



Predictors of Waste Separation Behavior and Behavioral Intention in Housewives



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Authors

Asadi Z.S.¹ PhD
Sharifi A.H.² MD, MPH
Naddafi K.³ PhD
Amani G.⁴ MSc
Abdi N.⁵ PhD

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ABSTRACT

Aims Waste separation behavior is beneficial for implementing waste management, recycling, and financial savings. The present study aimed to identify the predictors of waste separation behavior and behavioral intention based on the integrated behavioral model among housewives in Tehran.

Instrument & Methods This descriptive cross-sectional study was conducted on 326 housewives in an institutional district located in the northern part of Tehran in 2023. Data collection was carried out using a developed questionnaire based on the integrated behavioral model.

Findings The mean age of the study participants was 38.96 years. Waste separation behavior, environmental factors, and normative beliefs significantly influenced the behavioral intention score for waste separation ($p < 0.0001$). The levels of increase for the aforementioned factors were reported as 0.655, 0.101, and 0.204, respectively ($R^2 = 0.569$). Additionally, the history of waste separation training ($p < 0.0001$) and the spouses' educational level ($p = 0.003$) were found to significantly affect the behavioral intention score for waste separation, with levels of increase reported as 0.786 and 0.275, respectively ($R^2 = 0.203$).

Conclusion The housewives' behavior and their behavioral intention regarding waste separation largely depend on the history of waste separation training at the source and on environmental factors.

Keywords Behavior; Waste Management; Intention

¹Department of Community Medicine, Faculty of Medicine, AJA University of Medical Sciences, Tehran, Iran

²Department of Community Medicine, Faculty of Medicine, Tehran University of Medical Science, Tehran, Iran

³Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

⁴Department of English Language Teaching, Faculty of Literature and Humanities, Ilam University, Ilam, Iran

⁵Department of Nursing, Faculty of Nursing and Midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran

*Correspondence

Address: Faculty of Nursing and Midwifery, Kurdistan University of Medical Sciences, Pasdaran Street, Sanandaj, Iran. Postal Code: 66177-13446

Phone: +98 (87) 33664645

Fax: +98 (87) 33664643

abdi_nasrin@yahoo.com

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Introduction

Urban development, population growth, lifestyle changes, and the introduction of new materials into human life are significant factors contributing to the rapid increase in municipal waste generation [1]. Consequently, this growing trend is considered one of the main obstacles to improving quality of life and municipal development. Today, waste management has become an issue of paramount importance in sustainable development [2]. Statistics reveal that more than 5.2 million tons of household waste are generated annually in Tehran, with 30% of this amount classified as valuable dry waste. It is worth mentioning that waste collection and disposal in most countries, especially in developing nations, do not utilize advanced technology. Therefore, establishing an orderly system for the hygienic collection and disposal of waste is regarded as one of the basic needs of cities in developing countries. By implementing this procedure, the problems associated with garbage heaps and the lack of hygienic waste collection and disposal can be addressed. It could be argued that waste separation is a key factor in the scientific management of waste. This is because the correct classification and separation of different types of waste materials contribute to their better refinement and disposal [3]. Based on previous estimates, if all the waste in Tehran were fully recycled, it would be converted into materials worth 357 billion. Bread, plastics, and paper are among the materials found in the household waste generated by Tehran's citizens. Experts believe that recycling the entire amount of Tehran's waste can lead to savings of approximately 200 million dollars a year [4]. Other management strategies, such as installing waste separation facilities and employing current methods, like waste separation and disposal underground, can reduce solid waste by about 26.4 tons annually [5]. Therefore, regarding waste management, effective actions are urgently required, and such actions should be prioritized in the programs of responsible organizations. Waste separation at the source will be effective only if it is conducted with extensive cooperation from the public. Reusing and recycling waste is not a simple task; it requires scientific, technical, and cultural infrastructures, with cultural factors playing the most significant role. Citizens should be trained to produce less waste, and by performing initial separation at home, the recycling process will become less demanding. Issues such as the importance of public cooperation, motivating and demotivating factors, as well as elements that have the potential to change recycling behavior, are vital in a waste management system. Recognizing the effective behavioral and mental factors that influence citizens' cooperation in conducting waste separation at the source will contribute to better and more effective recycling

programs within society. Consequently, models and theories are required to study behavior and discern the behavioral mechanisms of waste separation at the source. Schwartz's norm activation theory, the theory of reasoned action, and the theory of planned behavior are examples of theories that could be employed to identify the effective factors influencing recycling behavior [6]. Among the aforementioned theories, the theory of reasoned action and the theory of planned behavior are recommended for studies related to environmental factors [7,8]. These theories provide researchers with a scientific and systematic framework to determine factors that influence behavioral changes. This model predicts the occurrence of a specific behavior only if the person intends to engage in that behavior. According to this model, the intention to perform a behavior is predictable based on behavioral factors, behavioral intention, attitude toward the behavior, subjective (mental) norms, perceived behavioral control, and self-efficacy.

