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Effects of Information Provided to University Students Through an Educational Brochure on Health Beliefs and Testicular Self-Examination

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Abstract

This study aimed to examine the effect of an educational brochure about testicular cancer and its early diagnosis on the health beliefs and self-examination of participants. The pretests/posttests were conducted in a quasi-experimental design with non-randomized groups and a control group of university students. The study recruited students enrolled in the psychological counseling and guidance department of a Turkish public university. The research sample comprised 92 students, 48 in the experimental and 44 in the control group. An educational brochure about testicular cancer and self-examination was provided to the experimental group. The data includes a personal information form, testicular cancer and health beliefs scale about testicular self-examination, and the form for self-examination. Mann Whitney U, Wilcoxon, and chi-square analyses were performed for data analysis. A significant difference was found between the scores of the experimental and control groups regarding seriousness/caring, benefit and health motivation, obstacles, and self-efficacy ($p < 0.05$). Moreover, the testicular self-examination ratio was determined as 83.3% in the experimental group and 4.5% in the control group. It can be asserted that the training brochure is effective in promoting the self-examination of testicles. It may be recommended to conduct experimental studies with larger study groups to increase testicular self-examination.

Keywords Testicular cancer · Cancer · Testicular self-examination · Early diagnosis · Brochure

Introduction

Testicular cancer is one of the most common cancers in men aged between 15–35 years, with increasing momentum. It is the third most common type of cancer in men globally for the 0–34 age group [1]. It ranks first among the most common cancer types in men aged between 15–24 in Turkey [2]. Although testicular cancer poses a severe threat to health, it is known that with early diagnosis and treatment, there is a recovery of up to 85–90%, and these also reduce morbidity [3]. It is essential to recognize the signs of cancer in the developmental period for an early diagnosis [4]. The World Health Organization emphasized the importance of early diagnosis in the treatment of cancer in its cancer guideline early diagnosis report and highlighted the importance of knowledge of the symptoms in early diagnosis [5]. It is crucial for males facing the risk factors to know the symptoms of testicular cancer adequately, recognize their own body, a possible sign of testicular cancer, and take responsibility in the early diagnosis [6].

It is considered that the first step toward treatment in the detection of testicular cancer at an early stage is testicular self-examination [4]. Although testicular self-exam (TSE) has a vital role in the early diagnosis of testicular cancer, the rate of performing TSE is not at the desired level in Turkey and globally. The rate of men performing TSE in European countries is 12.8%. The country-based studies revealed that the rates of TSEs are 23.6% in Germany, 10% in Ireland, and 9.9% in Poland. The studies conducted in the USA show that it lags behind other countries with rates between 2 and 19%, and it is 1% in Turkey [7–9].

The reasons behind the low rate of TSEs might be that individuals have a severe lack of knowledge about testicular

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cancer, they have never heard of it, do not know what to look for, have not receive any information about TSE, and are not aware that it should be done regularly every month [8, 10, 11]. Studies on the awareness of testicular cancer and TSE revealed that it is quite low, efforts to increase public awareness and education are necessary, activities to provide individuals with healthy lifestyle behaviors should be organized by health professionals, and there was a shortage in primary health care services [12, 13].

This study examines the effect of the educational brochure about testicular cancer and its early diagnosis on the health beliefs and TSE rates in university students.

Research Hypotheses

$H1_0$: There was no significant difference between the experimental and the control group regarding health beliefs.
$H2_0$: There is no difference regarding testicular self-examination.

Methods

This study was registered on 28 September 2021 on ClinicalTrials.gov with the Identifier, NCT05073198.

Study Design

The research was conducted between June 15 and July 20, 2020, with pre-tests/post-tests through a quasi-experimental design in non-randomized groups with students enrolled in a Turkish public university's Psychological Counseling and Guidance (PCG) department.

