EVALUATION OF THE EFFECTIVENESS OF HOSPITAL RECYCLING PROGRAM FOR IMPROVING NURSES' RECYCLING BEHAVIOURS

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ABSTRACT

Purpose: To evaluate the effect of the Hospital Recycling Program conducted for the wastes generated during the practice of nurses on the recycling behavior and waste amounts of the nurses.

Material and Methods: A quasi-experimental study with a pre-test and post-test control group was conducted with 64 nurses. Data were collected by the Nurse Descriptive Characteristics Form, Recycling Scale for Sustainable Hospital, and Unit Waste Registration Form. The Hospital Recycling Program based on the Theory of Planned Behaviour was applied to the intervention group.

Results: The Hospital Recycling Program had a positive effect on attitudes/behavior intention, and recycling behavior scores of nurses in the intervention group; the amount of recyclable waste was significantly increased compared to the control group (p<0.05). It was found that perceived behavioral controls of all nurses affected the intention to recycle and the Hospital Recycling Program had a significant effect on the attitudes of the nurses in the intervention group (p<0.05).

Conclusion: The Hospital Recycling Program based on the Theory of Planned Behaviour has a positive effect on the recycling behaviors of the nurses and the amount of recyclable waste.

Keywords: attitude, hospitals, intention, nurse, recycling.

INTRODUCTION

Today, one of the most important causes of environmental pollution is the increase in the amount of waste. Hospitals are open 365 days, 7 days a week, twenty-four hours a day, because they offer hotel services, restaurants, and office services as well as clinical services and there are too many employees, they are also among the places where intensive waste production as well as energy and water consumption (1, 2). Sterile procedures, surgeries, patient hygiene, and numerous other services require a wide range of materials that are contaminated or disposable, even if they are opened and not used (3). Particularly among the nursing care activities, many wastes that can be recycled and non-recyclable are produced during drug treatment/drug procedures (4). Given that nurses often represent the majority of employees in a hospital and participate directly in patient care, the fact that they are an important source of consumer and waste producer is emerging (5-7).

Nurses have professional responsibilities for waste management (2). Studies show that nurses have low levels of knowledge/practice on environmental protection, rational use of resources and waste management practices (8, 9). In particular, there is
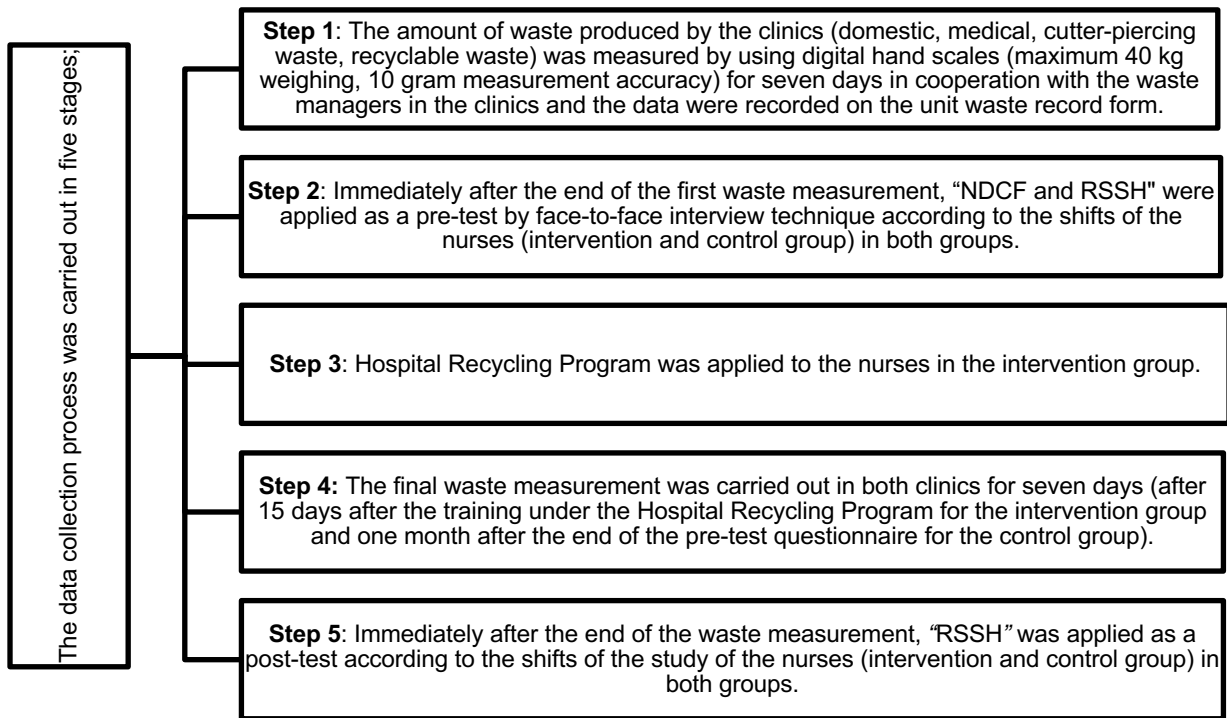
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The data collection process was carried out in five stages;

