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Evaluation of the Relationship between Knowledge Level and Anxiety Level of Cancer Patients with Port Catheter[1]

Port Kateter Uygulanan Kanserli Hastaların Bilgi Düzeyi ile Anksiyete Düzeyi Arasındaki İlişkinin Değerlendirilmesi

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ABSTRACT

Introduction: Complications related to port catheterization can be prevented or reduced in patients who are informed about port catheterization, and they can also experience less anxiety and fear.
Aim: This study was conducted to evaluate the relationship between the level of knowledge about port catheterization and the level of anxiety in cancer patients with port catheters, and to determine the factors affecting it.
Method: The sample of this descriptive and correlation study consisted of 136 patients receiving chemotherapy. The data was collected by the Patient Information Survey, Port Catheterization Patient Information Survey, and the Beck Anxiety Inventory.
Results: Of the patients, 15.4% received training before port catheterization and the physician gave 9.6% of the training. The total mean scores of both scales were determined 20.12 ± 2.44 for the Port Catheterization Patient Information Survey and 8.17 ± 4.85 for the Beck Anxiety Inventory. In the study, the married patients' port catheterization knowledge mean score was found to be statistically higher than that of the single patients, and the difference was significant ($p < 0.05$). In addition, this study found no significant relationship between port catheterization knowledge and anxiety scores ($r = 0.13$; $p > 0.05$).
Conclusion: The patients' knowledge level about port catheterization was above average and their anxiety level was mild. The level of knowledge of the patients about port catheterization did not affect their anxiety levels. Nurses need to consider individual characteristics and disease-related variables in the education of patients with port catheters.

Keywords: Anxiety; cancer; implantable catheters; nursing.

ÖZ

Giriş: Port kateterizasyonu konusunda bilgilendirilen hastalarda port kateterizasyonuna bağlı gelişebilecek komplikasyonlar önlenebilir veya azaltılabilir, ayrıca hastaların daha az anksiyete ve korku yaşamaları sağlanabilir.
Amaç: Bu araştırma port kateteri olan kanser hastalarının port kateterizasyonuna ilişkin bilgi düzeyi ile anksiyete düzeyi arasındaki ilişkiyi değerlendirmek ve etkileyen faktörleri belirlemek amacıyla gerçekleştirildi.
Yöntem: Tanımlayıcı ve ilişki arayıcı tasarımdaki bu çalışmanın örneklemini kemoterapi tedavisi gören 136 hasta oluşturdu. Araştırma verileri Hasta Bilgi Formu, Beck Anksiyete Ölçeği ve Port Kateterizasyonu Hasta Bilgi Formu ile toplandı.
Bulgular: Hastaların %15,4'ü port kateterizasyon öncesi eğitim aldığını ve eğitimlerin %9,6'sının hekim tarafından verildiğini ifade etti. Her iki ölçek toplam puan ortalamaları; Port Kateterizasyonu Hasta Bilgi Formu için 20,12 ± 2,44, Beck Anksiyete Ölçeği için 8,17 ± 4,85 olarak belirlendi. Çalışmada, evli hastaların port kateterizasyonu bilgi puan ortalaması bekar hastalara göre istatistiksel olarak daha yüksek bulundu ve aradaki fark anlamlıydı ($p < 0,05$). Ayrıca, port kateterizasyonu bilgi puanı ile anksiyete puanı arasında anlamlı bir ilişki belirlenmedi ($r = 0,13$; $p > 0,05$).
Sonuç: Hastaların port kateterizasyonuna ilişkin bilgi düzeyleri ortalamanın üzerinde ve anksiyete seviyeleri hafif düzeydedir. Hastaların port kateterizasyonuna ilişkin bilgi düzeylerinin anksiyete durumlarını etkilemediği belirlendi. Hemşirelerin port kateteri olan hastaların eğitiminde bireysel özellikleri ve hastalık ile ilgili değişkenleri göz önünde bulundurmaları önemlidir.

Anahtar Kelimeler: Anksiyete; hemşirelik; implantabl kateterler; kanser.

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Introduction

A port catheter, also known as an implanted port, is a venous access device used in patients requiring frequent or continuous chemotherapy. Port catheter insertion is an invasive procedure and is among the most commonly performed medical procedures in oncology patients (Zengin et al., 2013). The port catheter can be used to infuse a variety of drugs, transfuse fluids, collect samples from patients, and deliver total parenteral nutrition. It helps prevent discomfort and pain caused by repetitive peripheral punctures, as it transports drugs directly into the central veins and prevents corrosive and irritating substances from damaging peripheral veins. (Madabhavi et al., 2017; Li, Guo, Zhang & Kong, 2021; Işıklı, Soydaş, Önüt & Şen, 2023). Subcutaneous venous port catheters used for this purpose are frequently preferred because they are not visible outside the body, are well tolerated by the patient, have a low risk of infection, allow the patients' activities of daily living, and provide safe intravenous access (Üstüner et al., 2013; Güven, 2020). The port catheter system, which is a closed system, consists of two parts: a reservoir and a catheter. The port catheter is inserted into the opening of a pocket on the chest, arm, or abdomen. Some complications may occur during the placement or use of port catheters, which provide a great convenience for cancer patients. The most common complications are venous thrombosis, infection, and catheter dislocation (Kutlu, 2015; Li et al., 2021; Avcı, Sahin, Kılıç & Çiçek, 2022). In some studies, the incidence of early and late post-implantation complications was found to be 5.1%, 5.5% and 4.5%, 13.0%, respectively (Yanık, Karamustafaoğlu, Karataş & Yörük, 2018; Li et al., 2021).