Participants

The population of the research comprises a total of 113 students, 57 (3rd-year male students 21, senior male students 36) of whom are studying in primary education and 56 (3rd-year male students 22, senior male students 34) studying in secondary education, in the Faculty of Education, PCG. While students receive daytime education in primary education, they receive evening education in secondary education. The reason behind designing the research population with the third and fourth-year students of the PCG department was that the individuals graduating from these departments play a vital role in the education provided at the school to raise awareness of the students by planning training in the required fields within coordination with the health personnel from universities or the Ministry of Health besides providing counseling services at schools. Another goal was to increase these students' awareness, support, and contribute to the health education they will perform at schools in their professional life.

Sampling and Power Analysis

The sample size was determined by Power analysis and through the two-way p-value. The G*Power program indicated that each group should have at least 39 male students with a power of 98%. Considering that there may be dropouts from the study and the sample size, 92 students who overcame the exclusion criteria and agreed to participate in the study formed the study group. A lottery was drawn for the experimental group of 48 students from the primary education (3rd-grade male student 15, 4th-grade male student 33) and 44 students from the secondary education were selected as the control group (3rd-year male student: 17, 4th-year male student: 27). The groups are similar regarding basic characteristics (Table 1).

Recruitment Criteria

Studying the PCG department and being in the 3rd–4th grades.

Exclusion Criteria

Having any previous cancer diagnosis and previous TSE training.

Procedure

The pre-tests (Personal Information Form and Health Beliefs Scale for Testicular Cancer and TSE) were applied online with the students who approved the research after the written informed consent was obtained between June 15 and June 20, 2020. The educational brochure about testicular cancer and TSE was shared online with the students in the experimental group after the pre-tests. The post-tests (Health Beliefs Scale for Testicular Cancer and Testicular Self-Examination and the information form for performing TSE) were applied online between July 15 and July 20, 2020, in the experimental and control group.

Educational Brochure About Testicular Cancer and TSE

The brochure content for testicular cancer and TSE prepared through the literature [3–5] includes information (text and illustrations) such as the definition of testicular cancer, testicular cancer risk factors, and symptoms, the importance of early diagnosis in testicular cancer, how TSE is performed, and what to do in case of differences after the examination. Expert

Table 1 Distribution of the basic characteristics of the students in the experimental and control groups

Characteristics	Mean (Min–Max)				Standard deviation			
Age								
Experiment	23.27 (21–33)				2.51			
Control	23.22 (21–26)				1.25			
	Experiment ($n=48$)		Control ($n=44$)		Total ($n=92$)		χ^2	p
	n	%	n	%	n	%		
Academic year of the students								
3rd grade	15	31.3	17	38.6	32	34.8	0.552	0.457
4th grade	33	68.8	27	61.4	60	65.2		
Nationality								
Turkısh Republıc	47	97.9	44	100.0	91	98.9	0.000[F]	1.000
Azerbaijan	1	2.1	0	0.0	1	1.1		
Marital status								
Married	3	6.3	2	4.5	5	5.4	0.000[F]	1.000
Single	45	93.8	42	95.5	87	94.6		
Land of residence								
Home	31	64.6	25	56.8	56	60.9	0.581	0.523
Dormitory	17	35.4	19	43.2	36	39.1		

[F]Fisher's Exact Test (It is used when the expected value assumption is not met in the chi-square analysis)