Step 1: The amount of waste produced by the clinics (domestic, medical, cutter-piercing waste, recyclable waste) was measured by using digital hand scales (maximum 40 kg weighing, 10 gram measurement accuracy) for seven days in cooperation with the waste managers in the clinics and the data were recorded on the unit waste record form.

Step 2: Immediately after the end of the first waste measurement, "NDCF and RSSH" were applied as a pre-test by face-to-face interview technique according to the shifts of the nurses (intervention and control group) in both groups.

Step 3: Hospital Recycling Program was applied to the nurses in the intervention group.

Step 4: The final waste measurement was carried out in both clinics for seven days (after 15 days after the training under the Hospital Recycling Program for the intervention group and one month after the end of the pre-test questionnaire for the control group).

Step 5: Immediately after the end of the waste measurement, *"RSSH"* was applied as a post-test according to the shifts of the study of the nurses (intervention and control group) in both groups.

Figure 1. Data Collection Stages

evidence that there are problems with effective recycling practices and the separation of waste at the source (7,10). To reduce the risk of disease transmission, nurses dispose of some of the waste in domestic waste and recycling and unnecessarily waste them into medical waste bags. The inclusion of recyclable wastes in domestic waste and medical wastes brings economic and environmental burdens, so the separation of wastes at the source is important (9-11). However, it is stated that nurses are generally unaware of waste and energy costs (12). However, nurses need to be an active part of cost-effective efforts (13).

Nurses should be involved in waste management practices to improve environmental sustainability in health care (5, 6). Since environmental problems cannot be solved only by technology and laws, individual behavior changes are required. There should also be a change in knowledge and attitude for behavior change. Developing a positive attitude towards the environment is possible with environmental education (14). Environmental education aims to increase the awareness of the individual about environmental problems (15). Theory-based studies need to be conducted and tested to understand the mechanism responsible for recycling behavior. In this context, in many studies,

the Theory of Planned Behavior (TPB) has been successfully applied to understand the behavior of recycling (16-18). In our country, it is determined that studies on recycling behavior are concentrated in educational sciences and there is no study on nursing (19-21). For a sustainable future, it is important to explain the recycling behavior of nurses based on the model (16). Supporting nurses with a professional and motivating approach is thought to positively affect their recycling behavior. It is thought that nurses who are role models in hospitals will improve their recycling behaviors and contribute to gaining these behaviors in student nurses. This study aimed to evaluate the effect of the Hospital Recycling Program prepared by the researcher on the recycling behavior of the nurses and their waste amounts.

MATERIAL AND METHODS
Design
The study was conducted as a quasi-experimental study with a pre-test, and post-test control group.The research hypotheses were:
-H_1: The Hospital Recycling Program affects the recycling behaviors of nurses.
-H_1: The Hospital Recycling Program affects the amount of recyclable waste in the clinic.

