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Physical Activity's Related Factors Based on Transtheoretical Model in Older Adults Guilan In 2013

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ABSTRACT

The present study is aimed to determine the physical activity and its related factors based on transtheoretical model in elderly residents of Guilan province, Iran.
In this study, cross-sectional research design was applied. 262 elderly people were selected using convenience sampling techniques. Furthermore, the participants were asked to complete a self-administrated questionnaire.
The study was carried out in the active retirement centers located at Rasht, Guilan province, Iran; also, the collected data belongs to the year 2013. The selected individuals completed questionnaire included with the stages of change, processes of change, and physical activity scale for elderly questionnaire (PASE). Data were analyzed applying SPSS V. 16 Software by which the descriptive and analytic statistics were performed.
The result showed that mean PASE score was 119.35 ±51.50. Most of the individuals were in the maintenance stage. There is a significant difference in the of change during stage of change ($P<0.05$). Also, a significant relationships was found among the physical activity, increasing awareness, self-reevaluation, counter conditioning, reinforcement management, and stimulus control ($P<0.05$). Based on the results from the regression analysis, counter conditioning and stage of change are in fact the predictors of physical activity behavior. Also indicated that specific factors, counter conditioning, social liberation, self reevaluation, self-liberation , have important roles in predicting stage of change physical activity behavior.
Based on the results, it can be concluded that the use of TTM to identify the factors affecting physical activity behavior and its change in elderly is a promising method which should be taken into account.
KEYWORDS: Physical activity, Aged, Transtheoretical model

INTRODUCTION

Due mostly to this fact that an aging is a critical period of human life, focusing on it is indeed a social necessity. The control of population through birth control programs and advanced technology in order to increase the life time of the individuals has changed the structure of the population toward the process of aging(1).Mortality rate reduction caused by reducing the birthrate has increased the life expectancy and also the elder population(2).In a survey conducted in Iran(2007), life expectancy for men and women was estimated to be 72.2 and 73.9 years, respectively(3). Review of statistical indices has also indicated the accelerated growth of elderly population; such that an explosion in the elderly population is expected to occur in 2031. The increase in the elderly population is one of the most important economic, social, and health challenges in the 21st century(4).

The elderly are exposed to potential threats, including increased risk of chronic diseases, loneliness, isolation *etc(*5). based on the previously conducted studies, a small increase in physical activity will be beneficiary for human health(6). Physical activity is known as one of the most important health behaviors in preventing a variety of diseases associated with aging(7).

In addition, it has also been shown that over 80% of Iranian population is not physically active(9). In the United States, 25% of adults are inactive, while in Brazil, only 13% participate in a regular physical activity(10). Salehi(2010) reported that 30.25% of the elderly had no specific exercise program(8).

So far, many studies have identified the factors which are related to participation of the elderly in physical activity(9). In fact, psychological, social, environmental(7), and demographic factors were considered to be the important factors in regular physical activity(9). In many studies, independence, sense of efficacy, preventing fatigue, sense of ability, easy access to sporting facilities(6), meeting new people, having fun and communication with friends were involved in performing physical activities(9).In addition, lack of time, laziness, lack of partner and friend for

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performing sport, air pollution(9), lack of motivation, physical pain, illness, lack of knowledge(6), lack of willpower and support, lack of time(11), low socioeconomic status, smoking, and marital status affect physical activity(10). It should be mentioned that encouraging the elderly for physical activity is a very difficult duty(6).

Since many elderly are sedentary and suffer from its effects currently, it seems that identification of different psychosocial variables affecting physical activity is of particular importance in research and programs on physical activity(12). To better understand the behavior of physical activity, health care providers have encouraged the study of individuals' sport behaviors through psychosocial theories. The Transtheoretical Model of Behavior Change is one of the theories that indicates these factors(13).