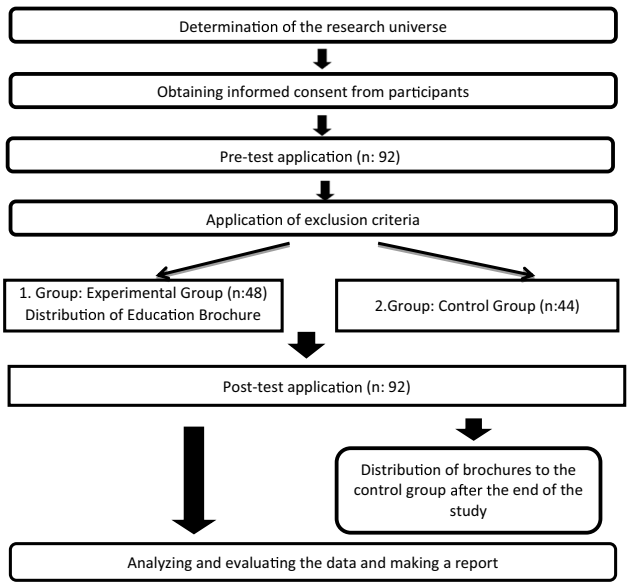

Fig. 1 Flow chart of the study

opinion was utilized from three faculty members (a professor from the Department of Urology, a professor in Public Health Nursing, and a physician faculty member) regarding the content validity of the developed educational brochure before the research (Fig. 1).

Measures

Personal Information Form

The form, which was prepared after the literature review [4, 14] to be applied in the first test by the authors, comprises a total of five questions to determine the socio-demographic characteristics (age, academic year of the students, nationality, marital status, and land of residence).

Health Beliefs Scale for Testicular Cancer and Testicular Self-Examination

The scale developed the health belief model scale used in testicular cancer screenings for males to measure susceptibility, seriousness, health motivation, barriers, benefits, and self-efficacy by Avci and Altinel [15] and includes 37 items from six sub-dimensions. These were the susceptibility sub-dimension (5 items), seriousness/regard sub-dimension (10 items), benefit and health motivation sub-dimension (6 items), barriers sub-dimension (9 items), self-efficacy sub-dimension (4 items), and health motivation sub-dimension (3 items). The scale is a Likert-type scale scored from 1 to 5, and the answers to the scale are strongly agree = 5; agree = 4; undecided = 3; disagree = 2 and strongly disagree = 1. High scores indicate favorable conditions for the sub-dimensions of sensitivity, regard, health motivation, benefits, and health motivation and self-efficacy, while a negative situation for the barriers sub-dimension, indicating that they are perceived as substantial impediments. The scale does not have a total score, and each sub-dimension score

is calculated separately. It comprises 37 questions in total. The Cronbach's alpha value of the scale was determined as 0.88 in sensitivity, 0.86 in regard, 0.87 in benefit and health motivation, 0.82 in disability, 0.68 in self-efficacy, and 0.64 in the health motivation sub-dimensions.

Information Form for TSE Application

The form to be applied in the post-test asks whether individuals have done TSE or not.

Statistical Methodology

The data obtained as a result of the research were analyzed in a computer environment with SPSS 23 statistical analysis program. Statistical significance in the analyses was regarded at the $p < 0.05$ level. Mann Whitney U, Wilcoxon, and chi-square analyses were performed for data analysis.

Ethics Approval

Ethics committee approvel was received for this study (data and number: 25/12/2019–2019/14512). Another permission was obtained from the authors to use the Health Beliefs Scale for Testicular Cancer and Testicular Self-Examination. The participants were informed about the research, and they agreed to participate in this study. After the ethical post-tests were applied, the educational brochure presented to the experimental group was also provided to the control group.

Results

While there was a statistically significant difference between the post-tests of the experimental and control groups for Testicular Cancer and Testicular Self-Examination Health Beliefs Scale's Seriousness/Regard, Benefit and Health Motivation, Barriers and Self-efficacy sub-dimensions ($p < 0.05$), a statistically significant difference was not found ($p > 0.05$) for Susceptibility and Health Motivation sub-dimensions (Table 2).

The TSE application rate before the intervention of the students in the experimental group was 4.2% and 2.3% in the control group. After the intervention, 83.3% of the students in the experimental group and 4.5% of the students in the control group stated that they performed a TSE. The chi-square analysis indicates a statistically significant correlation between the post-intervention experimental group and the control group's TSE practice ($p < 0.001$) (Table 3).