Table 1. Distribution of Nurses in the Intervention and Control Group by Descriptive Characteristics

Characteristics		Intervention (n = 32)	Control (n = 32)	Total (n = 64)	*Test value* *p*
Age (year)	*Min-Max (Median)*	23-49 (33.5)	23-58 (35)	23-58 (34)	*t=-0.473*
	x̄±SD	33.97±6.74	34.88±8.48	34.42±7.62	*[a]p =0.638*
Gender	**Female**	31	31	62	*χ²=0.001*
	Male	1	1	2	*[b]p =1.000*
Marital status	**Married**	14	20	34	*χ²=2.259*
	Single	18	12	30	*[c]p= 0.133*
Education	**University**	25	30	55	*χ²=3.232*
	Graduate	7	2	9	*[b]p =0.148*
Professional working time (year)	*Min-Max (Median)*	1-30 (10)	1-36 (12)	1-36 (10)	*t=-0.624*
	x̄±SD	11.17±7.49	12.44±8.70	11.80±8.08	*[a]p =0.535*
Department	**Clinic**	13	12	25	*χ²=2.127*
	Intensive care	9	14	23	*[c]p =0.345*
	Operating room	10	6	16	
Professional position	**Clinic nurse**	18	21	39	*χ²=1.363*
	Supervisor nurse	1	2	3	*[a]p =0.562*
	Other	13	9	22	
Membership in the environmental group	**Yes**	1	2	3	*χ²=0.350*
	No	31	30	61	*[b]p =1.000*
Thinking that nurses should take an active role in protecting environmental health	**Yes**	27	28	55	*χ²=0.129*
	No	5	4	9	*[b]p =1.000*
Evaluation of hospital recycling activities	*Min-Max (Median)* *x̄±SD*	*1-7 (3)* 3.09±1.61	*1-7 (4)* 4.03±1.71	*1-7(4)* 3.56±1.72	*Z=-2.158* *[e]p =0.031**

[a]Student t Test. [b]Fisher's Exact Test. [c]Pearson Chi-Square Test. [d]Fisher Freeman Halton Test. [e]Mann Whitney U Test
*p<0.05

Place and Time of Study
The study was conducted between June 2017 and February 2018 at a University Medical Faculty Hospital General Surgery and Cardiovascular Surgery Clinics (service, intensive care, and operating room).

Sample
The sample of the intervention group consisted of nurses at the Cardiovascular Surgery Clinic and the control group at the General Surgery Clinic. Because of the high number of recyclable medical products in these clinics, nurses working in these units were sampled and randomly determined. The most intensive clinics of the hospital in terms of patient circulation and working nurse were selected. The nurses here were chosen because they would

support the researcher in data collection.The study sample was composed of 64 nurses based on a confidence interval of 95%, moderate effect size (d=0.50), and a statistical power of 80%. The study was started with 72 nurses and was completed with 64 nurses (intervention = 32, control = 32) due to health problems and unit change. Power analysis (G*Power v3.1.7) made at the end of the study showed a statistical power of 81% based on a confidence interval of 95%.
Inclusion criteria. Voluntary nurses working in cardiovascular and general surgery clinics who accepted to participate in the study were included in the study.
Exclusion criteria. Nurses who were leaving work, on sick leave, on annual/unpaid leave were excluded from the study.

