



# Investigating the Stress Management Status in Middle-Aged Women in Bushehr based on a Transtheoretical Model

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## ABSTRACT

**Aims** The present study aimed to investigate the relationship between self-efficacy, decision-making balance, and change processes with stress management in middle-aged women.

**Instrument & Methods** This cross-sectional study was performed in 2019 on 600 middle-aged women covered by Bushehr Comprehensive Health Services Centers. The method of sampling was stratified. Data was gathered by demographic questionnaire and TTM based questionnaire, including self-efficacy, decisional balance (perceived barriers and benefits), processes of change, and stage of changes. Data were analyzed using ANOVA and Tukey post hoc test in SPSS 20 software.

**Findings** The lowest and highest mean stress management scores were in the women in pre-contemplation (13.64±3.79) and maintenance (22.58±4.10), respectively. The mean score of self-efficacy in the women during the stages of change from pre-contemplation (15.71±6.80) to maintenance (33.06±5.09) was upward, and this average score in the stages of pre-contemplation, contemplation, and preparation was significantly lower than the stages of action and maintenance (p<0.001). Regarding processes of change, consciousness-raising, dramatic relief, environmental reevaluation, self-evaluation, social liberation, self-liberation, stimulus control, counter conditioning, helping relationships, and reinforcement management are significantly lower pre-contemplation and contemplation than action and maintenance (p<0.001).

**Conclusion** The results indicate the importance of TTM constructs in advancing individuals to higher levels of change. Based on this, it is recommended to design and implement educational interventions based on TTM to improve stress management behaviors.

**Keywords** Stress; Transtheoretical Model; Middle-aged

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## Introduction

In the present century, stress has become a part of everyday life that is inevitable and seriously affects human health [1]. However, according to some researchers, stress is not inherently harmful and destructive, and some stress is needed for effort, mobility, and work progress [2], but severe or long-term stress has serious destructive physiological effects [3]. Stress is generally associated with various physical illnesses, mental disorders, depression, and abnormal behaviors [4]. Studies show that stress effectively develops a cardiovascular disease, metabolic changes such as abdominal obesity, adverse hypercholesterolemia, and hypertension [1]. Stress also increases insulin resistance in different cells and thus increases glycaemic index [5]. This factor gradually affects the immune system and weakens the immune system, and as a result, can lead to the growth of cancer cells in the body; because the immune system will not be effective in counteracting the proliferation of these cells [6]. Evidence shows the directive and negative relationship between stress and marital satisfaction so that this factor plays an essential role in the occurrence of cold temper and reduced marital satisfaction [7]. Some studies also show that high stress and tension in life are also associated with infertility [8].

The World Health Organization estimates that the prevalence of mental disorders is increasing in developing countries. The organization estimates anxiety at the top of mental disorders and estimates that 400 million worldwide are coping with mental disorders. Women are more likely to be anxious than men. This rate is reported to be 30.5% in women and 19.2% in men [9]. The prevalence of mental illnesses, especially depression and anxiety, in Iranian women is 2.5 times higher than in Iranian men. Women constitute half the population of society, and their health is the basis of family and community health and one of the indicators of development. Therefore, recognizing women's psychological and emotional needs and characteristics in social and economic dimensions is very important. Mental health in women also causes happiness and vitality and increases their sense of self-confidence, and its absence will bring anxiety, stress, apprehension, and despair of life [10]. However, stress as an important and influential factor in human health can occur at any age and cause unpleasant consequences.

Nevertheless, middle-aged people, especially middle-aged women, often experience more stress and a combination of complex emotions and different patterns of response to change during these years due to experiencing fundamental changes such as biological changes, changes in health status, decreased physical strength, changes in appearance (facial wrinkles, weakness, overweight), loss of family or friends, occupation changes, attitudes changes, transitional periods such as menopause and

leaving children in this period of life. For this reason, most of the common health conditions during these years, and the stress caused by them can be an overture to women's problems in the future, which will be associated with mortality and their affecting by various chronic diseases in aging [11]. Stress management generally increases people's ability to reduce stress and adapt to stressful situations [12]. Studies have shown that stress management behaviors through lifestyle improvements and physiological mechanisms are a suitable solution for preventing and treating various diseases [13].

