

Factors Related to Stages of Exercise Behavior Change among University Students Based on the Transtheoretical Model

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Abstract. [Purpose] The purpose of this study was to identify the distribution of stages of change in the exercise behavior of university students the transtheoretical model. [Subjects and Methods] Study subjects at four universities in G city were surveyed. A total of 1,000 questionnaires were distributed, and 959 responses were analyzed. The collected data was analyzed using descriptive statistics and multiple logistic regression analysis. [Results] Factors that contributed to the transition from the pre-contemplation stage to the contemplation stage included change-experimental processes (C-EP) and change-behavioral processes (C-BP). Factors that contributed to the transition from the contemplation stage to the preparation stage were C-BP and decisional balance-cons (DB-C). Self-efficacy was the factor that contributed to the transition from the preparation stage to the action stage. However, there was no factor that contributed to the transition from the action stage to the maintenance stage. [Conclusion] When exercise behavior change is low, strategies such as giving one-to-one training, having the subjects read relevant books, and providing information are needed. When exercise behavior change is high, it is necessary to heighten self-efficacy by having subjects select and freely conduct appropriate kinds of exercises.

Key words: Transtheoretical model, University students, Stage of change

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INTRODUCTION

According to the Fifth Korea National Health and Nutrition Examination Survey by the Korea Center for Disease Control and Prevention, the percentage of college students who regularly performed moderate to intense exercise three times or more per week was 18.3%. A considerable number of undergraduates lack exercise¹⁾. It was reported that 74.4% of college students irregularly participated in exercise or did not exercise at all²⁾. Chang and Chaung³⁾ observed that only 14% of college students regularly performed exercise.

Recently, researchers have looked at strategies that encourage physical activities using the transtheoretical model to develop intervention programs aimed at forming exercise habits^{4–6)}. The transtheoretical model was developed by Prochaska and DiClemente⁷⁾, and it is an integrated theoretical model which aims to explain individual behavioral changes. The key to this model is that there are stages of exercise behavior change and this model emphasizes that individuals progress from their current stage to the next

stage. Intervention in the processes of change, decisional balance, and self-efficacy may induce effective changes.

Studies of exercise behaviors based on the transtheoretical model in Korea include those conducted on elementary⁸⁾, middle and high school students^{9–11)}, adults^{12–14)}, and elderly people^{15–17)}. These studies investigated differences among the processes of change, decisional balance, and self-efficacy according to exercise behaviors or examined relevant factors, and presented intervention strategies based on subjects' stage of exercise behavior change. However, research examining university students' stages of exercise behavior change using the transtheoretical model is lacking.

Accordingly, this study used the transtheoretical model to examine university student stages of change, processes of change, decisional balance, and self-efficacy, to classify their relationship to stages of exercise behavior change, and provide basic data for developing exercise practice programs for undergraduates.

SUBJECTS AND METHODS

Subjects

This study selected 1,000 students in their senior year at four universities located in G City using a convenience sampling method. Self-administered questionnaires were distributed to the 1,000 subjects who had been explained the purpose of this study and who voluntarily consented

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Table 1. Characteristics of the study participants

Variable	Item	N (%)
Age (years)		21.32±2.94
BMI (kg/m ²)		21.41±3.11
Sex	Male	409 (42.6)
	Female	550 (57.4)

to participate. Out of the 1,000 questionnaires, 976 questionnaires were collected (collection rate: 97.6%). Among these, a total of 959 questionnaires were used for the final analysis after excluding 17 questionnaires with insufficient responses. All examination protocols were approved by the Institutional Review Board of Chosun University Hospital (No. 2013-08-005). The general characteristics of the subjects are as shown in Table 1.

Methods

The elements of the transtheoretical model are stages of change, processes of change, decisional balance, and self-efficacy. Stages of exercise behavior change were assessed using the Korean Scale for Stages of Exercise Behavior Change adapted by Lee and Chang¹⁶⁾ from the Stages of Change Scale for Exercise developed by Marcus et al.¹⁸⁾. A subject selects the one stage out of five that he or she belongs to at present from five available stages: pre-contemplation, contemplation, preparation, action, and maintenance. The Process of Change Questionnaire developed by Nigg et al.¹⁹⁾ and translated by Kim²⁰⁾ was used. Decisional balance on exercise behavior is a set of variables that influences decision-making levels on exercise behavior and may be differentiated into the pros and cons of behavioral change. This study employed the Decisional-making Balance Scale developed by Marcus and Owen²¹⁾ and revised and adapted by Seo²²⁾. The tool has a total of 12 questions (six on pros and six on cons). Self-efficacy is a tool for examining subjects' judgment about their ability to do exercise under different conditions, and this study employed an 18-question tool developed by Marcus et al.¹⁸⁾ and revised and complemented by Han²³⁾.