Table 2. Evaluation of Recycling Scale for Sustainable Hospital Sub-Dimension and Scale Scores By Groups

Sub-dimensions		Intervention (n = 32) Median/ x̄±SD	Control (n = 32) Median/x̄±SD	Test value　p
1. Attitude	Pretest	6.1	6.4	
	Posttest Point difference	6.7 0.73±0.63	6.6 0.25±0.57	Z=-3.213 ᵉp =**0.001****
2. Behavior results	Pretest	7	7	
	Posttest Point difference	7 0.20±0.50	7 0.17±0.45	Z=-0.195　ᵉp=0.846
3. The importance of the results of behavior	Pretest	7	7	
	Posttest Point difference	7 0.18±0.46	7 0.07±0.31	Z=-0.904　ᵉp=0.366
4. Subjective norm	Pretest	5.5	6.5	
	Posttest Point difference	6 0.73±1.45	7 0.41±0.93	Z=-1.296　ᵉp=0.195
5. Perceived expectations	Pretest	5.4	5.6	
	Posttest Point difference	6.2 0.63±1.34	6.1 0.29±0.95	Z=-0.949　ᵉp=0.343
6. The importance of expectations	Pretest	6.1	6	
	Posttest Point difference	6.7 0.62±1.57	6.8 0.46±1.30	Z=-0.189　ᵉp=0.850
7. Perceived behavior control	Pretest	4.88±1.02	5.19±1.19	
	Posttest Point difference	5.70±1.10 0.81±1.26	5.24±1.11 0.05±1.18	t=2.479　ᵃp= **0.016***
8. Perceived conditions/situations	Pretest	4.55±1.02	5.16±0.89	
	Posttest Point difference	5.59±0.52 1.04±1.01	5.21±0.91 0.05±0.91	t=4.101　ᵃp=**0.001****
9. Facilitating conditions/ situations	Pretest	6.3	6.3	
	Posttest Point difference	6.3 0.28±0.66	6.3 -0.01±0.42	Z=-1.926　ᵉp=0.054
10. Behavior intention	Pretest	6	6	
	Posttest Point difference	7 0.96±1.15	7 0.40±0.88	Z=-2.053 ᵉp=**0.040***
11. Recycling behavior	Pretest	5	5.8	
	Posttest Point difference	6.2 1.25±1.72	6 0.29±1.11	Z=-2.184 ᵉp=**0.029***
Scale Total	Pretest	5.64±0.50	5.93±0.49	
	Posttest Point difference	6.32±0.27 0.68±0.52	6.15±0.44 0.22±0.39	t=3.947　ᵃp=**0.001****

ᵃ*Student t Test* ᵉ*Mann Whitney U Test. *p<0.05. **p<0.01*

Data Collection Tools
Nurse Descriptive Characteristics Form (NDCF):
The form consisted of 10 questions that were developed in light of the relevant literature (20, 22).
Recycling Scale for Sustainable Hospital (RSSH): Tekkaya et al. (2011), the 7-point Likert-type scale, created according to TPB, is intended to determine the recycling behavior of university students on campus and consists of 11 sub-dimensions and 90 questions (20). The average score for the scale sub-dimensions was obtained by summing all the items in the sub-dimension and dividing by the total number of items. The mean score for the whole scale was obtained by summing all items in the scale and dividing it by the total number of items. Negative expressions (4 items) were reverse coded. Some expressions in the Perceived Expectations and Importance of Expectations sub-dimensions were changed with the permission of the scale owner as the study was conducted in the hospital environment: university management=hospital management, faculty members=nursing, services directorate, responsible nurses, campus=hospital. The Recycle Behavior sub-dimension included a blue wrap, glass vial, IV bag, medical packaging, and oxygen mask (Cronbach's Alpha coefficient = 0.83). Cronbach's Alpha coefficient values of each sub-dimension were calculated in the original scale, and no calculation was made for the scale total. In this study, Cronbach's Alpha coefficient of the scale was calculated as 0.92 in the pre-test.Cronbach's Alpha coefficient values are as follows: the attitude (original:0.87, this study: 0.89), behavior results (original:0.93, this study: 0.94), the importance of the results of the behavior (original:0.95, this study: 0.96), subjective norm (original: 0.67, this study: 0.75), perceived expectations (original:0.89, this study: 0.86), the importance of expectations (original:0.92, this study:0.96), perceived behavior control (original:0.72, this study: 0.77), perceived conditions/conditions (original: 0.76, this study: 0.75), facilitating conditions/situations (original: 0.92, this study: 0.83), behavior intention (original: 0.93, this study: 0.94),recycling behavior (original:0.90, this study: 0.80) (20).
Unit Waste Registration Form: The form was developed considering the relevant literature (23). It is a form in which seven-day measurements of the unit name, collector and waste types (domestic, medical, sharp-drilling, recyclable) are written.

