

Smoking behaviors in Iranian male students: An application of transtheoretical model

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ABSTRACT

Objective: To investigate selected constructs of the transtheoretical model (TTM) of behavior change regarding smoking behavior among Iranian male students. **Materials and Methods:** A convenience sample of 578 smokers and ex-smokers from six universities during December 2009 to June 2010 completed three Persian versions of the short form smoking questionnaire based on TTM, developed by Prochaska, Velicer, and Diclemente. Data were analyzed using SPSS 15. Frequency analysis was conducted to demographic variables. Stages' differences were assessed with analysis of variance (ANOVA) followed by *post-hoc* multiple comparisons with Tukey's honestly significant difference (HSD) test. Alpha levels were set at $P < 0.05$. **Results:** More than half of the subjects were in contemplation stage. The pros of smoking among subjects in the precontemplation stage were significantly higher than those of subjects in the preparation and maintenance stages. Meanwhile; the pros of smoking ratings were significantly higher for the contemplation and preparation stages than for the maintenance stage. Significant mean differences in cons of smoking behavior emerged across the stages of change. However, pros and cons of smoking in the action stage were not significantly different than other stages of change. In line with self-efficacy/temptation construct, the result showed that positive social efficacy, negative affect efficacy, and habit strength were significantly different between the stages of change. **Conclusion:** The results provide support to the advantages of increased self-efficacy and the role of decisional balance for the intervention program development for smoking cessation.

Key words: Decisional balance, self-efficacy, smoking behavior, stages of change, transtheoretical model

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Access this article online	
Quick Response Code: 	Website: www.jehp.net
	DOI: 10.4103/2277-9531.99954

INTRODUCTION

According to World Health Organization (WHO) reports, smoking is the leading preventable cause of death in the world, accounting for about 5 million deaths per year.^[1] Iranian Ministry of Health (IMH) estimated that about 750,000 of Iranians died from smoking complications in 2006 and reported that 15% of men in Iran, aged 15 and older, currently smoke.^[2]

The transtheoretical model (TTM) was developed and introduced to understand behavior change, especially change

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This article may be cited as:
Charkazi A, Shahnazi H, Ghourchaei AB, Mirkarimi K. Smoking behaviors in Iranian male students: An application of transtheoretical model. *J Edu Health Promot* 2012;1:22.

associated with addictive behaviors.^[3] The TTM not only delineates a way to conceptualize behavior change, but also provides the foundation for developing assessments of individual's readiness to change and for tailoring interventions to actualize behavior change.^[4] The TTM consists of five stages of smoking behavior: (a) precontemplation (individuals are smoking and not intending to quit smoking in the next 6 months), (b) contemplation (individuals are smoking but are considering quitting in the next 6 months), (c) preparation (individuals are smoking but are planning to quit smoking in the next 30 days), (d) action (individuals have actually quit smoking and been abstinent for less than 6 months), and (e) maintenance (individuals have quit smoking and been abstinent for more than 6 months after initial quitting).^[5] Two intermediate indicators of when changes occur are decisional balance and self-efficacy.^[4] They also explain behavior change strategies through 10 processes of change, which will not be discussed in this paper.

Decisional balance is defined as the potential benefits (pros) and costs (cons) of behavior change.^[6] In moving toward any decision, individuals weigh the costs and benefits of the action being contemplated. In behavioral change, these considerations are known as decisional balancing, a process of cognitively appraising or evaluating the "good" aspects or pros and the "less good" aspects or cons of a behavior and the reasons to change and not to change that behavior. Lasting behavior change is associated with the pros for the behavior change increasing and the cons for change decreasing until the point of crossing over is reached.^[7]

The concept of self-efficacy is a component of Bandura's social learning theory defined as one's perceived confidence in the ability to carry out a specific behavior.^[8] In smoking behavior; self-efficacy represents the subjects' level of confidence that they can resist smoking across a number of tempting situations.^[9] Self-confidence to resist smoking temptations has tended to be low among precontemplators and much higher as the smoker acts and maintain abstinence.^[10]

In this regard, the examining stage of change of smoking behavior in students is important in the development or design of successful cessation programs that address their specific needs in different stages of change. In line with such a possible association between smoking behavior change and TTM constructs, many studies in this area have been designed and implemented across the wide range of population, especially in the western countries. Pallonen *et al.*'s study showed most of the subjects were in earlier stage of smoking behavior.^[11] Lafferty *et al.*'s study indicated that decisional balance patterns for smoking cessation differed across three Southeast Asian groups in the US.^[12] It is important to develop an adequate understanding of the factors related to smoking quitting and its maintenance. This study examined the relationship of stages of changes with decisional balance and self-efficacy among Iranian male students.