Despite the importance of stress management in improving women's physical and mental health in this critical period of life, evidence shows that most women do not accept stress management behaviors and techniques as principles in life. In this regard, the results of a study in Turkey showed that life stress and failure to use methods such as relaxation are associated with experiencing the symptoms and adverse effects of menopause on women's quality of life [14]. The study of health-promoting behaviors in the community of middle-aged women in Zanjan also showed that middle-aged women perform stress management behaviors at a fragile level [11]. A study conducted in Zahedan to explain the perception of middle-aged women about health-seeking behaviors also showed that some women, despite the many stresses in their daily lives, could not cope with them without stress management skills [15]. Education of women to perform stress management behaviors is significant and plays an essential role in preventing many health-related problems.

Since behavioral modification, to perform stress management behaviors, is necessary to identify the most important factors and determinants of behavior, then the use of behavioral science models that provide a suitable theoretical framework for implementing behavioral interventions is beneficial [16]. One of the patterns used at the individual level to intentionally change behavior is the transtheoretical model, which has been used for a wide range of health behaviors [17]. This model usually interprets behavior change as an event and performs behavioral evaluation based on the overt and final behaviors. Modifying preventative behaviors such as stress management, unlike one-step and simpler behaviors, requires continuity in behaviors. Modifying preventive behaviors requires the use of theories such as the transtheoretical model, which is more sensitive to different stages and small stages of change [18]. This model is proposed as an integrated and comprehensive model in behavioral modification, and the behavioral change model is one of the basic theories of psychotherapy [19]. This model comprehensively covers different aspects of an individual's behavior because this model is the result of combining different behavioral theories. This model has been used to modulate behaviors in the

field of mental health such as controlling anxiety and panic disorder, controlling anger, and quitting drug and alcohol use, and has been effective in identifying the factors affecting these behaviors and modifying them [17]. This model includes four constructs of change stages, change processes, decision-making balance, and self-efficacy [20] and states that change is not an event but it is a process and people go through different stages of this process. Therefore, according to this pattern, behavioral change is formed gradually in different stages. Compliance with these steps occurs over time. According to this model and construct, the stages of change of people include 5 stages (pre-contemplation, contemplation, preparation, action, maintenance) [20]. The construct of change processes includes activities and strategies or processes that help the individual to progress in the stages of change and includes two categories of cognitive processes and behavioral processes [21]. Cognitive processes include increased self-awareness, environmental reevaluation, social liberation, self-reevaluation, and behavioral processes including counter conditioning, stimulus control, helping relationship, reinforcement management, and self-liberation [17]. The construct of balance in decision-making emphasizes the importance of perceived benefits and perceived disadvantages of the behavioral change based on the decision-making model of Janis and Mann Stannis. The construct of self-efficacy is also a determining factor affecting a person's effort and resistance to any activity, which is defined as a person's belief in their ability to perform tasks successfully and deal with a risky situation (without returning to their previous unhealthy habit) [22].

Individuals are usually not the same at different stages of change in terms of psychological characteristics such as level of self-efficacy, perceived benefits and costs of behavior, and the processes required for change; therefore, recognizing these cases to design effective education interventions is necessary. This study aimed to determine the relationship between self-efficacy, decision-making balance, and change processes with stress management changes in middle-aged women.

### Instrument & Methods

The present study is a descriptive-analytical cross-sectional study performed on middle-aged women covered by Bushehr Comprehensive Health Service Centers in the first quarter of 2019. Based on a study by Horiuchi *et al.* [23], According to the mean score of dramatic relief in the pre-contemplation and maintenance stage ( $47.58 \pm 9.22$  and  $51.30 \pm 9.68$ , respectively) and considering  $\alpha=0.05$  and  $\beta=0.2$  for the probability of type I and type II errors, respectively, at least 103 cases were calculated for each stage of change. Therefore, 600 people were estimated for five stages of change. Stratified