Data Collection
Figure 1 presents data collection stages.

Implementation of Hospital Recycling Program
The content of the program consists of seven interference packages;
1. Recycling Training for Nurses: The training (individual or group) was conducted with 8 different groups interactively with 45 minutes PowerPoint presentation, video demonstration and 15 minutes discussion on the subject (a total of one hour, one time). Nurses were allowed to express their concerns and ask questions. In the presentation of 51 slides prepared by scanning the literature; waste management, legal responsibilities in waste management, the definition of recycling, benefits of recycling, recyclable medical materials, examples of recycling practices in hospitals around the world, nurses' responsibilities in recycling practices are included (7, 9, 10-12, 23-25).
2. 'Support recycling you too' Video: It was taken by the researcher with the technical support of a University Information and Communication Technologies Application and Research Center to emphasize the professional responsibilities of nurses and to realize the institutional impact on subjective norms. In this video, a member of the Department of Cardiovascular Surgery, head nurse and nurse responsible for intensive care unit, an environmental engineer working in the hospital environmental management unit, director of Environmental Problems Application and Research Center of our university, dean of nursing faculty, thesis supervisor and thesis student were included and the messages which were determined in line with the literature and thought to increase the sensitivity to recycling in hospitals were included. The video duration was 4.36 seconds. Watching the video during the training nurses were encouraged to recycle.
3. Recycling Board, Posters, and Brochures: The board was formed from recyclable medical materials (blue wrap, oxygen mask, intravenous bag, medical packaging material, glass vial) for use in training. It was aimed that the nurses could identify the recyclable materials and examine the recycling codes. Nurses were given a plastic code list with recycling numbers (23). Posters obtained from environmental non-governmental organizations were hung in the treatment and restrooms of the nurses for reminding and warning.

Table 3. Model Fit Indexes and Interpretation

Compliance index	Evaluation criteria	Values of the model in this study	Conformity in this study
χ2	0≤χ2 ≤2df	8.78	Good
p value	0.05≤p≤1.00	0.19 (p >0.05)	
χ2 /df	0≤χ2 /df≤2	8.78/6 (1.46)	Good
RMSEA	0.05≤RMSEA≤0.10 (Acceptable)	0.086	Acceptable
CFI	0.95≤CFI≤0.97 (Acceptable)	0.93	-
GFI	0.95≤GFI≤1.00 (Good)	0.96	Good

RMSEA: Root Mean Square Error of Approximation, CFI: Comparative Fit Index, GFI: Goodness of Fit Index

4. The slogan of the Hospital Recycling Program: Inspired by literature, the following slogan created by the researcher was used in the video and on cloth bags (26). The slogan was "Economically sustainability, Ecologically sensitive, Socially sensitive for Nursing Applications Support Recycling You Too".

5. Recycling Reminder Badge: It was prepared by the investigator collecting the vial caps from the cardiovascular surgery clinic.

6. Supply and Increasing the Number of Recycle Bins: As it was found out that there were no recycle bins in the operating room, 7 recycle bins were placed in the operating room and an additional one was placed in the service and intensive care units. Also, waste battery boxes obtained from an environmental non-governmental organization were placed in the common room used by the operating room and intensive care nurses.

7. Encouragement of behavior: A stimulating environment was created for the nurses by using educational materials (posters, brochures, recyclable medical equipment board, plastic recycling code list) that contain information parallel to the content of the program. At the end of the training, nurses, brochures obtained from environmental non-governmental organizations, pencils (larch seed, obtained from recycling), a notepad, a reminder name badge, a cloth bag with the slogan of the program, booklet created in 2015 by a University Environmental Problems Application and Research Center distributed for motivation purposes.