The model of stages of change states that one makes great efforts before being successful to change his/her exercise behavior. These stages of communication and its relationship to other Transtheoretical structures, including the self-efficacy, processes of change and decisional balance are predictable(14). The process of change which indicates the readiness of the individual for changing behavior(15) consists of five physical activity behavior stages, including pre-contemplation, contemplation, preparation, action, and maintenance(7).In the pre-contemplation stage, the does not think about behavior change for at least the next six months. In the contemplation stage, the person really thinks of changing behavior over the next six months. In the preparation stage, the person intends to make a change in the near future (always within next month).In the action stage, the person makes appropriate changes in his/her lifestyle over the past six months. In the maintenance stage, the behavior changes and consolidates for a longer period (more than six months); however they require active and conscious effort to keep it(16).

The process of change which forms another structure of TTM includes behavioral and cognitive strategies that the person uses them to change his/her behavior(15); cognitive processes deal with thinking and feeling of individuals about unhealthy behavior, and behavioral processes are causing unhealthy behavior(14).Marcus *et al*, demonstrated that the combination of stages and processes of change could be considered as an appropriate guidance for physical activities (15). Lee *et al*, showed that there is a significant difference between the processes of change during the stages of change(17).

The model has been successfully applied in various populations in order to determine the physical activity behavior change and its related factors. However, most of these studies have been conducted in western countries. And, according to literature review, there has not been any study on physical activity behavior change in Iranian elderly In fact, physical activity behavior is a behavior-based economic, social and cultural context and vary among different societies also, cultural and geographical diversity largely affects the creation and maintenance of the physical activity behavior. That is why this study is focused on physical activity and also identifying its associated factors based on the stages of change and processes of change in elderly population of Rasht, Guilan, Iran.

METHODS

Participants and study design

The present work is across-sectional study.262 elders, which 141 and 121 of them were respectively males and females, were selected to participate in this study. The participants were from Rasht, Guilan, Iran, and the study was conducted in 2013.The range of age in participants was from 60 to 83years old. It is noteworthy that each individual voluntary completed informed consent to be involved in the study. The participants were asked to complete the provided questionnaires so as to assess their physical activity level and Transtheoretical model structure. In order to use the original scales, the required permission was obtained from the relevant authors. In addition, the participants were selected based on the following factors; being at age 60 and/or older, be a member of an active retirement centers in Rasht, having ability for verbal communication to respond the questions, having ability to perform daily activities without any devices or helps, without debilitating illnesses, disabilities and recent surgery, consented participate in the study and being retired at least 6 months ago.

Procedures

In this study, convenience sampling method was applied to select the individuals from the retirement center, located at Rasht, Guilan, Iran. Participants were individually interviewed for 30 minutes. The objects and procedures of the study were explained for the individuals in six retirement centers in Rasht. The required data was collected from February to May2013.

It should be mentioned that all the questions were translated into Persian (Farsi language) using a forward-backward translation technique. The data were screened for normality issues; also, the collected data satisfied the criteria. Scale reliabilities, correlations coefficient,and alpha Cronbach were calculated using SPSS V.16. The structural validity of the scales was examined using Content Validity Index(CVI), which was 88.61 % and 92.4% for the process of change and .PASE, respectively. The needed BMI via weight was measured by a balance scale while the individuals put their dress on, except their shoes. And, their height was measure by tape.

Instruments

The stage of Exercise Behavior Change Questionnaire, which was developed by Marcus et al.,(18) was used in this study. Participants were asked to indicate which of the followings best describes the level of their present exercise behavior: brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc. This kind of activities should be performed 3 to 5 times per week for 20-60 minutes per session. The exercise have to be nor painful neither effective, but should be done at a level that increases the breathing rate and orderly contributes to break a sweat(18).

These specific statements which were required to be selected by the participants were as the followings: "pre-contemplation, contemplation, preparation, action, maintenance(19).

In this study, 2-week test-retest reliability measures were applied with a correlation coefficient of 0.92.

Processes of Change were assessed by using the Processes of Change Questionnaire (PCQ), developed by Nigg and et al(20). In fact, PCQ was applied to assess the processes of exercise behavior change. PCQ questionnaire contains 30 items by which the cognitive and behavioral processes of change can be measured. Each individual was asked to recall the past month and rate the frequency of occurrence of each of the items by choosing a number between 1 and 5; based on the 5-point Likert scale, 1 means that individuals do not remember that item at all and by 5 it means that it occurred to them repeatedly. Furthermore, the derived Cronbachs alpha for the present studywas0.86.