The integrated behavioral model (IBM) combines elements of the theory of logical integration and the theory of reasoned action. The theory of reasoned action uses behavioral beliefs and behavioral assessments to determine individuals' attitudes toward behaviors, which are influenced by their normative beliefs and motivation to adhere to those beliefs. Additionally, the theory of reasoned action assesses individuals' perceptions of subjective norms, which are related to attitudes and mentalities that shape their intention to perform a behavior. According to previous studies, this model has been found to be one of the most effective frameworks for determining behavior. Furthermore, this model considers external variables such as demographic factors, personal characteristics, attitudes, and other individual norms, including health behaviors and health education [9,10].

Using this theory, several studies have been conducted on recycling behavior. Different constructs of this theory include behavior and predictors of behavioral intention. For instance, in the study by Pongpunpurt *et al.*, consciousness and subjective norms have a significant effect on waste separation and are predictors of behavioral intention [11]. Similarly, Zhang *et al.* identified attitude as the most significant predictor of recycling behavioral intention [12]. In the study by Haghighatjoo *et al.* [13], the history of past behavior and descriptive norms are predictors of recycling behavior. Mahmud and Osman present perceived behavioral control and perceived subjective norms as the strongest predictive components of recycling behavior [3]. Furthermore, Ramayah *et al.* verified social norms as the strongest predictor of recycling behavior [4], while Chan and Bishop recognized recycling intention as the strongest predictor [9]. An overview of the research findings from various studies, along with

their data analyses, acknowledged the implementation of solid municipal waste separation as one of the most fundamental and effective waste management methods. The annual generation of a large amount of waste, along with a significant increase in waste production in Tehran, which is statistically reported to be constantly rising, intensifies the undeniable need for solid waste separation at the source. So far, a limited number of comprehensive studies have examined waste separation behavior at the source in residential areas of Tehran. Thus, it is evident that studies, like the present one will contribute to the progress and increased efficiency of solid waste recycling. Correspondingly, this study will be highly beneficial for the environment, preserving national capital, preventing resource depletion, returning materials to the production cycle, and supporting the community's economy. Previous studies have identified waste separation at the source as the best and most efficient method for waste reduction. Although there are significant economic benefits associated with recycling, no serious consideration has been given to this industry in Iran. Therefore, the present study aimed to investigate the predictors of waste separation behavior and behavioral intention at the source, based on the IBM, among housewives in Tehran.

Instrument and Methods

This descriptive cross-sectional study was conducted on housewives residing in an institutional district in Tehran selected by convenience sampling in 2023. The inclusion criteria included participants having primary education, reading and writing literacy, and providing consent to participate in the study, while the exclusion criterion was dissatisfaction with answering the questionnaires. There were 600 households in the studied institutional district. Initially, based on Morgan's table, it was decided to include 234 participants; however, due to potential issues, such as questionnaire distortion, participant attrition, and failure to properly complete the questionnaires, the researchers opted to include a larger sample of 326 participants.

The questionnaire developed by Sadeghi *et al.* was employed [14]. The reliability and validity of the questionnaire, considering the content validity ratio (CVR) and content validity index (CVI), were reported to be 0.9 and 0.8 for all subscales, respectively. Cronbach's alpha for all the subscales was reported to be 83%. The final questionnaire consisted of two sections; the first section addressed demographic information, while the second section focused on the constructs of the IBM. This second section included the attitudinal construct toward behavior (eight items), with scales ranging from 8 to 40; mental (abstract) norms (five items), with scales ranging from 8 to 40; normative beliefs (two items);

and environmental factors (two items), all of which were reported to be normally distributed. Furthermore, behavior and behavioral intention were each represented as a single item scored on the Likert scale. For all the aforementioned items, a five-point Likert scale ranging from "strongly agree" to "strongly disagree" was used as the scoring system. Descriptive statistics, including mean and standard deviation, were used to describe the data, while statistical tests, including Pearson and Spearman correlation, were employed to analyze the data. Additionally, regression analysis was used to determine the predictors and the data were analyzed using SPSS version 24 at $p < 0.05$.