While the program was applied to the intervention group, no intervention was applied to the control group. Routine hospital operation continued.

Statistical analysis
SPSS 20.0 software, LISREL 8.8 software for path analysis, and G-Power software for power analysis were used for data analysis. Numbers, percentages, mean, median, minimum, maximum, and standard deviation values were used to evaluate descriptive characteristics. The suitability of the data for normal distribution was determined by Shapiro-Wilk's test. Data were evaluated by Student t-Test, Mann Whitney U test, Wilcoxon Signed Ranks, Pearson Chi-Square test, Fisher-Freeman-Halton (post hoc Bonferroni method) test, and Fisher's Exact test. Confirmatory factor analysis was performed to assess the compatibility of the model, p<0.05 was considered significant.

Ethical considerations
Ethical approval was obtained from the Clinical Research Ethical Committee of a University Medical School Research and Training Hospital (Dated 30.05.2017 and No:17-5.2/20). Written permission was obtained for conducting the study in the same hospital (dated 29.06.2017 and No:69631334-302.99) and from the researchers who developed the scale used in the study. Verbal and written informed consent were obtained from nurses included in the study. The research conforms to the provisions of the Declaration of Helsinki (as revised in Brazil 2013).

RESULTS
Activities for the Environment and Personal Information of Intervention and Control Group Nurses
It was found that nurses in the intervention and control groups were similar in terms of personal information and environmental activity characteristics (p>0.05). It was found that nurses in the intervention group found the recycling activities in the hospital less adequate (p<0.05) (Table 1).

Recycling Behavior of Nurses in the Intervention and Control Group

Table 4. Distribution of Waste Amount of the Intervention and Control Group (kg**)**

Waste Types		Intervention Group (n=32)	Control Group (n=32)	Between Groups Test value
		$\bar{x}\pm SD$	$\bar{x}\pm SD$	
Domestic waste	Pretest Posttest	23.49±16.56	33.23±27.89	$Z=-0.616. ^{e}p = 0.538$
		22.80±17.12	31.24±26.80	$Z =-0.968 ^{e}p = 0.333$
	In-group	$^{g}p = 0.543$	$^{g}p = 0.476$	
	First-Last waste difference	-0.69±8.47	-1.99±8.23	$Z =-0.013 \quad ^{e}p =0.990$
Medical waste	Pretest Posttest	115.09±74.03	112.27±41.74	$Z=-0.541 \quad ^{e}p =0.589$
		57.33±27.37	100.85±23.07	$Z=-4.138 \quad ^{e}p =\bm{0.001}$**
	In-group	$^{g}p = \bm{0.001}$**	$^{g}p = 0.244$	
	First-Last waste difference	-57.76±53.07	-11.42±35.31	$Z=-2.956 \quad ^{e}p =\bm{0.003}$**
Sharp waste	Pretest Posttest	9.83±7.64	8.62±5.08	$Z=-0.050 \quad ^{e}p =0.960$
		12.12±3.87	12.81±7.25	$Z=-0.176 \quad ^{e}p = 0.860$
	In-group	$^{g}p =0.224$	$^{g}p = \bm{0.012}$*	
	First-Last waste difference	2.29±7.19	4.19±7.01	$Z=-0.138 \quad ^{e}p = 0.890$
Recyclable waste	Pretest Posttest	2.14±1.77	2.26±0.65	$Z=-1.287 \quad ^{e}p =0.198$
		6.45±3.97	2.30±0.79	$Z= -3.400 \quad ^{e}p =\bm{0.001}$**
	In-group	$^{g}p =\bm{0.002}$**	$^{g}p =0.730$	
	First-Last waste difference	4.30±3.73	0.04±0.92	$Z=-3.446 \quad ^{e}p = \bm{0.001}$**

^{e}Mann Whitney U Test. ^{g}Wilcoxon Signed Ranks. *p<0.05. **p<0.01

As seen in Table 2, the attitude, perceived behavior control, perceived conditions/conditions, behavior intention, recycling behavior dimensions and total scale scores of the intervention group were significantly higher than the control group after the Hospital Recycling Program (p<0.05). Behavior results, the importance of the results of the behavior, subjective norm, perceived expectations, the importance of expectations, and facilitating conditions/situations subscale scores were not significantly different in the intervention and control groups (p>0.05).