sampling was used in this study. Thus, all comprehensive health service centers and health centers in Bushehr were considered as community classes. Then, among these ten comprehensive health service centers and health centers in Bushehr, and according to the ratio of the number of middle-aged women in each center to the total number of the community, the required sample size of each center was determined. The inclusion criteria were included having the age of 30-59, the ability to read and write, registered information in the Sib system, having the appropriate physical condition to answering, and willingness to participate in the study. A list of eligible women was prepared at each center, and they were randomly contacted to be invited to participate in the study. Failure to complete the research questionnaires and having psychological and cognitive problems registered in the Sib system caused the participants to be excluded from the study.

A researcher-made demographic information questionnaire and a questionnaire related to transtheoretical model constructs, including self-efficacy, perceived barriers and benefits, ten-step change processes, and stress management change steps, were used to collect data. Demographic information included ten questions regarding age, marital status, education level, spouse education level, employment status, spouse occupation, number of children, household income, type of housing ownership, and disease status. Questionnaire items were designed based on the concepts related to transtheoretical model constructs and modeling the questions used in various studies [16, 23]. The researcher-made questionnaire of stress management change stages consisted of 5 questions about the pre-contemplation stage (they did not adopt stress management behaviors and had no intention of starting stress management behaviors in the next six months), contemplation (they did not adopt appropriate stress management behaviors but thought about starting them in the next six months), continuity of behavior (they have been performing stress management behaviors for more than six months). Participants were asked to choose one of the above steps that reflect the current status of their stress management behaviors. In order to evaluate self-efficacy, a researcher-made questionnaire consisting of 8 questions by a 5-point Likert scale was used (from strongly agree to strongly disagree). The researcher-made decision-making balance questionnaire consisted of 10 questions was used. This questionnaire examined the advantages and disadvantages of adopting stress management behaviors in middle-aged women. The subjects rated the importance of each statement by a five-point Likert scale from strongly agree to strongly disagree. The change processes questionnaire was a researcher-made tool related to hidden and clear activities called 10-stages cognitive and behavioral

processes, which middle-aged women used for stress management behaviors. This questionnaire includes 50 questions about consciousness-raising (5 questions), dramatic relief (4 questions), reevaluation of the environment (6 questions), self reevaluation (4 questions), social liberation (5 questions), self-liberation (6 questions), counter conditioning (6 questions), stimulus control (6 questions), reinforcement management (4 questions) and helping relationship (4 questions).

All items were ranked by a 5-point Likert scale. In order to evaluate the validity, the questionnaire designed by ten experts was evaluated, and content validity was calculated quantitatively. All questions in the three areas of clarity, relevance, and simplicity scored above 0.79 and between 0.94-1 and were considered appropriate. The total score of the content validity ratio for the constructs was more than 0.62 based on the Lavche table, and they were considered appropriate. Content validity ratio and content validity index were calculated for the change stages questionnaire (1 and 1), decision making balance (0.86 and 1), self-efficacy (0.97 and 1), consciousness-raising (0.9 and 1), dramatic relief (0.92 and 1), environmental re-evaluation (0.93 and 1), self re-evaluation (0.95 and 1), social liberation (0.96 and 1), self-liberation (0.83 and 0.98), counter conditioning (0.96 and 0.98), stimulus control (0.96 and 1), reinforcement management (1 and 1) and helping relationship (1 and 1). To determine the content validity by a qualitative method, experts were asked to study the tools carefully and stated their corrective views on each item of the questionnaire based on the grammar, appropriate words, accurate placing items, and scoring method. After collecting the opinions of experts, according to the obtained data, the final version of the questionnaire was developed to assess the reliability. To determine the reliability, the questionnaire approved by the panel of experts was completed by 30 qualified people. Cronbach's alpha coefficient was calculated for the process of behavior change, perceived self-efficacy, and decision-making balance. The alpha number for transtheoretical model constructs was estimated 0.78-0.97, and the internal correlation of the instrument was confirmed.