Discussion

Susceptibility perceptions of the students in the experimental group increased in the post-test (Table 2). It is stated that some conditions (environmental factors, perception of health, etc.) increase the perception of susceptibility. Contemporary scholarship indicates that health education effectively increases the perception of susceptibility [16]. Moreover, a quasi-experimental study with health science students provided brochures and interactive health education and found that the susceptibility score after the intervention decreased [11]. Similar studies highlight no change in the susceptibility perception [17, 18]. The reason for the different results in this study may stem from the current pandemic period. It is thought that the pandemic period has a substantial impact on susceptibility perception, which is affected by environmental conditions.

It was found that the seriousness/regard perception of the experimental group significantly decreased in comparison to the control group (Table 2). Seriousness Perception indicates how a person perceives the severity or seriousness regarding the consequences of an illness. This perception is particularly affected by the individual's health knowledge [19]. Elmezayen and Abd El-Hay organized training for university students on TSE and testicular cancer as the students were evaluated for 6 months [18]. They founded that the perception of seriousness/regard decreased at the end of the training. The reasons for the low perception of seriousness in this study may be rooted in the information on the high rate of recovery in early diagnosis in the brochure.

It was observed that the perceptions of benefit and health motivation of the experimental group toward testicular cancer and TSE had changed positively after the training brochure (Table 2). Students think that regular TSEs will reduce the possible risks of the disease and provide benefits with an early diagnosis. The quasi-experimental studies show that the benefit sub-dimension was found to be significantly higher after interventions [17, 19]. Contemporary scholarship suggests a need for training applications for men, despite findings on the high benefit perceptions in the high-education group as the rates are still insufficient.

A decrease was observed in the experimental group's barriers perception of testicular cancer and TSEs after the training brochure (Table 2). A decrease in the perception of barriers may help the individual to develop healthy lifestyle behaviors, which is directly related to performing TSEs [19]. Similar quasi-experimental studies show that the perceived barrier sub-dimension decreased significantly after the training provided [17, 20]. It is thought that the training brochure helps reduce the barrier perception caused by lack of information and also impediments caused by the forgetting factor, as it is a visual reminder.

Table 2 Distribution of testicular self-examination health beliefs scale sub-dimension scores of students in the experimental and control groups by pre-test and post-test measurements (n: 92)

	Pre-Test			Post-Test			Intra group	
	x ± ss	Median (25–75%)	Min–Max	x ± ss	Median (25–75%)	Min–Max	Z^b	p
Susceptibility								
Experiment	8.69 ± 4.038	8. 00 (5–10)	5.00–19.00	9.15 ± 3.294	8.00(7–10)	5.00–19.00	–1.400	0.162
Control	8.05 ± 2.778	8.50 (5–10)	5.00–14.00	8.14 ± 2.742	8.50(5–10)	5.00–14.00	–0.816	0.414
Difference between groups		Z^a = –0.267 p = 0.789			Z^a = –1.142 p = 0.254			
Seriousness/regard								
Experiment	26.73 ± 9.651	30.00(22.5–34)	10.00–47.00	24.69 ± 9.290	23.50(15.5–32)	10.00–47.00	–1.609	0.108
Control	27.95 ± 8.383	30.00(23.5–34)	10.00–38.00	28.45 ± 7.804	30.00(26–34)	10.00–40.00	–0.051	0.959
Difference between groups		Z^a = –0.573 p = 0.567			Z^a = –1.975 p = 0.048*			
Benefit and health motivation								
Experiment	21.58 ± 6.791	24.00(20.5–26)	6.00–28.00	28.52 ± 2.658	29.00(27–30)	22.00–40.00	–5.672	0.000*
Control	22.39 ± 5.482	23.50(21–26)	6.00–29.00	22.77 ± 4.931	24.00(21–26)	6.00–29.00	–0.724	0.469
Difference between groups		Z^a = –0.004 p = 0.997			Z^a = –6.653 p = 0.000*			
Barriers								
Experiment	22.88 ± 7.908	24.00(17–27.5)	9.00–40.00	14.38 ± 4.446	13.00(12–15)	9.00–27.00	–5.080	0.000*
Control	23.68 ± 7.745	25.00(17–29)	9.00–41.00	23.82 ± 7.118	25.50(17.5–29)	9.00–41.00	–0.051	0.959
Difference between groups		Z^a = –0.558 p = 0.577			Z^a = –6.318 p = 0.000*			
Self efficacy								
Experiment	9.85 ± 4.491	9.00(7–12)	1.00–22.00	18.9 ± 2.176	20.00(18–20)	10.00–22.00	–5.786	0.000*
Control	9.84 ± 4.080	8.50(8–12)	4.00–18.00	9.61 ± 3.877	8.00(8–12)	4.00–18.00	–0.730	0.465
Difference between groups		Z^a = –0.107 p = 0.915			Z^a = –7.914 p = 0.000*			
Health motivation								
Experiment	10.33 ± 3.062	11.00(8–12)	3.00–15.00	11.92 ± 2.797	12.00(10–14)	6.00–20.00	–2.940	0.003*
Control	10.57 ± 2.618	11.00(10–12)	4.00–15.00	11.18 ± 2.326	11.00(10.5–12.5)	5.00–16.00	–1.633	0.102
Difference between groups		Z^a = –0.024 p = 0.981			Z^a = –1.173 p = 0.241			