Comparison of Recycling Behavior of Nurses in Intervention and Control Groups with Path Analysis

In order to evaluate the effectiveness of the TPB-based Hospital Recycling Program, a model was established by Path Analysis by taking the RSSH post-test scores of all nurses in the intervention and control groups and the model was found to be in good agreement (Table 3).

In Model 1, the direct impact of the Hospital Recycling Program on attitude, subjective norm, perceived behavioral control, intention, and behavior; the direct effect of attitude, subjective norm, perceived behavioral control on intention; the direct effect of perceived behavioral control on behavior and the direct effect of intention on behavior were evaluated together. It was found that Hospital Recycling Program (β=2.14, S.E= 5.57) had a significant effect on attitude (p<0.05), but it did not directly affect subjective norm (β=-1.71, S.E.=5.57), perceived behavioral control (β=1.64, S.E.=5.57), intention (β =0.96, S.E.=7.87) and behavior (β=0.75, S.E.=5.57) (p>0.05). It was determined that perceived behavioral control (β=0.94, S.E.=5.57) and intention (β=1.92, S.E.=5.57) did not affect behavior (p>0.05). Subjective norms (β=-0.08, S.E.= 7.87) and attitudes (β=1.10, S.E.=7.87) did not have a direct effect on intention (p>0.05), and perceived behavioral control (β=2.57, S.E.=7.87) had a significant effect on intention (p<0.05). 16% of the total change in the intent variable is explained by perceived behavioral control (INTENTION=0.31* PERCEIVED

BEHAVIORAL CONTROL -0.0095* SUBJECTIVE NORM +0.14*ATTITUDE+0.12*GROUP, Errorvar.=0.87, R²=0.16). 7% of the total change in attitude variable is explained by the Hospital Recycling Program (ATTITUDE=0.25*GROUP, Errorvar.=0.87, R²=0.069) (Model 1).

Intervention and Control Group Average of the amount of waste belonging to the units where nurses work

The distribution of domestic, medical, sharp, and recyclable waste amounts (kg) belonging to the intervention and control groups was shown in Table 4. It was observed that the amount of waste in the pretest was similar. In line with these results, there was no statistically significant difference between the intervention and control groups in terms of domestic and sharp waste amounts after the Hospital Recycling Program (p>0.05), and there was a statistically significant difference between the intervention and control groups in terms of the amount of recyclable and medical waste (p<0.05).

DISCUSSION
Recycling Behavior of Nurses
It was stated in the literature that nurses had very important roles in waste management in hospitals and that the positive attitude of nurses increases the success of separation practices at the source (27). Nevertheless, some studies show that nurses have negative attitudes towards waste management (28, 29). At this point, the importance of education is emphasized for proper separation of wastes in hospitals. In a study of 255 health workers in Pakistan with a pre-test-post-test-control group design conducted for 3 months; the intervention group received training on medical waste management. At the end of the training, there was a significant difference in the attitudes of the intervention group (30). Six months after the training on hazardous waste to 69 healthcare workers in Egypt, positive attitudes of participants were found to increase (31). In this study, it was determined that the Hospital Recycling Program applied to the intervention group had a positive effect on the attitudes of nurses, in accordance with the literature.
Knowing how wastes should be separated and which wastes are recyclable, the presence of recycling bins in the immediate environment contributes to the individual's perception of recycling behavior as easy (28, 32, 33). When the resources and opportunities of the individual increase or the barriers decrease, the perception of control over the behavior increases (34). In a study conducted with anesthesiologists working in private and public hospitals in Australia, New Zealand, and the UK, the greatest obstacle to recycling waste was the inadequacy of recycling bins (28). The reason for the high amount of waste in a medical center in Nigeria has been attributed to waste bins in unsuitable places and a lack of information on medical waste (33). In a study conducted with 164 healthcare workers in America, the rate of discard of glass vials in recycling bins increased from 33% to 58% after the training initiative (32). In this study, in the scope of Hospital Recycling Program, supplying and increasing the number of recycling bins, showing which medical equipment is recyclable by plastic recycling code list, and explaining the hospital samples from the world, it was ensured that nurses in the intervention group scored high on perceived behavior control and perceived conditions/situations.