Findings

A total of 350 questionnaires were distributed among housewives. Out of the total questionnaires, 24 were distorted, and only 326 were considered for the study (Table 1).

Table 1. Frequency of the subjects' background information

Parameter		Values
Housewives' educational level	Under diploma	44(13.5)
	Diploma and associate degree	166(50.9)
	Bachelor of arts/sciences	91(27.9)
	Master of arts/sciences and PhD	25(7.7)
Spouses' educational level	Diploma and associate degree	12(3.7)
	Bachelor of arts/sciences	187(57.4)
	Master of arts/sciences and PhD	127(39)
Being trained about wet and dry waste separation in advance	No	241(73.9)
	Yes	85(26.1)
Number of children	1	78(23.9)
	2	184(56.4)
	3	48(14.7)
	4	16(4.9)
Household members	3	78(23.9)
	4	184(56.4)
	5	48(14.7)
	6	16(4.9)

The mean (standard deviation) of the IBM constructs reported for each one individually was 3.77 (0.80) for waste separation behavior, 2.55 (0.91) for waste separation behavioral intention, 4.10 (1.59) for environmental factors, 20.26 (4.81) for behavioral attitude, 15.32 (2.84) for abstract (mental) norms, 16.12 (3.27) for perceived behavioral control, 31.53 (4.11) for self-efficacy, and 2.79 (0.73) for normative beliefs (Table 2).

Waste separation behavior was positively and significantly correlated with the history of waste separation training ($cc=0.512$, $p<0.0001$). Similarly, waste separation behavioral intention was positively and significantly correlated with the history of waste separation training ($r=0.372$, $p<0.0001$) and spouses' educational level ($r=0.277$, $p<0.0001$).

Table 2. Frequency of the constructs, including behavior, normative beliefs, and environmental factors

Construct	Always	Usually	Sometimes	Rarely	Never
Separation behavior in the last month	4(1.2)	17(5.2)	76(23.3)	180(55.2)	49(15)
Higher-income and separation behavior	6(1.8)	47(14.4)	95(29.1)	150(46)	28(8.6)
Appropriate jobs and separation behavior	7(2.1)	46(14.1)	92(28.2)	149(45.7)	32(9.8)
Behavioral intention for next month	28(8.6)	150(46)	95(29.1)	45(13.8)	8(2.5)
Enough space at home	240(73.6)			86(26.4)	
Cooperating with other members in waste separation	294(90.2)			32(9.8)	

Table 3. Multiple linear regression analysis of waste separation intentional behavior and the constructs of the integrated model

Parameter	Effect estimation	Standard error	Standardized estimate	t-statistic	p-value
Constant value	-1.716	383	-	-4.482	<0.0001*
Waste separation behavior	0.655	0.053	0.577	12.297	<0.0001*
Environmental factors	0.101	0.027	0.176	3.743	<0.0001*
Behavioral attitude	-0.014	0.007	-0.072	-1.939	0.055
Abstract (mental) norms	0.016	0.016	0.049	1.006	0.315
Perceived behavioral control	0.013	0.014	0.046	0.907	0.365
Self-efficacy	0.015	0.009	0.066	1.705	0.089
Normative beliefs	0.204	0.047	0.163	4.340	<0.0001*

R²=0.574, *Significant at p<0.0001.

Multiple linear regression analysis was performed on waste separation behavioral intention in relation to other constructs of IBM (Table 3). Waste separation behavior ($t=12.297$, $p<0.0001$), environmental factors ($t=3.743$, $p<0.0001$), and normative beliefs ($t=4.340$, $p<0.0001$) significantly affected the score of waste separation behavioral intention. Their respective contributions were reported to be 0.655, 0.101, and 0.204. Additionally, multiple linear regression analysis for the behavioral intention of wet and dry waste separation was conducted based on variables, including age, educational level, spouses' educational level, and history of waste separation training. Waste separation training ($t=7.155$, $p<0.0001$) and spouses' educational level ($t=3.035$, $p=0.003$) had positive effects of approximately 786% and 275% on waste separation behavioral intention, respectively ($R^2=0.204$, $p<0.0001$).

