecting the expected behavior for a period of more than six months).^{23, 24}

Structure of change: In this tool, the process of changing behavior of individuals in order to perform tensile motion behavior based on trans-theoretical model, with a 5-question plan, whether you already have regular physical activity in the workplace? It is clear that answers do not include 1, but do not currently have physical activity in the workplace and do not intend to start physical activity in the next six months. 2. No, I intend to start a regular physical activity in the Carrera within six months. 3. Yes, I have an irregular physical activity in the workplace and have planned to start a regular physical activity within the next month. 4-Yes, it is less than six months that I regularly have physical activity in the workplace. 5. Yes, more than six months, I regularly have physical activity in the workplace. The next structure is self-efficacy, which is defined as an assurance that individuals have the ability to deal with risk situations and situations.⁵ In several studies, the importance and role of self-efficacy in increasing individuals' physical activity has been emphasized.^{25, 26} The practical concept of self-efficacy in this study includes the perceived reliability of physical activity behavior that is measured through automated tools. Evaluating the level of self-efficacy in a questionnaire of activities scale 5 part of them (I am not sure I am-I am not sure I'm not sure) was used.

The questionnaire is 7 questions to evaluate the level of self-efficacy that is acknowledged in this questionnaire, even if the body is too tired, there are too many lagging things to do, if the feeling of physical activity, does not have much effect, under psychological pressure (stress) is a lot, or feel, because the weight fits in does not require physical activity or will be mocked by colleagues or if there is no suitable environment can be physical activity in the workplace. Be. Balance structure in decision making as another structure of this pattern is defined by the concept of examining the benefits and costs of

changing behavior by the person that the person does not change its behavior unless it excels to the benefits of the obstacles.¹⁶ When moving towards change, people will have a light and heavy behavior and benefits based on the change or behavior of their actions. In other words, the balance in the decision-making process is the cognitive evaluation of good or negative aspects of behavior by the individual, and the reasons for change or not change the person.²⁷ Therefore, the perceived barriers and benefits of physical activity are considered individual factors²⁸ and are positive and negative cognitive factors that can cause or do not perform regular stretching movements.⁴

The structure of interests: belief and understanding about the useful and effective action to reduce the risk of illness or understanding the benefits of doing a health action.²⁷ In this questionnaire, five questions related to the benefits, including the feeling of vitality and vitality, lower stress, reduction of bodily pain (back pain, neck pain, hand pain, and knee pain), weight loss, or less obesity, and a sense of self-confidence are more. To measure them from a 5-part activities scale (from totally agree-I do not agree-no idea-disagree-totally disagree) was used. The structure of barriers is the factor that prevents health behavior in such a way that, despite that, the person believes that the health behaviors of beneficial benefits may not be taken into practice. That's because the potential barriers are negative.²⁹

In this questionnaire, 7 questions related to the barriers were designed, including the possibility of ridiculing colleagues, feeling embarrassed because of the negative attitude of colleagues, lack of sufficient time for physical activity, and lack of proper environment in the workplace. To carry out stretching, there is no motivation and negative attitude of senior executives who are used to assess the scale of activities 5-part (from totally agree-i-no comment-disagree-totally disagree). According to

scientific evidence, determinants that can be effective with physical activity behavior in adults include personal factors such as age, gender, income, perceived health status, barriers and perceived benefits, awareness, behavioral intention and efficacy and socio-cultural and economic factors and organizational factors such as financial and environmental support organizations and workplace policies, which can be effective on reducing or increasing the physical activity of employees.²⁸

Conclusion

Due to the high importance of physical mobility in body health, this questionnaire was designed and evaluated, and according to the results of its validity and reliability, it can be said that this questionnaire is a useful and valuable tool for predicting physical activity behavior in employees that can be used by researchers.