Necessary permission was obtained from the ethics committee of the Bushehr University of Medical Sciences. During the telephone call, the objectives of the study were explained to the subjects. Women who wished to participate in the study were invited to visit the center on selected days. Participants completed the design questionnaires when they visited the center. Approximately 30-40 minutes were allocated to complete each questionnaire. In order to comply with ethical principles, participation in this study was voluntary for middle-aged women. Data were analyzed using SPSS 20 software through descriptive statistics (frequency and percentage for qualitative variables, mean and standard deviation

for quantitative variables) and inferential statistics (one-way analysis of variance and Tukey post hoc test). The significance level of statistical tests was considered 0.05.

## Findings

In this study, 600 middle-aged women completed the research questionnaires. The mean age of the subjects was  $40.78 \pm 7.86$ , and the minimum and maximum ages were 30 and 59 years, respectively. Most women were married (93.2%) and homemakers (79.3%). The mean number of years of study was  $12.54 \pm 3.42$ . So that 3.5% of the subjects had primary education, 53.5% had secondary and high school education, and 43% had a university education. Most Spouse's job was an employee (44.1%). 31.5% of the subjects were affected by chronic diseases, including hypertension (11.2%), diabetes (7.7%), cholesterol (6.3%), thyroid (6.7%), and heart problems (3 %). According to the model of change stages, 25.8% of women did not take appropriate action to manage their stress. 24.8% of the subjects did not take proper action to manage their stress but thought about doing it for the next six months, and 9% of them planned to perform regular stress management behaviors for the next month. 13.2% of the subjects performed regular stress management behaviors for less than six months, and 27.2% had more than six months of regular stress management behaviors. The personal and demographic characteristics of the middle-aged women are shown in Table 1.

According to the construct of change stages, about 60% of women (59.6%) were in the inactive stages, and 40.4% were in the active stages. So that 25.8%, 24.8%, 9%, 13.2%, 27.2% of them were in the pre-contemplation, contemplation, preparation, and action stages, respectively. The lowest and the highest mean scores were related to the pre-contemplation and maintenance stages, respectively (Table 2).

The lowest mean scores were observed in the constructs of self-efficacy ( $15.71 \pm 6.80$ ), perceived benefits ( $13.18 \pm 4.88$ ), change processes of consciousness rising ( $8.74 \pm 4.76$ ), environmental reevaluation ( $19.85 \pm 7.38$ ), self-reevaluation ( $14.00 \pm 4.71$ ), social liberation ( $17.12 \pm 7.01$ ), self-liberation ( $9.60 \pm 4.50$ ), counter conditioning ( $10.56 \pm 4.35$ ), stimulus control ( $11.43 \pm 4.34$ ), reinforcement management ( $8.61 \pm 4.20$ ), and helping relationships ( $9.22 \pm 4.33$ ), and the highest mean scores were observed in the perceived barriers in the pre-contemplation stage ( $11.45 \pm 4.09$ ). In addition, the highest mean score was observed in the dramatic relief construct in the preparation stage ( $10.07 \pm 2.46$ ). On the other hand, the highest scores of the self-efficacy ( $33.06 \pm 5.09$ ), perceived barriers ( $20.58 \pm 3.46$ ), change processes of environmental reevaluation ( $27.25 \pm 2.86$ ), self-reevaluation

(18.35±1.67), social liberation (23.21±2.84), self-liberation (26.06±4.04), counter conditioning (22.06±3.77), stimulus control (22.54±5.73), reinforcement management (13.23±3.64), and helping relationships (13.00±4.32). The lowest mean score of the perceived barriers (5.82±1.82) was observed in the active stages of action and maintenance. The lowest and highest score of the dramatic relief were 1.07±2.46 and 12.01±3.76 in the preparation and pre-contemplation, respectively. The highest mean score of consciousness rising was observed in the preparation stage (18.4±33.76). Tukey test was used to compare the mean scores of transtheoretical model constructs and stress management between different stages of change. According to the results, the mean score of self-efficacy in the women studied had an upward trend during the stages from pre-contemplation to maintenance, and this means that the score in the stages of pre-contemplation, contemplation, and preparation was significantly lower than the stages of action and maintenance (p<0.001). Perceived benefits were also significantly lower in the pre-contemplation stage than in the other stages, and it was more in the maintenance stage than the inactive stages, including pre-contemplation, contemplation, and preparation (p<0.001).