Multiple linear regression analysis was performed on waste separation behavior in relation to the constructs of the IBM. Waste separation behavioral intention ($t=12.297$, $p<0.0001$), environmental factors ($t=6.298$, $p<0.0001$), perceived behavioral control ($t=3.884$, $p<0.0001$), and normative beliefs ($t=3.859$, $p<0.0001$) significantly affected the score of waste separation behavior. Their respective increases were reported to be 492%, 142%, and 47%. However, normative beliefs had a decreasing effect of approximately 158% ($R^2=0.582$, $p<0.0001$).

Discussion

This study aimed to identify the predictors of waste separation behavior and behavioral intention based on the integrated behavioral model among housewives in Tehran. Behavioral intention and behavioral conduct constitute the most significant constructs of IBM. Thus, the present study investigated the predictors of both behavioral intention and behavior itself. In the study by Pongpunpurt *et al.*, abstract norms are considered predictors of behavioral intention due to their

significant impact on waste separation behavior [11]. Similarly, in studies conducted by Shen *et al.* and Huang *et al.*, abstract norms are identified as predictors of the behavioral intention to separate waste. Specifically, observing waste separation behavior in the participants' environment plays a significant role as a behavioral stimulator for waste separation [15, 16]. Likewise, in studies by Wang *et al.*, Zhang *et al.*, and Wunder *et al.*, abstract norms are recognized as significant determinants of waste separation behavior [12, 17, 18]. In the present study, normative beliefs were identified as influential predictors of both behavioral intention and the behavior itself.

Perceived behavioral control is associated with an individual's assessment of his or her abilities and motivation to engage in a behavior [19]. In other words, perceived behavioral control reflects an individual's past experiences and anticipated obstacles that have either encouraged or hindered them from performing a behavior. Perceived behavioral control had a positive impact on the score of waste separation behavior. Similarly, Shen *et al.* demonstrated that perceived behavioral control has the greatest impact on waste separation behavioral intention [16]. Likewise, Visschers *et al.* highlighted the positive and significant impact of perceived behavioral control on waste separation behavioral intention [20].

Environmental factors are highly influential in shaping behavioral intention and waste separation performance. These factors may include the cooperation of other family members, an appropriate separation environment, public awareness efforts by municipal experts, and the availability of separation facilities, bags, and specialized waste separation trash cans. Zhang *et al.* showed that situational factors, such as the presence of waste separation trash cans and the availability of time for waste separation, significantly impact the behavioral intention to separate waste [12]. In the same vein, Ng *et al.* identified environmental factors, such as the

availability of facilities, as significant contributors [21]. Stoeva and Alriksson note that individuals who hold a positive attitude toward waste separation behavior may become discouraged and lose motivation to cooperate if they lack access to the necessary facilities [22]. Furthermore, Rispo *et al.* indicated that providing the required infrastructure may enhance citizens' effective participation in waste separation [23].

Hosseini *et al.* asserted that, from the perspective of municipal households, a lack of patience (61.3%) and insufficient space to separate household waste (95.5%) are considered the main obstacles to waste separation. From the viewpoint of municipal-related factors, non-active delivery vehicles for dry waste on weekends (94.7%), a limited number of containers (95.8%), and a lack of continuous training (95%) are identified as the primary obstacles to waste separation [24]. Fahiminia *et al.* argue that about 90% of citizens have expressed their readiness to carry out urban waste separation at the source. From the perspective of citizens, the main reasons for the failure of this program are attributed to the non-implementation or irregular implementation of the program by municipal administrative staff (45%), insufficient training of citizens (32%), and weak cooperation among people due to cultural and social issues or a lack of economic justification (25%). Fahiminia *et al.* also emphasized the importance of improving environmental factors so that studies, actions, and further investments by stakeholders can be made for waste separation. Such actions will undoubtedly contribute to desirable results [25]. In line with our findings, Haghighatjoo *et al.* verified a significant relationship between awareness of waste collection and recycling programs, receiving incentive packages for waste separation, the availability of vehicles for collecting recyclable waste, and the performance of recycling behavior [13]. The history of waste separation training was identified as a strong predictor of both the intention to separate waste and the actual implementation of waste separation. This finding aligns with that of Haghighatjoo *et al.* Similarly, Hu *et al.* demonstrated a significant impact of awareness regarding environmental factors and conditions related to waste separation among individuals [26]. Conversely, a lack of awareness of such factors and conditions can act as a deterrent for those who are willing to engage in waste separation [27, 28].