In addition, physical activity levels in elder were assessed by physical activity scale for the elderly(PASE) scale(21).The first section of the questionnaire which contained six questions had to do with the frequency of leisure time activities Individuals were asked to answer the questions by pointing out the following items: never, seldom, sometimes, and often. Also, it is noteworthy that the duration was categorized as less than 1 hour,1 to2 hours, 2to 4 hours and more than 4 hours. The second section included six questions about household activities. In this section, the participants were only required to answer to the questions by choosing one for Yes and zero for No. Third section was about work-related activity with only one question.

Total PASE scores were calculated by multiplying either the amount of spent time in each activity(h/d) or participation(yes/no) in an activity by the respective weights and summing over all activities. The weights should be derived empirically through a sample of elderly population. In a study conducted by Washburn et al, the PASE scores are reported to have a possible range from 0 to 400 or higher(23).

Statistical analysis:

Data were analyzed using the SPSS V. 16, (Pearson , Mann-Whitney, Kruskal- Wallis ANOVA, linear-ordinal regression).

RESULTS

The Sample demographics characteristics are displayed in Table 1.

Table 1: Sample demographics characteristics

Characteristics	Categories	Frequency (%)
Age	60-64	150(57.3)
	65-69	54(20.6)
	>70	58(22.1)
Gender	Male	141(53.8)
	Female	121(46.2)
Education	Illiterate	3(1.1)
	Middle school	36(13.7)
	High school	186(71)
	College and above	37(14.1)
Mrital status	Married	219(83.6)
	Not married	2(0.8)
	Widow	40(15.3)
	Divorce	1(0.4)
Cohabitation type	Alone	35(13.4)
	With spouse/children	226(86.3)
	With Relatives	1(0.4)
House	Own	229(87.4)
	Rental	33(12.6)

Descriptive PASE, SOC model

The mean and standard deviation PASE score were 119.35± 51.50 that there was not significant statistical difference between men and women were elderly (P>0.05).

The results showed that among demographical variables, there was only a significant difference between age and physical activity(P=0.04). The participants in stage of change were significantly different in age, marital status, cohabitation type, and education(P<0.05).

The physical activity distribution of participants based on stage of change construct included: precontemplation (21.8%), contemplation(16.4%), preparation(22.5%), action(5%) and maintenance (34.4%).

Relationships among SOC PASE, and POC

The mean PASE based on PASE scale with stage of change physical activity was consistent and One-way ANOVA analysis in the field statistically significant which it is shown in Table 2.

Table 2 : Comparison of stage of change physical activity behavior

Stage of change	PASE			ANOVA
	N	Mean	standard deviation	
precontemplation	57	66.11	45.40	**df= (4-257) F=6.53 P<0.0001 Sig**
contemplation	43	121.14	57.35	
preparation	59	107.06	46.88	
action	13	142.03	29.92	
maintenance	90	135.94	51.55	
Total	262	119.35	51.50	

As well as the mean component cognitive and behavioral processes of behavior change physical activity in the during the stage of change through five stages toward to sustain increased physical activity behaviors as one-way ANOVA showed differences between the processes of change component during the stage of change(Table 3).

Table 3: Comparing mean and standard deviation of the processes of change (cognitive - behavioral) with separate stage of change