MATERIALS AND METHODS

Participants

Participants were a convenience sample of 578 male smokers and ex-smokers among Iranian students in six universities. These universities were Isfahan University ($n=104$), Isfahan University of Medical Sciences ($n=94$), Tehran University ($n=95$), Tehran University of Medical Sciences ($n=76$), Ahwaz University of Medical Sciences ($n=92$), and Khomein Islamic Azad University ($n=117$). Due to cultural barriers to contact the female students, they were excluded. The participants' ages ranged between 18 and 49 years, with a mean age of 23.26 ± 3.33 years. Majority of them (84.6%) were single, 10.6% were married, and the remainder were divorced or separated. Current smokers and ex-smokers smoked an average of 9.09 ± 7.44 cigarettes per day. The mean years of smoking were 4.64 ± 3.36 years. The following stages of smoking behavior were observed: Precontemplation ($n=321$, 55.5%); contemplation ($n=109$, 18.9%); preparation ($n=99$, 17.1%); action ($n=27$, 4.7%); and maintenance ($n=22$, 3.7%).

Instruments

In order to identify the smoking behavior, stage of smoking behavior was assessed using a 5-item; dichotomous scale (yes/no) related to current smoking behavior and intention to quit smoking, as used by Diclemente *et al.*^[13] The decisional balance was assessed as per Velicer *et al.*,^[14] with the 6-item short form. Participants' ratings were made on a 5-point Likert scale, from "not important" to "extremely important."

The self-efficacy scale to avoid smoking temptation was assessed by a used by Velicer *et al.*,^[15] which contains nine items (short form) and assesses participants' perceptions of their ability to refrain from smoking in various situations. Participants' ratings were made on a 5-point Likert scale, from "not at all tempted" to "extremely tempted."

Procedure

The instruments were translated using the Banville method to develop a cultural adaptation.^[16] In brief, the original instruments were translated into Persian by three students of PhD in health education and two bilingual health professionals back translated the instrument without access to original English version independently. These three versions were then compared, evaluated, and modified to reconcile any differences that were observed. Content validity suitable for the purpose of the study was established via asking of it's quantified the clarity and linguistic appropriateness from 4 Iranian experts in health education. Then, edited versions were given to a sample of 30 university students in pilot phase to test for its reliability.

The participants were a convenience sample of students in that all of them were currently smoking (at least one cigarette per day) or have smoked sometime in the past and quit at the time of the study. In order to reach potential respondents, they were looked for at places such as campus coffee-house, accommodation, and at mess. Students were asked to respond

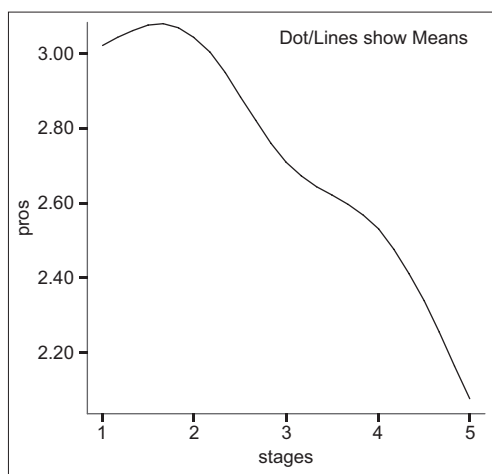
to the questions in their own privacy and were guaranteed of their privacy.

Statistical analysis

Data were analyzed using SPSS 15. Frequency analysis was conducted to demographic variables. Stages' differences were assessed with analysis of variance (ANOVA) followed by *post-hoc* multiple comparisons with Tukey's honestly significant difference (HSD) test. Alpha levels were set at $P < 0.05$.