According to Wang *et al.*, the three main components of behavioral intention (attitude, perceived behavioral control, and abstract norms) play a mediating role between environmental concerns and behavioral intention [18]. Moreover, McCarthy and Liu and Bhatti *et al.*, reported that awareness of environmental risks (such as greenhouse gas emissions, energy crises, and environmental pollutants) contributes to the reduction of food waste [29, 30]. It is worth mentioning that the educational

level of spouses affected waste separation behavioral intention. Specifically, the higher the spouses' educational level, the greater the intention to engage in waste separation.

According to Ng *et al.* and Hu *et al.*, there is a significant relationship between age, gender, and income on the one hand, and waste separation behavior on the other hand [21, 26]. Our findings are somewhat in line with the reviewed studies. The observed differences and discrepancies may be attributed to variations in study design, sample size, data collection instruments, and the environment and culture of the study subjects. Therefore, there is a need to design a more comprehensive study with a larger sample size, a multi-centered and multi-city scope, and the capacity to evaluate multiple variables and factors. Such actions could help homogenize conditions, making the results more generalizable to a larger population and facilitating appropriate planning for intervention studies aimed at improving conditions and promoting waste separation behavior.

One limitation of the present study is the use of a questionnaire for data collection, which may lead to inaccurate or inappropriate reporting and, in some cases, non-cooperation in completing the questionnaires. Additionally, the lack of an appropriate framework for sampling and the use of a convenience sampling method may reduce the generalizability of the findings. Accordingly, it is necessary to conduct comprehensive sampling by selecting participants from different areas and regions of the city, as well as from across the country. Moreover, the findings of this study can be instrumental in creating effective structures, designing educational programs, and improving waste separation and management processes at various levels of society. Ultimately, achieving sustainable development through the advancement of cities and communities is the most significant concern.

Conclusion

The housewives' behavior and their behavioral intention regarding waste separation largely depend on the history of waste separation training at the source and on environmental factors.

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Ethical Permissions: A letter of introduction and written consent were obtained from university officials and research centers. The information of all participants remained confidential. The ethical guidelines of the Helsinki Declaration and the ethics research committees of the Aja University of Medical Sciences were followed. The study was approved by the Medical Research Council (IR.AJAUMS.REC.1400.047).