Investigation of Nurse's Recycling Behavior by Path Analysis
One of the most common models used to predict and explain recycling behavior is TPB (20). In a study conducted with 163 health personnel working in a hospital in Uganda, perceived behavioral control was found to affect intent (16). In this study, in accordance with the literature, it was found that perceived behavioral control affected intent (17, 18). However, although this study did not show the effect of attitude on intention, the fact that the study was conducted experimentally shows that the effect of the initiative on attitude was achieved through the "Hospital Recycling Program". It is thought that this positive attitude will turn into behavior in the long run.

Waste Amount of Units
Considering the high amount of waste produced daily by the surgical units in hospitals, it is stated that the initiatives to be carried out regarding waste management will have a positive impact on the environment as well as reduce the waste disposal costs and contribute to the saving of hospitals (32). The studies propose the use of initiatives to reduce the amount of waste in hospitals (training, number/availability of waste bins, availability of hospital procedures, institutional support) (25). Through these initiatives, it was observed that the attitudes and behaviors of the personnel were changed the amount of medical waste was reduced,

and recycling was increased (32, 35, 36). It has been shown that the systematic separation of wastes identified as having a recycling sign in a hospital operating room in Korea can lead to a reduction in medical waste production and an increase in recyclable waste rates (36). Waste measurement was carried out for two weeks following the training initiative with the Recycling in the Operating Room Project carried out in 16 operating theaters of Harborview Medical Center in the USA. As a result, medical waste decreased by 59%, and recyclable waste increased by 19% (32). After a one-month online waste management training program conducted by the Association of Perioperative Registered Nurses with 66 perioperative employees (nurses, anesthesiologists, technicians), there was a 40.68% reduction in the amount of medical waste measured on any day (35). In this study, nurses' awareness of recycling was increased, recycling behaviors were improved and the amount of recyclable waste was increased by conducting research-specific initiatives (such as reminder badges, video) in addition to similar initiatives in the literature. Following the Hospital Recycling Program, the amount of recyclable waste increased, and the amount of medical waste decreased. It was concluded that the Hospital Recycling Program was effective in creating behavior change in nurses.

Limitations
Only the recycling step in the waste management hierarchy and the fact that it only includes nurses among health professionals constituted the limitation of the research.

CONCLUSION
The Hospital Recycling Program developed according to the Theory of Planned Behavior, has affected the attitudes of nurses, has significantly improved recycling behavior, increased the amount of recyclable waste, and reduced the amount of medical waste. However, it was a good example of how nurses could lead in project development aiming at reducing waste in the hospital. In this respect, hospitals may prefer to use this program in waste management practices. It has also enabled raising awareness about the appropriate waste segregation that provides environmental and economic benefits.
This study not only emphasizes the importance and feasibility of the implementation of an appropriate waste separation program in the surgical units in the hospital, but it is also important in terms of minimizing the cost of institutional disposal and showing what should be done to reduce the carbon footprint created by the health sector. For future research, it may be suggested to conduct research (qualitative and quantitative) to identify conditions that prevent nurses from recycling behavior, to investigate the amount of waste in internal clinics as well as surgical units, and to investigate the determinants of recycling behaviors of all healthcare workers in larger sample groups.

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