Regarding change processes, the results showed that consciousness-raising, reevaluation, environmental reevaluation, stimulus control, counter conditioning, social liberation, helping relationships, reinforcement management, and self-liberation were significantly lower in the pre-contemplation and contemplation stages than in the action stages (p<0.001). So that the mean of these constructs in the inactive stages of the change processes was relatively less than the active stages, and an upward trend was observed during the stages of pre-contemplation to maintenance (Table 3).

**Table 1)** Personal and demographic characteristics of middle-aged women in Bushehr

Variable	N (%)	Mean±SD
<b>Marital Status</b>		
Single	24 (4.0)	-
Married	559 (93.1)	-
Widowed or separated	17 (2.9)	-
<b>Job Status</b>		
Unemployed	476 (79.3)	-
Employee	77 (12.8)	-
Freelance	31 (5.2)	-
Retired	16 (2.0)	-
<b>Spouse's job status</b>		
Unemployed	8 (1.4)	-
Employee	248 (44.1)	-
Freelance	213 (37.9)	-
Retired	93 (16.6)	-
<b>Economic status (self-report)</b>		
Weak	120 (20.0)	-
medium	271 (45.2)	-
Good	206 (34.3)	-
<b>Having a specific disease</b>		
No	411 (68.5)	-
Yes	189 (31.5)	-
<b>Hospitalization history</b>		
No	554 (92.3)	-
Yes	46 (7.7)	-
<b>Behavior change stage</b>		
Pre-contemplation	155 (25.8)	-
Contemplation	149 (24.8)	-
Preparation	54 (9.0)	-
Action	79 (13.2)	-
Maintenance	163 (27.2)	-
Age	-	40.78±7.865
Years of education	-	12.54±3.422
Spouse's years of education	-	13.24±3.756
Number of children	-	2.23±1.164

**Table 2)** Frequency distribution and mean score of stress management behaviors in middle-aged women in Bushehr by stages of change

Stage of Change	N	%	Mean	STD	Min	Max
Pre-contemplation	155	25.8	13.64	3.79	8	26
Contemplation	149	24.8	14.59	3.53	8	28
Preparation	54	9	15.62	3.54	8	25
Action	79	13.2	21.35	3.69	13	30
Maintenance	163	27.2	22.58	4.1	14	32

**Table 3)** Comparison of the mean and standard deviation of transtheoretical model constructs and stress management by stages of change

Constructs	Stages of change					F-Value	Tukey's post-hoc
	PC	C	PR	A	M		
Self-efficacy	15.71±6.80	20.09±7.19	28.01±5.70	31.34±4.95	33.06±5.09	205.46	PC<C<PR<A<M
Perceived Benefits	13.18±4.88	14.68±4.14	17.46±3.89	20.29±4.16	20.58±3.46	86.61	PC<C<PR<A, M
Perceived Barriers	11.45±4.09	9.80±3.22	7.55±2.78	6.36±2.24	5.82±1.82	61.06	PC>C>PR, A, M
Consciousness Rising	8.74±4.67	12.04±5.09	18.33±4.76	16.70±5.99	15.54±6.11	56.48	PC<C<PR, A, M P<M
Dramatic Relief	12.01±3.76	10.81±3.24	10.07±2.46	10.98±3.26	11.18±3.27	4.41	PC>C, PR, A, M
Environmental Reevaluation	19.85±7.37	21.70±7.54	25.35±4.32	26.82±3.36	27.25±2.86	52.96	PC<C<PR, A, M
Self Reevaluation	14.00±4.71	15.03±3.52	17.70±2.45	18.35±1.67	18.14±2.28	45.86	PC<C<PR<A, M
Social Liberation	17.12±7.01	19.76±5.57	23.05±2.92	23.21±2.84	22.42±3.75	32.3	PC<C<PR, A, M
Counter Conditioning	10.86±4.35	12.36±4.55	15.33±4.70	21.43±3.69	22.06±3.77	203.21	PC<C<PR<A<M
Helping Relationships	9.22±4.33	9.79±3.82	10.51±4.55	12.26±4.48	13.00±4.32	20.66	PC, C < A, M PR<C<M
Reinforcement Management	8.61±4.20	9.36±3.66	11.38±4.13	12.69±4.20	13.23±3.64	37.63	PC, C < A, M PR<C<M
Stimulus control	11.43±4.34	13.00±4.97	16.25±4.73	22.54±5.73	22.38±4.83	150.84	PC<C<PR<A, M
Self Liberation	9.60±4.50	13.12±6.07	19.68±6.28	25.26±3.73	26.06±4.04	303.26	PC<C<PR<A<M