Acknowledgment

This article is part of the master's thesis on health education and promoting health promotion as "investigation of the effect of educational intervention based on the trans-theoretical model on the improvement of stretching movements in the workplace in employees of Ahvaz Jundishapur University of Medical Sciences in 2018", Ahvaz Jundishapur University of Medical Sciences with IR code. AJUMS. REC. 1397.336 on 31/4/97, which was carried out in 2018 with the support of social determinants of health and School of Health. The authors of the article will confirm the appreciation of the employees participating in the plan.

References

1. Jorvand R, Sadeghirad K, Haeri Mehrizi AA, Ghofranipour F, Tavousi M. Determinants of daily exercises among employees with overweight or obesity: the application of health belief model. *Research and Health*. 2019;9(5):387-93.
2. Jorvand R, Tavousi M, Ghofranipour F. Impact of sport on the cardiovascular diseases scale based on health belief model: questionnaire psychometric properties. *Iranian Red Crescent Medical Journal*. 2018;20(S1).
3. Karimi Z, Majlesi F, Tol A, Rahimi Foroushani A, Sahaf R, Ali Gol M, et al. The Effect of educational intervention on the promotion of physical activities of the elderly men in Qom city: application of Trans-Theoretical Model. *Iranian Journal of Ageing*. 2015;10(3):182-91.[Persian]
4. Shiri M, Asgari H, Talebi M, karamalian H, Rohani M, Narimani S. Educational needs assessment of family (general) physicians working in rural health centers of Esfahan Districts in five domains. *Iranian Journal of Medical Education*. 2011;10(5):726-34.[Persian]
5. Zare F, Aghamolaei T, Ghanbarnejad A, Haji-Alizadeh K. Relationship of Exercise Benefits/Barriers and self efficacy with stages of change for physical activity in Abu Musa Island employees, Iran. *Preventive Medicine*. 2014;1(1):31-8.[Persian]
6. Bullard T, Ji M, An R, Trinh L, Mackenzie M, Mullen SP. A systematic review and meta-analysis of adherence to physical activity interventions among three chronic conditions: cancer, cardiovascular disease, and diabetes. *BMC public health*. 2019;19(1):636.
7. Tofighi A, Babaei S, Dastah S. The relationship between physical activity and mental health among nurses of urmia hospitals. *Urmia Nursing And Midwifery Faculty*. 2014;12(1):72-8.[Persian]
8. Ramezankhani A, Motalebi M, Tavassoli E, Heydarabadi AB, Barekati H, Gilasi HR, et al. The Study of Knowledge, attitude and practice towards physical activity and its Related Factorsof College Students Living on Campus in Shahid Beheshti University of medical science. *Archives of Advanced in Bioscience*. 2013;4(3).
9. Sedghi F, Lael-monfared E. Effect of Intervention Counseling 5A Step Method Based on the Structure on Stage of Change to Promote Physical Activity Female Employees in Mashhad Factories Industrial. *School of Public Health and Institute of Public Health Research*. 2016;14(1):59-70.[Persian]
10. King AC, Whitt-Glover MC, Marquez DX, Buman MP, Napolitano MA, Jakicic J, et al. Physical activity promotion: highlights from the 2018 physical activity guidelines advisory committee systematic review. *Medicine & Science in Sports & Exercise*. 2019;51(6):1340-53.
11. Jalilian F, Emdadi SH, Mirzaie M, Barati M. The survey physical activity status of employed women in Hamadan University of Medical Sciences: The relationship between the benefits, Barriers, self-efficacy and stages of change. *TOLoo-E-BEHIDASHT*. 2011;9(4):89-98.[Persian]
12. Pronk NP, Katz AS, Lowry M, Payfer JR. Peer reviewed: reducing occupational sitting time and improving worker health: the take-a-stand project, 2011. *Preventing chronic disease*. 2012;9.
13. Hazavehei SM, Shadzi SH, Asgari T, Pourabdian S, Hasanzadeh A. The effect of safety education based on Health Belief Model (HBM) on the workers practice of Borujen industrial town in using the personal protection respiratory equipments. *Iran Occupational Health*. 2008;5(1):21-30.[Persian]
14. Khajehlandi K, Babaei Heydarabadi A, Araban M, Haghighizadeh M. Effect of Targeted Educational Program Based