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References

- 1- Ravichandran C, Venkatesan G. Toward sustainable solid waste management-challenges and opportunities. In: Handbook of advanced approaches towards pollution prevention and control. Amsterdam: Elsevier; 2021. p. 67-103.
- 2- Ma J, Hipel KW, Hanson ML, Cai X, Liu Y. An analysis of influencing factors on municipal solid waste source-separated collection behavior in Guilin, China by Using the Theory of Planned Behavior. *Sustain Cities Soc*. 2018;37:336-43.
- 3- Mahmud SND, Osman K. The determinants of recycling intention behavior among the Malaysian school students: An application of theory of planned behaviour. *Procedia Soc Behav Sci*. 2010;9:119-24.
- 4- Ramayah T, Lee JWC, Lim S. Sustaining the environment through recycling: An empirical study. *J Environ Manag*. 2012;102:141-7.
- 5- Byamba B, Ishikawa M. Municipal solid waste management in Ulaanbaatar, Mongolia: Systems analysis. *Sustainability*. 2017;9(6):896.
- 6- Wan C, Shen GQ, Yu A. The role of perceived effectiveness of policy measures in predicting recycling behaviour in Hong Kong. *Resour Conserv Recycl*. 2014;83:141-51.
- 7- Allen S, Marquart-Pyatt ST. Workplace energy conservation at Michigan state university. *Int J Sustain High Educ*. 2018;19(1):114-29.
- 8- Han JH, Nelson CM, Kim C. Pro-environmental behavior in sport event tourism: Roles of event attendees and destinations. *Tour Geogr*. 2015;17(5):719-37.
- 9- Chan L, Bishop B. A moral basis for recycling: Extending the theory of planned behaviour. *J Environ Psychol*. 2013;36:96-102.
- 10- Glanz K, Lewis FM, Rimer BK. Health behavior and health education: Theory, research, and practice. Hoboken: Jossey-Bass/Wiley; 1990.
- 11- Pongpunpurt P, Muensitthiroj P, Pinitjitsamut P, Chuenchum P, Painmanakul P, Chawaloeshonsiya N, et al. Studying waste separation behaviors and environmental impacts toward sustainable solid waste management: A case study of Bang Chalong Housing, Samut Prakan, Thailand. *Sustainability*. 2022;14(9):5040.
- 12- Zhang D, Huang G, Yin X, Gong Q. Residents' waste separation behaviors at the source: Using SEM with the theory of planned behavior in Guangzhou, China. *Int J Environ Res Public Health*. 2015;12(8):9475-91.
- 13- Haghighatjoo S, Asgari A, Tahmasebi R, Noroozi A. Predictor factors of recycling behavior in residents of bushehr city: Application of theory of planned behavior. *Iran South Med J*. 2020;23(2):116-28.
- 14- Sadeghi S, Asadi ZS, Rakhshani T, Mohammadi MJ, Azadi NA. The effect of an educational intervention based on the Integrated Behavior Model (IBM) on the waste separation. *Clin Epidemiol Glob Health*. 2020;8(2):576-80.
- 15- Huang M, Law KMY, Geng S, Niu B, Kettunen P. Predictors of waste sorting and recycling behavioural intention among youths: Evidence from Shenzhen, China and Turku, Finland. *Waste Manag Res*. 2022;40(6):721-35.
- 16- Shen L, Si H, Yu L, Si H. Factors influencing young people's intention toward municipal solid waste sorting. *Int J Environ Res Public Health*. 2019;16(10):1708.
- 17- Wunder S, Van Herpen E, McFarland K, Ritter A, Van Geffen L, Stenmarck A, et al. Policies against consumer food waste: Policy options for behaviour change including public campaigns. Europe: REFRESH; 2019.
- 18- Wang S, Wang J, Yang S, Li J, Zhou K. From intention to behavior: Comprehending residents' waste sorting intention and behavior formation process. *Waste Manag*. 2020;113:41-50.
- 19- Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50(2):179-211.
- 20- Visschers VHM, Wickli N, Siegrist M. Sorting out food waste behaviour: A survey on the motivators and barriers of self-reported amounts of food waste in households. *J Environ Psychol*. 2016;45:66-78.
- 21- Ng PY, Ho PL, Sia JKM. Integrative model of behavioural intention: The influence of environmental concern and condition factors on food waste separation. *Manag Environ Qual*. 2021;32(3):631-45.
- 22- Stoeva K, Alriksson S. Influence of recycling programmes on waste separation behaviour. *Waste Manag*. 2017;68:732-41.
- 23- Rispo A, Williams ID, Shaw PJ. Source segregation and food waste prevention activities in high-density households in a deprived urban area. *Waste Manag*. 2015;44:15-27.
- 24- Hosseini SH, Ebrahimi AA, Dehghani Tafni A, Marvati Sharifabad MA. Citizen participation in urban waste separation from origin and its barriers (case study: City of Babol). *TOLUO-E-BEHDASHT*. 2021;19(6):15-32. [Persian]
- 25- Fahiminia M, Farzadkia M, Nazari S, Arsang Jang S, Soudabeh Matboo A, Ibrahimi A, et al. Evaluation of the status of citizen participation in municipal waste source separation plan and offering corrective strategies. *Qom Univ Med Sci J*. 2013;7(5):66-72. [Persian]
- 26- Hu J, Tang K, Qian X, Sun F, Zhou W. Behavioral change in waste separation at source in an international community: An application of the theory of planned behavior. *Waste Manag*. 2021;135:397-408.
- 27- Yuriev A, Boiral O, Guillaumie L. Evaluating determinants of employees' pro-environmental behavioral intentions. *Int J Manpow*. 2020;41(7):1005-19.
- 28- Zhang B, Lai KH, Wang B, Wang Z. From intention to action: How do personal attitudes, facilities accessibility, and government stimulus matter for household waste sorting? *J Environ Manage*. 2019;233:447-58.
- 29- Bhatti SH, Saleem F, Zakariya R, Ahmad A. The determinants of food waste behavior in young consumers in a developing country. *Br Food J*. 2023;125(6):1953-67.
- 30- McCarthy B, Liu HB. Food waste and the 'green' consumer. *Australas Mark J*. 2017;25(2):126-32.