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Factors Related to Salt Consumption: Application of Theory of Planned Behavior

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Abstract: A diet with excessive amount of salt results in pathological changes in many body organs including blood pressure system; these changes include endothelial dysfunction and vascular damage and have a significant role in the progress of cardiac diseases. The aim of this study was to determine the factors related to factors related to factors related to salt consumption based on the Theory of Panned Behavior (TPB). In this cross-sectional study, conducted in Kermanshah County, the wests of Iran, a total of 400 women's, were randomly selected to participate voluntarily in the study. Participants filled out a self-administered questionnaire including the expanded theory of planned behavior components. Data were analyzed by SPSS Version 21 using bivariate correlation and logistic regression statistical tests at 95% significant level. Almost 53.3% of the participants reported salt consumption during eating food (at the food table). Among background variables, education was (OR = 0.715) strong factor to predict salt consumption during eating food among the participants. The best predictors for salt consumption during eating food were subjective norms with odds ratio estimate of 1.081 [95% CI: 1.011, 1.155], perceived behavioral control with odds ratio estimate of 0.751 [95% CI: 0.674, 8.837] and intention with odds ratio estimate of 1.329 [95% CI: 1.191, 1.484]. Based on our findings among TPB variables, subjective norms, perceived behavioral control and intention may be some of the most effective factors for salt consumption during eating food (at the food table).

Key words: Salt consumption, theory of planned behavior, women's, food, dran

INTRODUCTION

The main factors forming the society's earing pattern include eating habits and culture of individuals that are formed in the family from the time the individual is born and the those habits and culture are related to the framework provide by the society. Therefore, eating habits impacting health respond to instinctual need and physiological wants on one hand and are a cultural behavior on the other hand (Bowman and Vinyard, 2004). In this regard, salt to being used as food flavor, has a role in regulating critical and internal functions of the body and excessive use of it will lead to problems for the body. A diet with excessive amount of salt results in pathological changes in many body organs including blood pressure system; these changes include endothelial dysfunction and vascular damage and have a significant role in the progress of cardiac diseases (Simon, 2003). Now a days, there is an increasing attention to the effects of consumption of high amount of alt on the cardiovascular system as the average amount of salt intake in most people is more than the physiological need to salt (Resende and Mill, 2007). The importance of salt consumption is to an extent that World Health Organization (WHO) like many other international organizations involved in public health has demanded the reduction of excessive salt consumption (Simon, 2003). Salt is not only found in nature but also used as an additive in food industry for flavoring, keeping and improvement of color and texture of products. Assessment of the amount of salt needed for the body in depends on some conditions such as intensity and level of physical activity and the level and composition of body sweat, environmental conditions and especially temperature, body compatibility and finally, genetic factors. Salt intake in the United States is 10-12 g (3 g is added to food materials, 3 g is added at eating table and 4-6 g at the industrial processes) (Tajik *et al*., 2008). Excessive sodium intake results in the increase of urinary calcium and a strong positive relationship between calcium excretion and sodium intake in studies. Also, the results of a study indicated that excessive sodium intake

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results in the reduction of minerals in bones (Chan *et al*., 1993). Different studies have been conducted on the useful effects of reduction of salt intake and the results indicate that salt intake reduction has important useful effects on blood pressure in individuals with hypertension and this can reduce mortality due to cardiovascular diseases (Sacks *et al*., 2001). For example, in Ireland a 5 mmHg reduction in blood pressure was obtained with a reduction of 5 g salt a day on average and this can result in 13% reduction in stroke and 10% reduction in cardiovascular diseases (He and MacGregor, 2003). WHO has demanded reduction in salt intake and recommends a salt consumption of <5 g per day (Tajik *et al*., 2008). In this regard, one of the ways for chaining eating habits in individuals is changing their perception. Theories can highly help in determining the perceptional characteristics of individuals. The theory of planned behavior proposed by Ajzen and Fishbein has been widely used in different studies for determining the attitudes and beliefs regarding food selection (Eldredge *et al*., 2016). Meta-analysis studies of theory of planned behavior indicated that the theory constructs predict intention and then behavior well (Godin and Kok, 1996). According to this theory intention is the main determining factor of behavior. Intention is determined by three factors.