Stage of Change / **Process of change**	**precontemplation** mean ± standard deviation	**Contemplation** mean ± standard deviation	**Preparation** mean± standard deviation	**action** mean ± standard deviation	**Maintenance** mean ± standard deviation	**ANOVA**	**HSD Tukey**
Increasing Awarenes	1.38±0.61	1.73±0.81	1.93±0.85	2.23±1.18	2.3±1.06	df= (4-257) F=9.96 P<0.0001	PC,C<P<A<M C<M
Dramatic Relief	2.38±1.24	2.61±1.12	3.16±0.95	3.05±1.007	3.22±0.93	df= (4-257) F=7.51 P<0.0001	PC,C<P,A<M C<M
Environmental Reevaluation	3.28±1.06	3.77±0.98	4.03±0.95	4.12±0.63	4.11±0.80	df= (4-257) F=8.21 P<0.0001	PC,C<P,A,M
Self Reevaluation	2.27±0.99	3.18±0.91	3.93±0.91	4.28±0.65	4.6±0.55	df= (4-257) F=77.91 P<0.0001	PC<C<P<A<M P<M
Social Liberation	3.22±0.97	3.5±0.78	3.55±0.79	3.05±1.24	3.65±0.73	df= (4-257) F=3.18 P<0.01	PC<M
Counter Conditioning	1.56±1.01	1.89±1.01	2.05±0.95	2.25±1.12	2.35±1.09	df= (4-257) F=5.42 P<0.0001	PC<M
Helping Relationships	2.11±1.18	2.7±1.14	2.9±1.02	3.07±1.17	3±1.06	df= (4-257) F=6.47 P<0.0001	PC<P,A,M
Reinforcement Management	2.61±0.69	3.18±0.65	4.05±0.61	4.12±0.56	4.28±0.55	df= (4-257) F=78.44 P<0.0001	PC,C<P,A,M
Self liberation	2.18±1.12	3.27±0.92	3.52±0.86	3.74±0.7	4.03±0.81	df= (4-257) F=36.37 P<0.0001	PC<C<P<A<M C<M P<M
Stimulus Control	1.43±0.69	2.25±1.09	2.71±1.3	2.87±1.15	3.17±1.09	df= (4-257) F =23.91 P<0.0001	PC<C<P<A<M C<M

Table 4 shows significant differences in the behavioral and cognitive processes against physical activity in increasing awareness, social liberation, counter conditioning, reinforcement management, stimulus control($P<0.05$).

Table 4: Correlations for process of change and physical activity

Process of Change	PASE	Increasing Awarenes	Dramatic Relief	Environmental Reevaluation	Self Reevaluation	Social Liberation	Counter Conditioning	Helping Relationships	Self liberation	Reinforcement Management	Stimulus Control
PASE	1										
Increasing Awarenes	0.14 P<0.02	1									
Dramatic Relief	0.06 P <0.29	0.35 P<0.0001	1								
Environmental Reevaluation	0.1 P <0.07	0.27 P<0.0001	0.48 P<0.0001	1							
Self Reevaluation	0.23 P<0.0001	0.36 P<0.0001	0.38 P<0.0001	0.37 P<0.0001	1						
Social Liberation	0.004 P <0.94	0.18 P <0.004	0.21 P<0.0001	0.30 P<0.0001	0.27 P<0.0001	1					
Counter Conditioning	0.26 P <0.0001	0.19 P <0.002	0.20 P <0.001	0.12 P <0.04	0.35 P<0.0001	0.23 P<0.0001	1				
Helping Relationships	0.09 P <0.13	0.21 P <0.001	0.19 P <0.001	0.26 P<0.0001	0.29 P<0.0001	0.20 P <0/001	0.16 P <0.007	1			
Reinforcement Management	0.17 P<0.004	0.31 P<0.0001	0.30 P<0.0001	0.39 P<0.0001	0.70 P<0.0001	0.24 P<0.0001	0.34 P<0.0001	0.25 P<0.0001	1		
Self liberation	0.11 P<0.006	0.34 P<0.0001	0.35 P<0.0001	0.39 P<0.0001	0.63 P<0.0001	0.33 P<0.0001	0.34 P<0.0001	0.38 P<0.0001	0.58 P<0.0001	1	
Stimulus Control	**0.19 P<0.002**	**0.37 P<0.0001**	**0.24 P<0.0001**	**0.24 P<0.0001**	**0/54 P<0.0001**	**0/28 P<0.0001**	**0/30 P<0.0001**	**0.22 P<0.0001**	**0.47 P<0.0001**	**0.51 P<0.0001**	**1**

DISCUSSION

Present study was aimed to evaluate the extent of physical activity and its associated factors based on the stages of change and processes of change of physical activity behavior in the elderly residents of Rasht, Guilan, Iran.

The results showed that the mean physical activity in the elderly is 119.35. Although this is in line with a conducted study(9), there is an inconsistency with other previously conducted studies(21,24).