RESULTS

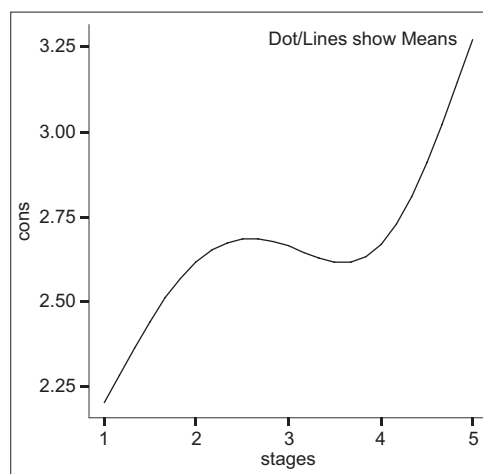
The mean, standard deviation, and ANOVA tests and Tukey's *post-hoc* contrasts for the self-efficacy and decisional balance across the five stages of smoking behavior are reported in Table 1.^[1] Tukey's *post-hoc* tests showed that pros of smoking among subjects in the precontemplation stage (3.02 ± 0.99) were significantly higher than those of subjects in the preparation (2.71 ± 1.00) and maintenance (2.07 ± 0.76) stages. Meanwhile, the pros of smoking ratings were significantly higher for the contemplation (3.04 ± 0.94) and preparation (2.71 ± 1.00) stages than for the maintenance (2.07 ± 0.76) stage. However, pros of smoking in the action stage were not significantly different from the other stages of change [Table 1 and Graph 1].



Graph 1: Pros of smoking behavior and stages of change among Iranian male students. 1=Precontemplation, 2=Contemplation, 3=Preparation, 4=Action, 5=Maintenance. Pros=Mean±SD

In addition, significant mean differences in cons of smoking behavior emerged across the stages of change. Tukey's *post-hoc* tests showed that subjects in the precontemplation stage (2.20 ± 0.88) had significantly lower cons associated with smoking in comparison to those in the contemplation (2.61 ± 1.02), preparation (2.66 ± 0.99), and maintenance stages (3.27 ± 1.09). Meanwhile, students in the maintenance stage had significantly higher cons of smoking perceived than contemplation and preparation stages. However, cons of smoking in the action stage were not significantly different from the other stages of change [Table 1 and Graph 2].

In line with self-efficacy/temptation construct, the result showed that positive social efficacy, negative affect efficacy, and habit strength were significantly different between the stages of change. Tukey's HSD revealed that positive social efficacy of smoking scores was significantly higher for the precontemplation and contemplation stages than for action and maintenance stages. The same pattern of significant differences was obtained for habit strength. Also, this pattern was observed for negative affect efficacy, except that subjects in contemplation stage had significantly lower confidence to resist smoking temptation than those in maintenance stage.



Graph 2: Cons of smoking behavior and stages of change among Iranian male students. 1=Precontemplation, 2=Contemplation, 3=Preparation, 4=Action, 5=Maintenance. Cons=Mean±SD

Table 1: The mean, standard deviation, and ANOVA tests and Tukey's post-hoc contrasts for self-efficacy and decisional balance across the five stages of smoking behavior in Iranian male students

	PC (n=321)	C (n=109)	P (n=99)	A (n=27)	M (n=22)	F	Tukey's HSD ^a
Pros	3.02 ± 0.99	3.04 ± 0.94	2.71 ± 1.00	2.53 ± 0.97	2.07 ± 0.76	7.661	PC > P, M C > M P > M
Cons	2.20 ± 0.88	2.61 ± 1.02	2.66 ± 0.99	2.66 ± 0.75	3.27 ± 1.09	12.304	M, C, P > PC M > C, P
Positive social efficacy	3.61 ± 0.89	3.63 ± 0.84	3.47 ± 0.90	3.06 ± 0.097	2.46 ± 1.17	10.511	PC > A, M C > A, M P > M
Negative affect efficacy	3.68 ± 1.08	3.64 ± 0.92	3.65 ± 0.96	3.04 ± 1.25	2.77 ± 1.21	5.983	PC > A, M C > M P > M
Habits strength	2.74 ± 1.00	2.82 ± 0.82	2.62 ± 0.83	2.16 ± 1.05	1.65 ± 0.78	9.664	PC > A, M C > A, M MP > M

PC = Precontemplation, C = Contemplation, P = Preparation, A = Action, M = Maintenance. ^aMean differences for the Tukey's HSD pairwise comparisons ($P < 0.05$)