The first factor is the individual's attitude to the behavior. The second factor is the individual's perception of social pressures from important individuals in doing or not doing a behavior (subjective norms). The third factor is the individual's perception of easiness or difficulty of doing a behavior (perceived behavior control). These include internal and external factors. These behaviors can result in prevention or facilitation of a behavior. Different studies have been conducted using theory of planned behavior and they have shown the importance of employing this theory in prediction of behavior (Ataee *et al*., 2014; Jalilian and Emdadi, 2011). Studies have also shown that the studies based on psychology and social psychology theories have a valuable role in creating programs impacting health promotion (Moghadam *et al*., 2012; Alavijeh *et al*., 2015; Jalilian *et al*., 2015). Thus, the present study was conducted with the aim of determining factors related to salt consumption based on theory of planned behavior.

MATERIALS AND METHODS

This cross-sectional study was conducted on 400 women referred to health centers in Kermanshah County, the west of Iran, during 2016. The sample size was calculated at 95% significant level according to the results of a pilot study and a sample of 400 was estimated. To enroll the participants and collect data the following stages were done. First, different areas of the city were classified based on the division of the geographical region, next for each social class one health centers were randomly selected (a total of eight health centers were selected). Then, subjects referred to the health centers for taking health care were enrolled into this study voluntarily. Finally, the volunteers were given the self-questionnaire. This research has been approved by the institutional review board at the Kermanshah University of Medical Sciences (KUMS.REC.1395.288). 351 (87.7%) participants out of 400 subjects signed the consent form and voluntarily agreed to participate in the study.

Prior to conducting the main project, a pilot study was carried out. Initially, the relevant questionnaires were administered to 30 women who were similar to study population in order to estimate the duration of the study conduction and to evaluate the reliability of the questionnaire. Estimated reliability using alpha Cronbach coefficient for each TPB constructs questionnaire were as follows: attitude ($\alpha = 0.84$); subjective norms ($\alpha = 0.81$); perceived behavior control ($\alpha = 0.80$) and behavioral intention ($\alpha = 0.85$).

The variables assessed in this study included: age, education level (primary school/secondary school/high school/academic), job (housewife/working), number of family, economic status (very weak, weak, average, good very good) and salt consumption during eating food (yes, no).

TPB scale was designed based on a standard questionnaire (Atabay *et al*., 2015) and included items under four constructs including attitude; subjective norms; perceived behavioral control; behavioral intention. Four items were designed to measure attitude toward salt consumption during eating food (at the food table). Five items were designed to measure subjective norms toward salt consumption during eating food (at the food table). Three items were designed to perceived behavioral control toward not salt consumption during eating food (at the food table). Three items were designed to evaluate intention toward salt consumption during eating food (at the food table). In order to facilitate participants' responses to the items, all items were standardized to a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Data were analyzed by SPSS Version 21 using appropriate statistical tests including bivariate correlation and logistic regression at 95% significant level.

RESULTS AND DISCUSSION

The mean age of respondents was 37.29 year [95% CI: 36.51, 38.08], ranged from 30-60 year. Regarding the

Table 1: Predictor variables of salt consumption based on bivariate correlation analysis

Variables	Mean (SD)	Scores range	X^1	X^2	X^3
X^1: Attitude	13.86 (3.36)	4-20	1.000	-	-
X^2: Subjective norms	17.05 (4.22)	5-25	0.485**	1.000	-
X^3: Perceived behavioral control	9.03 (2.96)	3-15	-0.350**	-0.111*	1.000
X^4: Behavioural intention	9.75 (2.91)	3-15	0.576**	0.445**	-0.332**

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

Table 2: Logistic regression analysis for socio-demographic characteristics related to salt consumption

				95% confidence intervals		
Variables	B	SE	Odds ratio	Lower	Upper	p-value
Final model; step 7						
Education level	-0.335	0.109	0.715	0.577	0.885	0.002