Considering the ability of the PASE tool to evaluate different areas of physical activity, the extent of physical activity in the Guilanian elderly was shown to be the light exercise; but, its continuity was high. It can be possibly due to the ways of living in apartment and also having no access to sport facilities which could be contributed to financial problems. On one hand, he only result that they found beneficial for their health was regular walking. On the other hand, they tended to perform sit at outdoor areas after retirement. These factors maybe regarded for the PASE scores to be in the section of light exercise in the Guilanian elderly.

Based on the results, aging is significantly associated with reduced physical activity which is consistent with the reports of Salehi (2010) and Dumith(2007) (8,10). In addition, it was found that age of one increases, allocation of his/her in higher stages of behavior change significantly reduces that it is consistent with the findings of Dumith and Thogersen (10,26). Due to physical and psychological inability, it cannot be expected from elderly to have a specific and continuously active exercise program. People who were in the higher stages of exercise behavior change had significantly higher extents of physical activity which corresponds to the study of Salehi and Riebe(8,27). The results also showed that the extent of physical activity has increased in educated persons compared to uneducated ones. This difference was not statistically significant, although they were significantly at higher stages of behavior change. This finding is in line with the study of Salehi and Kang(7,8).

The results showed that the extent of physical activity in women was higher than men. Although more men were in the maintenance stage, there was not a significant difference between elderly women and men. This finding has been also reported by other studies(7,9,26), however, another study contradicts it(28). According to the PASE scale that includes domestic activities, women engagement in these activities are fewer than men. In fact, men tends to do sitting outdoor activities after retiring which could result in having less physical activity.

The results also showed higher extent of physical activity and stages of behavior change in the married individuals, those who lived with their families and also participants who had their own house. The results are consistent with the reports of a conducted study by Kang (7). However, in a conducted study by Dumith(10), the cultural and lifestyle differences are recognized as the causes of the issue.

Regarding the relationship of the stages of behavior change with PASE, the results showed that people who were at higher stages of exercise behavior change had significantly higher extents of physical activity as well; that has been also concluded by some of the conducted studies(8,27).

Based on the results of the current study, the majority of subjects are in maintenance stage which is in line with the findings of Kang(7) and Cloek(28), and inconsistent with the findings of Salehi(8) and Dumith(10).

Identifying physical activity determinants and measuring the relevant psychosocial factors, among which the process of change can be pointed(29), could be the basis for development of behavioral interventions to enhance physical activity(16).

The results indicated that all the processes had significant differences during the process of change which is consistent with other studies(13,18) Chung *et al.*, *(*2007*)* showed that the processes of behavior have increased during the stages of change, although the cognitive processes did not change which is inconsistent with the results of the present study(30).

The difference of cognitive and behavioral change processes with physical activitywas statistically significant in the areas of increasing awareness, self-reevaluation, counter conditioning, reinforcement management , and stimulus control($P<0.05$).

It seems that people should pass the processes of change to adjust their physical activity behavior and mostly use the areas of increasing awareness and self-reevaluation in the cognitive process to do exercise and keep it, and use counter conditioning, reinforcement management , and stimulus control areas in the behavior process.

The results of this study indicated that specific factors, including counter conditioning and the stages of change, have important roles in predicting physical activity behavior which is inconsistent with the study of Bug(2008) in which the process of change was concluded to be a predicting factor(31). Also study indicated that specific factors, counter conditioning, social liberation, self reevaluation, self-liberation , have important roles in predicting stage of change physical activity behavior.

However, in the study of Salehi , *et al.*, *(*2010*)*, the variables of self-efficacy, perceived benefits, and exercise knowledge were reported as predictors of physical activity(9). In the study of Kang *et al*, (2012), self-efficacy was the strongest predictor of physical activity(7).

As the limitations of this study, inaccessibility to the elderly, inclusion of elderly of the State retirement organization, and the use of self-report tool can be mentioned. In order to generalize the results, it is recommended to extent the study to retirement organizations in other cities.

CONCLUSION

As the results showed, the physical activity of the Guilanian elderly was the light exercise, and many factors can affect the physical activity of them. Identification of factors influencing physical activity behavior in the elderly and providing them with health professionals can be helpful to design appropriate interventions.

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