DISCUSSION

To our knowledge, this is the first study that provides an examination of smoking behavior among Iranian students based on TTM. Of the total sample in the study, about three-fourth of the subjects were in the precontemplation and contemplation stages. This finding shows the importance of the necessity to encourage and motivate these subjects to think about cost of smoking and quitting benefits. 17.1% were in preparation stage and were ready for smoking cessation. This is a good opportunity for university authorities and health care providers to support and encourage this group for their positive decision. The numbers in later stages (action and maintenance) were very low. This result may be related to the no random sampling of the present study. These groups, especially subjects in the maintenance stage, could provide the vicarious experience for other subjects and should consider participating and sharing their successful experience for smoking cessation intervention. However, the vicarious experience is one of the important constructs of self-efficacy theory and can predict to gain a successful health behavior like smoking cessation.^[17] Stages of change distribution vary for different populations and cultures. This distribution in Turkey was 56.3% in the precontemplation stage, 16.3% for contemplation stage, 20.4% for preparation stage, 3.8% for action stage, and no subjects fitted in maintenance stage.^[18] Similar percentages were reported by Pallonen *et al.*^[11] In this regard, the volunteer samples of the current survey should be considered.

The data regarding decisional balance indicate that scores to smoking decision differed significantly between stages of smoking behavior. According to the TTM, decisional balance reflects an individual's relative weighing of the pros and cons of changing.^[19] The expected patterns of relationship between decisional balance and stages of changes are the cons of smoking being less important than the pros of smoking for smokers in the precontemplation stage, then the pros and cons intersecting at the contemplation stage, and finally, the cons being of greater importance than the pros in the later stages of change.^[14] In the current study, mean scores for precontemplation and contemplation were significantly more positive than for those in three later stages (preparation, action, and maintenance). This confirms the opinion that positive aspects of smoking are targeted in the early two stages and the negative aspects of smoking are targeted in the later stages. This result is somewhat inconsistent with the findings of Velicer *et al.*^[14] and Kim.^[20] In this regard, the current study emphasizes that the perceived benefits of smoking outweigh the costs in precontemplation and contemplation stages. Meanwhile, the cons of smoking become more important in advancing stages. Previous findings are different in terms of smoking pros in action stage. In consistent with our findings Dijkstra and Borland^[21] and Yalçinkaya-Alkar and Karanci^[18] reported increased pros of smoking in action stage and concluded that smokers in this stage start to experience difficulties related to quitting and may restart to evaluate the pros of smoking more favorably. In consistent with the

TTM construct, others found that the perceptions about the pros in the action stage increased.^[20,22]

The present study shows that the cons of smoking increased linearly with advancing stages except in action stage, with the highest cons scores in maintenance stage. This is in contrast with the expected patterns of decisional balance and may be related to the nature of action stage in which people consider the pros of smoking to be higher than its cons. Prochaska *et al.*^[23] reported that there could be cultural differences in this issue. Lafferty *et al.*^[12] found decisional balance patterns differed across the three Southeast Asian groups in the US. However, small sample size of the action and maintenance stages and convenience sample of this result should be considered in the generalizability of the findings.

The results reveal that self-efficacy scores to avoid smoking temptation significantly differed between stages of smoking. A similar finding was reported by others.^[18,20,23,24] However, an increase in confidence to resist smoking temptation is necessary from contemplation to maintenance stages. This finding may be useful for further smoking cessation programs for consideration of self-efficacy to avoid temptations and increase the students' confidence to overcome the quitting obstacles. The results related to positive self-efficacy indicate that students in the early stages are at risk for temptation to situations such as peer pressure, parties, and situational cues than those in the later stages. Related to this factor, intervention for problem solving may be useful for self-control and should be targeted.

Limitations

This study has some limitation to its generalizability. The study used a cross-sectional, convenience sample, male gender, and a small sample size in action and maintenance stages. Another limitation is the self-reporting nature of questionnaire in spite of the anonymous nature of the questionnaires. Future research is necessary to address these limitations and longitudinal designs are recommended in order to examine the stability of different smoking predictors across time.

CONCLUSION

The present study results show that more than half of Iranian students were in precontemplation stage. Hence, the smoking cessation intervention may be more effective and successful if this group is targeted. Meanwhile, the smoking temptation and pros scores were lower in the precontemplation and contemplation stages and that self-efficacy and cons scores in these stages were vice versa. This finding provides strong support for the TTM model utility in manifesting and describing smoking behavior change. This study has served as a first step toward the smoking behavior process based on TTM constructs, and in order to effectively work with Iranian students' smoking behavior, this model could be useful.

ACKNOWLEDGMENTS

We are grateful to all the students for their co-operation during the collection of data. Also, special thanks to Mr. Jorjani, Mr. Menglizadeh, Mr. Khojamli, and Mr. Orouji, without whom we would have been unable to complete this study.

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Source of Support: Nil, Conflict of Interest: None declared