Data was collected from October 1 to October 15, 2013. The researchers visited the universities in person and explained the purpose and method of this study to the deans. After requesting collaboration for data collection, the researchers distributed the questionnaires, asked the subjects who signed a written consent form to fill in the questionnaires, and individually collected them from the subjects. In order to heighten the reliability of the data, a preliminary investigation was performed with two professors in the field and three undergraduates as the respondents. Questions difficult to understand and content inappropriate for college students were revised.

All statistical analyses were performed using SPSS version 18.0 (SPSS, Inc., Chicago, IL, USA). The general characteristics and distribution of the model related to variables were presented by calculating frequency, average, and standard deviation. Multiple logistic regression analysis was conducted to verify the relationship between subject stage

Table 2. Distribution of the subjects according to stage of change

Classification of change stage	N (%)
Pre-contemplation	155 (16.2)
Contemplation	355 (37.0)
Preparation	259 (27.0)
Action	130 (13.6)
Maintenance	60 (6.2)

of exercise behavior change and study variables. The statistical significance level was chosen as $\alpha=0.05$.

RESULTS

Looking at the distribution of subjects according to the stage of exercise behavior change, the percentage of those in the contemplation stage was highest at 37% (355 students), followed by the percentage of those in the preparation stage at 27% (259 students), the percentage of those in the pre-contemplation stage at 16.2% (155 students), the percentage of those in the action stage at 13.6% (130 students), and the percentage of those in the maintenance stage at 6.2% (60 students). The percentage of those in the action and maintenance stages who actually performed exercise was 19.8% (190 students) (Table 2).

In multiple logistic regression analysis of the change stage, the factors that contributed to transition from the pre-contemplation stage to the contemplation stage were change-experimental process (C-EP), change-behavioral processes (C-BP), and decisional balance-cons (DB-C) ($p \leq 0.05$) (Table 3).

The factors that contributed to the transition from the contemplation stage to the preparation stage were C-BP and DB-C. The factor that contributed to the transition from the preparation stage to the action stage was self-efficacy, and the relationship was statistically significant ($p \leq 0.05$) (Table 3). N factor contributed to the transition from the action stage to the maintenance stage ($p > 0.05$) (Table 3).

DISCUSSION

In this study, the percentage of those in the pre-contemplation, contemplation, preparation, action, and maintenance stages were 16.2% (155 students), 37.0% (355 students), 27.0% (259 students), 13.6% (130 students), and 6.2% (60 students) of the total, respectively. The percentage of those in the action and maintenance stages who regularly performed exercise was 19.8%. This result is similar to the result of the Fifth Korea National Health and Nutrition Examination Survey¹⁾, which reported the proportion of undergraduates who regularly conducted exercise was 18.3%. This is thought to be due to insufficient exercise facilities and programs on campus, and lack of sleep due to on excessive load^{24, 25)}.

Factors that contributed to the transition from the pre-contemplation stage to the contemplation stage in multiple logistic regression analysis were C-EP, C-BP, and DB-C,

Table 3. Multiple logistic regression analysis according to stage of change

	PC to C		C to P		P to A		A to M	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
C-EP	1.05	1.01–1.10*	1.00	0.96–1.04	0.98	0.94–1.03	1.05	0.98–1.14
C-BP	1.06	1.01–1.11*	1.05	1.01–1.10*	1.01	0.96–1.06	1.00	0.92–1.09
DB-P	1.01	0.94–1.08	0.94	0.87–1.00	1.06	0.96–1.17	0.98	0.84–1.13
DB-C	0.93	0.86–0.99*	0.94	0.88–0.99*	0.97	0.90–1.04	1.01	0.92–1.10
SE	0.99	0.95–1.05	1.03	0.99–1.08	1.06	1.01–1.13*	1.03	0.94–1.12

* $p \leq 0.05$, OR: odd ratio, CI: confidence interval, PC: pre-contemplation, C: contemplation, P: preparation, A: action, M: maintenance, C-EP: change-experiential processes, C-BP: change-behavioral processes DB-P: decisional balance-pros, DB-C: decisional balance-cons SE: self efficacy

and the relationships were statistically significant. In a study of college students, Kim²⁶⁾ reported that C-EP had a statistically significant relationship with the transition from the pre-contemplation stage to the contemplation stage. In a study of smoking behaviors, Prochaska and Velicer²⁷⁾ observed that subjects who belonged to the early change stage used PC-EP, a result similar to that of the present study. In a study of 500 students in a Department of Nursing, Bae²⁸⁾ noted that C-BP had a significant relationship with the transition from the pre-contemplation stage to the contemplation stage, which is consistent with the present study result.