PC = Pre-contemplation; C = Contemplation; PR = Preparation; A = Action; M = Maintenance

## Discussion

This study showed that more than half of women did not have excellent adherence to stress management behaviors, and the transtheoretical model constructs were good predictors of stress management in the subjects. Among the change stages, the lowest mean score was related to the pre-contemplation stage, and the highest average was related to the maintenance stage. In a study by Horiuchi *et al.*, which aimed to investigate the relationship between stages of change for perceived stress and stress management behaviors, in 2010 at a university in Korea, 13.2%, 16.7%, 28.7%, 15.9%, and 25.5% of the participants were in the pre-contemplation, contemplation, preparation, action and maintenance stages, respectively [16]. In the study of Evangelia *et al.*, which was conducted to investigate stress management behaviors in stressful situations in Greek students, most people were in the stages of pre-contemplation, contemplation, and preparation [24]. In another study in Japan, which aimed to investigate the relationship between the stages and processes of change to management stress on students, 31.2%, 12.5%, 12.7%, 20.1%, and 23.5% of the subjects were in the pre-contemplation stage, contemplation, preparation, action, and maintenance, respectively [23]. Mauriello *et al.*'s study was conducted to evaluate the advantages and disadvantages of stress management among adolescents; 44.4%, 9.2%, 15.2%, and 31.1% in pre-contemplation and preparation, action stage, and maintenance stage [25]. In a study by Nakamura *et al.* to investigate the relationship between the stages of change, coping with stress, self-efficacy, and stress management in Japanese students [26] and Gentry *et al.* to investigate adaptation behaviors and cope with stress in Hawaii adults [27], the highest frequency of people regarding stress management behaviors was in the maintenance stage, which is following the result of this study. Although based on the frequency of distribution of individuals in different stages of change, the highest frequency was observed in the maintenance stage, but more than half of the subjects in this study, as well as other studies, have not taken adequate action on stress management behaviors and were in the early stages of change. Therefore, identifying these people and designing appropriate education interventions is necessary to change and improve stress management behavior.

Other results showed that self-efficacy increased during the stages of change from the pre-contemplation stage to maintaining stages. Indeed, it seems that people's self-efficacy in the higher stages of change, i.e., the stages of action and maintenance, has increased with the gradual transition from the early stages to overcome the barriers of performing stress management behaviors. People in the higher stages of change had more self-efficacy, following the results of Evangelia *et al.* [24] and Riley *et al.*, to assess

stress levels and determine the factors affecting stress management behaviors using a transtheoretical model in HIV-positive women [28]. Self-efficacy is a person's belief in their ability to succeed in stress management, and based on the results, increasing self-efficacy and creating belief in empowering women to implement stress management behaviors in each stage of change can lead them to a higher stage. Therefore, improving the level of self-efficacy through self-efficacy-enhancing strategies such as mastery behavior, verbal persuasion, and succession experiences are necessary for performing stress management behaviors in women.