Za, Differences between groups (Mann Whitney U Test); Zb, Intra-group differences (Wilcoxon Test); * $p < 0.05$

Table 3 The students in the experimental and control groups performing TSE

		Pre-Test		Post-Test		İntra groups
		n	%	n	%	
Experiment						
Yes		2	4.2	40	83.3	p^a = 0.000*
No		46	95.8	8	16.7	
Control						
Yes		1	2.3	2	4.5	p^a = 1.000
No		43	97.7	42	95.5	
Between groups	x^2	0.000[F]		57.436		
	p	1.000		0.000*		

[F]Fisher's Exact Test (It is used when the expected value assumption is not met in the chi-square analysis.)

* $p < 0.05$ (Statistically significant); p^a, Mc Nemar analysis (intra group)

An increase was observed in the experimental group's self-efficacy perception of testicular cancer and TSEs after the training brochure (Table 2). Perception of self-efficacy motivates the individual to believe that one can carry out an action and will get a positive result when it is performed [20, 21]. Thus, the individual can develop a healthy lifestyle behavior, which is directly related to performing TSEs. Several studies found that the self-efficacy sub-dimension increased after training [11, 20, 22].

An increase was observed in the experimental group's health motivation perception of testicular cancer and TSEs after the training brochure (Table 2). The perception of health motivation reveals the state of intention and desire that enables the individual to take action to improve one's health and exhibit positive health behaviors [23]. Studies show that the training provided has a positive effect on health motivation [17, 24].

There was a statistically significant difference between the experimental and the control group on performing TSEs after the educational brochure about testicular cancer and TSE ($p < 0.001$)(Table 3). It is argued that the information provided by health professionals in a simple and professional format encourages positive behavioral change regarding health [12]. It was stated in a randomized controlled experimental study that the TSE education provided to young people positively affected their self-examination behaviors [25]. The previous studies on TSE conducted with university students revealed that the interventions significantly increased the probability of performing a TSE [11, 17]. It was also asserted that men need TSE training, and the rate of performing a TSE has increased with training. The results indicate that the rate of performing a TSE increased after the training brochure, which coincides with the literature.

Limitations

This study cannot represent all men, as it was conducted on men representing a limited region affiliated with a university. The students in the formal education were determined as the experimental group, and the students in the evening education were allotted to the control group; thus, a random assignment was not possible. This situation caused a sampling limitation. The results of the study cannot be generalized because external validity cannot be achieved. Pre-tests were applied to both groups, and it is thought that this may have caused an influence on the control group.

Conclusion

It was found that men's health beliefs were positively affected by the training brochure as it effectively increased the TSE rates.

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Declarations

Conflict of Interest The authors declare that they have no conflicts of interest.

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