This result also suggests that sub-factors for the change process, such as provision of books and information that explain advantages and methods of exercise, and praising or rewarding students when they practice healthy behaviors, play an important role in the student transition from the pre-contemplation stage with no intention to do exercise within six months to the planning stage for exercise practice. DB-C was also found to have a statistically significant relationship with the transition from the pre-contemplation stage to the contemplation stage. Marcus and Owen²¹⁾ reported that the degree of perception of the cons of exercise was higher than the degree of perception about the pros of exercise in the pre-contemplation and contemplation stages, supporting the present study result. Therefore, educational programs that enable students to overcome obstacle factors should be conducted and measures to reduce cons should be presented to improve the change stage for exercise practice in this stage.

Factors C-BP and DB-C showed statistically significant relationships with the transition from the contemplation stage to the preparation stage. In a study of the relationship between C-BP and elderly subject exercise behaviors, Cho and Lee²⁹⁾ noted that C-BP was used more when the subjects entered the preparation stage than in the contemplation stage, similar to the behaviors observed in the present study. Park et al.⁸⁾ also observed that there was a significant relationship between C-BP and the transition from the contemplation stage to the preparation stage, which is consistent with the results of the present study. Given the above results, support and encouragement by family members and friends is important, and interventions for active health behaviors such as sports club activities are important when students intend to exercise even though participation is irregular, unlike the contemplation stage, when they have

the intention or will to do exercise within six months. DB-C of the decision making balance had a significant relationship with the transition from the contemplation stage to the preparation stage. This result is consistent with the result of a study of exercise behavior change stages by Kim et al.⁹⁾ in which obstacle factors for exercise were highest at the pre-contemplation stage and lowest at the maintenance stage. Similarly, it was reported that³⁰⁾ the higher the stage becomes and the higher the intention to do exercise grows, the higher self-efficacy becomes. Thus, in healthy behavior interventions, such as exercise, motive and cognitive aspects of the subjects should be taken into account.

Self-efficacy was the factor that contributed to the transition from the stage of preparation to the stage of action. Self-efficacy, an important concept of social learning theory, is the faith in oneself that one can continuously conduct exercise under any condition, and self-efficacy was reported to be closely related to the performance of healthy behaviors such as exercise behaviors³¹⁾. In a study of female college students, Choi³²⁾ noted that self-efficacy increased as the stage of exercise behavior change was higher, which is consistent with the results of the present study. In a study of middle-aged women, Cho³³⁾ observed that the self-efficacy of those in the stages of preparation and action was higher than that of those in the stages of pre-contemplation and contemplation, supporting the present study result. Many studies have reported that those in the stage of pre-contemplation have low self-efficacy, but as the stage of exercise behavior change, self-efficacy becomes higher¹⁹⁾. Therefore, increasing self-efficacy in an early stage of exercise behavior is a crucial strategy for exercise behavior change as well as for improvement in exercise practice.

The present study had the following limitations. First, this study was a cross-sectional study therefore, it was difficult to clarify the precedence relationship between exercise behavior stages and the variables of the transtheoretical model. Second, the subjects of this study were confined to a small group of college students and therefore it is difficult to generalize the result to all college students. Despite such limitations, this study obtained a valid result that can effectively explain exercise behavior change of university students using the transtheoretical model, and it demonstrated that university students' changing stages were closely associated with elements of the transtheoretical model.

In conclusion, when the stage of exercise behavior change

is low, strategies such as providing one-to-one training that can improve C-EP and C-BP, or presenting relevant books and information useful for exercise, are needed. Furthermore when the stage of exercise behavior change is high, heightening self-efficacy by encouraging the subjects to select appropriate exercises and freely conduct them is necessary. In addition, systematic management so that subjects can overcome obstacle factors that appear in the process of practicing exercise through counseling is necessary.

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