Other results of the present study also indicated that individuals' beliefs about the perceived benefits of stress management behaviors were significantly lower in the early stages of change. The perceived costs and barriers of behavior were significantly higher than the action and maintenance stages. These results are consistent with the principles expressed in the transtheoretical model; increasing the benefits and reducing the barriers to performing stress management behaviors moves the person to the stage of maintenance and behavior continuity. There was a relationship between decision-making balance and change stages in Marillo *et al.*, which is consistent with the result of this study. So that the two constructs of perceived benefits and perceived disadvantages, which are subsets of decision-making balance, had different statuses at different stages of change and the perceived benefits in the pre-thinking stage were significantly lower than in the other stages. Perceived disadvantages were also higher in the pre-contemplation stage than in the maintenance stage [25]. In the study by Deng *et al.*, which aimed to examine the balance of decision-making in changing effective stress management behaviors in Chinese university students, the perceived benefits in operation and maintenance stages were significantly higher than the initial stages of change, and the perceived disadvantages in the pre-contemplation stage were higher than higher stages of change.

Convincing women about the benefits of stress management and reducing barriers to stress management behaviors can lead women to higher levels of change and adherence to stress management behaviors, and it should be considered in education programs. Regarding cognitive and behavioral change processes as activities, strategies, or processes that help people move forward in the stages of change, the results showed that these change processes have a statistically significant relationship with the stages of change. This finding was in accordance with the results of a study conducted by Rakhshany *et al.* on Birjand university staff to investigate physical activity behavior based on a transtheoretical model [30]. One of these possible reasons could be that women in the pre-

contemplation and contemplation stage, without serious intent and specific plan to change behavior, have used these processes less than other women. However, by entering the practical stages of change, they adopt healthy behavior and try to prevent returning to the previous conditions by maintaining the new behavior using these processes. As predicted, all five behavioral change processes were significantly higher in the higher stages of change (action and maintenance stages) than in the lower stages of change (pre-contemplation and contemplation stages), and this finding was consistent with the results of the study of Horiuchi *et al.*, and it was the default of the transtheoretical model and showed that behavioral change processes are used more in the higher stages of change [23].

Given that people in the higher stages of change, or other words, active stages, have been involved in behavior for some time, so the behavioral processes that help maintain behavior will play a more important role, and therefore need to be considered in educational interventions to maintain behavior and prevent behavioral relapse. Regarding cognitive change processes, it was predicted that these processes would be used more in the stages of contemplation or preparation than in pre-contemplation, and these would be used less in the stages of action and maintenance than the contemplation stage. The present study results also indicate that these processes are less used except for dramatic relief in the pre-contemplation stage compared to the higher stages. Dramatic relief refers to identifying and expressing emotions related to problematic behavior, which, based on this study, problematic behavior means not doing stress management behaviors. Therefore, it seems that women in the pre-thinking stage do not even think about stress management behaviors, but, emotionally, they imagined a lack of stress management with various problems, complications, and consequences. Using other cognitive change processes is more effective in raising women to higher stages of change.

Regarding other cognitive change processes, the results also showed no significant difference between the stages of preparation, operation, and maintenance. This finding is consistent with the results of the study of Horiuchi *et al.* This finding may indicate that women to use stress management behaviors in higher stages of change, i.e., the stages of action and maintenance, also need to use cognitive processes to follow and maintain stress management behavior that attention to these processes in designing educational interventions can lead to better results. One of the limitations of the present study was the self-reporting of questions, making it possible for participants to give incorrect answers. Therefore, to solve this problem, while providing complete explanations to women and emphasizing the importance of the study, the questionnaires were

completed anonymously and in complete confidentiality. In addition, the present study was a cross-sectional study that did not detect the cause-and-effect relationship. Therefore, it is suggested that studies be designed and implemented as an intervention in this field.

## Conclusion

This study showed that more than half of women were in the inactive stage in terms of adherence to stress management behaviors. In addition, according to the constructs of the transtheoretical model, women with self-efficacy, more perceived benefits, and fewer perceived barriers were at higher stages of change. Behavioral change processes were also more common in women at higher levels of change, and the use of cognitive change processes other than dramatic relief in women who were in inactive stages, including pre-contemplation and contemplation, was less than the higher stages of change. These results indicate the effectiveness of the transtheoretical model in describing and explaining stress management behavior in women.

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