Table 3: Logistic regression analysis for TPB variables related to salt consumption

				95% confidence intervals		
Variables	B	SE	Odds ratio	Lower	Upper	p-value
Final model; step 2						
Subjective norms	0.078	0.034	1.081	1.011	1.155	0.022
Perceived behavioral control	-0.286	0.055	0.751	0.674	0.837	0.001
Behavioural intention	0.285	0.056	1.329	1.191	1.484	0.001

educational status: 10% (n = 35) had in elementary, 26.8% (n = 94) middle, 26.5% (n = 93) were diploma and 36.8% (n = 129) were academic education. About 93.2% (327/351) participants were married and 6.8% (24/351) were single. In addition, 13.4% (47/351) were reported worker and 86.6% (304/351) housewife. Almost 53.3% of the participants reported salt consumption during eating food (at the food table).

Table 1 shows mean, standard deviation and bivariate correlations between the TPB constructs which were statistically significant at either 0.01 or 0.05 level. Among background variables, education was (OR = 0.715) strong factor to predict salt consumption during eating food among the participants (Table 2).

Between the TPB variables the best predictors for salt consumption during eating food were subjective norms with odds ratio estimate of 1.081 [95% CI: 1.011, 1.155], perceived behavioral control with odds ratio estimate of 0.751 [95% CI: 0.674, 8.837] and intention with odds ratio estimate of 1.329 [95% CI: 1.191, 1.484] (Table 3).

The findings of the present study indicated that 53.3% of the participants have reported the use of salt shakers while eating. This finding is highly consistent with the findings of other studies in Iran. For example, Agheli *et al.* (2006) reported the use of salt shaker among women in the city of Rasht to be 55.2%. In the study by Vandevijvere *et al.* (2010) in Belgium showed that 14.4% of individuals used salt during eating. These findings indicate a high prevalence of salt consumption while eating and, considering the relationship between consumption of high amount of salt and different diseases such as hypertension, cardiovascular diseases and etc., it seems that performing information-giving interventions regarding the problems resulted from excessive use of salt is necessary in the society.

The findings of the present study showed that among background variables a significant relationship was found only between education and less use of salt shaker during eating at table. No significant relationship was found between use of salt shaker during eating at table and age, marital status, job, spouse's education and economic status. In this regard, Mazloomi *et al.* (2011) in the city of Yazd showed that women with higher levels of education had more positive attitude to avoiding salty food. The study suggested, in designing health promotion interventions for prevention of excessive salt consumption, paying attention to all age groups is important and education can have a useful role in this regard.

The findings of the present study indicated that beh avioral intention had a significant correlation with attitude, subjective norms and perceived behavior control. Also, logistic regression analysis showed that behavioral intention, perceived behavior control and subjective norms were respectively the stronger factors for predicting salt consumption during eating. These findings indicated that attitude was not a strong factor in predicting the behavior of adding salt to food during eating in the participants, despite the correlation between attitude and behavioral intention. Also, the findings of the linear regression analysis showed that the explored constructs predicted 39% of the behavioral intention variance of use of salt during eating. In this regard, the study by Atabay *et al.* (2015) regarding the consumption of salt in rural women of Chabahar reported the international behavior as the strongest factor in the prediction. Mazloomi *et al.* (2011) suggested in their study

that the constructs of theory of reasoned action predicted 37% of the variance of preventing salt consumption intention during eating. The findings of the present study indicate that if perceived behavior control is emphasized in designing interventions, more useful finings regarding prevention of excessive salt consumption could be reached.

Though, the present study is significant considering the lack of food information, it has some limitations. The limitations of this study include the lack of exploring salt intake from food, the lack of exploring the relationship between salt consumption during eating and background information and collection of data by questionnaire.

CONCLUSION

More than half of the participants added salt to food during eating. Considering the emphasis on subjective norms and perceived behavioral control, it is recommended to pay attention to the role of this construct in designing interventional programs.

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