- on the Transtheoretical Model in Promoting Healthy Nutrition Behaviors in Middle-aged Women in Dehdez, Iran. *Education Community Health*. 2019;6(1):25-31. [Persian]
15. Eslami m, Heidarnia A, Heidarzadeh A, Shokravi FA, Motlagh ME. Designed to determine the effect of questionnaire validity and reliability of health belief model in, two ways users of family planning pills and condoms. *Urmia University Medical Science*. 2011;21(5):382-90.[Persian]
 16. Ardestani MS, Niknami SH, Hidarnia A, Hajizadeh E. Validity and reliability of the Social Cognitive Theory Questionnaire in Tehranian Adolescent Girl student's Physical Activity behavior. *North Khorasan University of Medical Sciences*. 2017;9(2):219-30.[Persian]
 17. Jalilian M, Darabi M, Sharifirad Gh, Kakaei H. Effectiveness of interventional program based on trans-theoreticalmodel to promote regular physical activity in office workers. *Health system Research*. 2012;9(2):188-95.[Persian]
 18. Hassani L, Dehdari T, Hajizadeh E, Shojaeizadeh D, Abedini M, Nedjat S. Development of an instrument based on the protection motivation theory to measure factors influencing women's intention to first pap test practice. *Asian Pacific Journal of Cancer Prevention*. 2014;15(3):1227-32.
 19. Ngugi DG, Sawe E, Nguyen D, Bertsch A. Modelling and Measuring Acceptance and Use of Internet Banking: The Systematic Development of an Instrument. *Review of Integrative Business and Economics Research*. 2020;9(2):24-45.
 20. Dehdari T, Mirzaei N, Taghdisi MH, Khosropour A, Zare N. Psychometric properties of the iranian brief version of the transtheoretical model instrument in terms of hookah tobacco smoking cessation. *Addiction & health*. 2018;10(2):102-11.
 21. Coulson NS, Ferguson MA, Henshaw H, Heffernan E. Applying theories of health behaviour and change to hearing health research: Time for a new approach. *International Journal of Audiology*. 2016;55(sup3):S99-S104.
 22. Parhoodeh Y, Khezeli M, Bakhtiyari M, Delpisheh A, Latifi A. Effects of education based on transtheoretical model on physical activity of college students. *Health System Research*. 2012;8(2):320-9.[Persian]
 23. Abdi J, Eftekhkar H, Mahmodi M, Shojaeizadeh D, Sadeghi R. Physical activity status of employees of governmental departments in Hamadan, Iran: an application of the transtheoretical model. *Health System Research*. 2016;12(1):50-7.[Persian]
 24. Rizal H, Hajar MS, Kueh YC, Muhamad AS, Kuan G. Confirmatory factor analysis of the Malay-language transtheoretical model of physical activity among Malaysian primary school children. *The Malaysian journal of medical sciences: MJMS*. 2019;26(2):99-113.
 25. Kaewthummanukul T, Brown KC. Determinants of employee participation in physical activity: critical review of the literature. *Aaohn Journal*. 2006;54(6):249-61.
 26. Kaczynski AT, Bopp MJ, Wittman P. Peer reviewed: association of workplace supports with active commuting. *Preventing chronic disease*. 2010;7(6).
 27. Eskandari N, Araban M, Saki Malehi A. Promoting physical activity in women referred to health centers applying the trans-theoretical model. *Iranian Journal of Health Education and Health Promotion*. 2015;3(1):14-22.[Persian]
 28. Ramezankhani A, Haghdoost AA, Okhovati M, Sahamkhadam N. Determinants of physical activity in the workplace: A systematic review. *Razi Journal of Medical Sciences*. 2016;22(141):19-29. [Persian]
 29. moodi m, sharifzadeh G, rakhshany zabol f. Effectiveness of an Educational Program Based on the Transtheoretical Model to Increase Use of the Processes of Change for Physical Activity among the Employees of Birjand Universities. *Health Research in Community*. 2017;3(1):9-19.[Persian]