Port catheter implantation is the responsibility of the clinician, but the placement of the catheter needle maintenance of the catheter, and initiating the necessary interventions in case of complications require a team effort the responsibility of the nurse (Kıral, Saraç, Yüksel, Salepçi & Çağlayan, 2010; Yeşil et al., 2014). Port catheter care should be provided by experienced and trained chemotherapy nurses. Only in this way, the incidence of complications can be reduced with the joint efforts of a specialist team of physicians and nurses (Yanık et al., 2018; Li et al., 2021). Before the port catheter is applied, the nurses should inform the patients and their relatives about why the catheter should be inserted, how the port catheter should be placed, what should be considered while using it, what complications and symptoms may occur, and how often the catheter care and monitoring should be performed (Oran, 2009; Avcı et al., 2022). Nurses should emphasize to the patients that it is important to inform the healthcare personnel in case of symptoms such as pain, swelling, or hematoma at the catheter site (Yeşilbalkan, 2005; Kutlu, 2015). Therefore, as in all nursing practices, nurses should be aware of all rules and responsibilities regarding the use of port catheters and should be competent and knowledgeable to provide quality care to patients.

Anxiety often occurs when patients are scheduled or hospitalized to undergo diagnostic and/or invasive procedures and affects the body's physiological reaction and perception of pain. Thus, it is important to address anxiety and fear to reduce emotional distress before and after surgery and to conduct an effective interventional procedure (Zengin et al., 2013). In the literature, patients with a high need for information are more anxious before surgery. Informing patients about the interventions to be made may help reduce preoperative anxiety in patients (Çetinkaya & Karabulut, 2010; Matthias & Samarasekera, 2012). Consistent with the available literature, the anxiety levels of the patients who applied to the hospital for the insertion of the implantable port catheter were found to be high (Karaveli, Köşgeroğlu & İlhan, 2012; Uslu, Olgun, Karanlık & User, 2019). And, the patients who were informed about the port catheter had less anxiety and fear, while the patients who were not informed were affected by the problems experienced in the early period (Uslu et al., 2019). Therefore, in the port catheterization process, considering not only the physical but also the psychosocial dimension of care and evaluating the patients holistically are important for the outcomes of care (Işıklı et al., 2023).

The studies on this subject in the literature are very limited. Further studies on this subject may be effective in increasing the awareness of nurses who care for patients with port catheters. Only knowledgeable oncology nurses can ensure that the patients they care for can act without any problems, be aware of possible complications, and understand when to notify their healthcare provider. In this way, the use of implanted port catheters may allow the maintenance of intermittent, long-term intravenous treatments and help maintain patients' quality of daily life.

Aim

This study aimed to evaluate the relationship between the level of knowledge about port catheterization and the level of anxiety in cancer patients with port catheters and to determine the factors affecting it.

Research Question

1. What is the knowledge level of patients about port catheterization?

2. What is the anxiety level of the patients?

3. Is there a difference between the level of knowledge of port catheterization and the level of anxiety according to the socio-demographic and disease-related characteristics of the patients?

4. Is there a relationship between the patients' level of knowledge about port catheterization and their anxiety level?

Method

Study Design

The design of this study is descriptive and correlational.

Setting

The study was conducted in a state hospital in Istanbul on patients who received chemotherapy treatment in an outpatient

unit between April 15 and October 15, 2021.

Research Population and Sample

The study population consisted of 145 patients with port catheters treated in the chemotherapy unit. The sampling method with a known population was used to determine the number of participants to be included. The sample size calculated with a 99% confidence interval and 0.05 margin of error was determined as at least 120 patients. The study sample consisted of 136 patients who met the inclusion criteria. Having a port catheter, being literate, speaking Turkish, being 18 years of age and older, volunteering to participate in the study, and filling out the questions in the surveys were among the study's inclusion criteria.

Data Collection Tools

Patient Information Survey: This survey consists of a total of 15 questions, including sociodemographic characteristics and disease-related characteristics of the patients.

Port Catheterization Patient Information Survey: This questionnaire was created by the researchers in light of the literature review (Yeşilbalkan, 2005; Güleser & Taşçı, 2009; Süslü, Arslan & Turan, 2012; Uslu et al., 2019), consists of a total of 23 items. Correct answers to the statements in the Port Catheterization Patient Information Survey were evaluated as "1" points, and incorrect answers as "0" points. The lowest score obtained from this form is 0, and the highest score is 23. Four items (5th, 7th, 16th, and 23rd) in the information form were reverse-scored because they contained incorrect information. A high knowledge score indicates that the patients' knowledge level regarding port catheterization has increased. To determine the clarity and relevance of the statements in the data collection form, expert opinion was obtained from five academicians who are experts in the field of internal medicine nursing. The final version of the form was given after expert suggestions and a pilot study that was conducted on 10 patients. The internal consistency coefficient of the information form was calculated with Kuderichardson Formula-20 (KR-20) and found to be 0.85.

Beck Anxiety Inventory: This scale, developed by Beck, Epstein, Brown, and Steer (1988), aims to determine the frequency and severity of anxiety symptoms experienced by individuals (Beck et al., 1988). Beck Anxiety Inventory is a Likert-type self-reporting scale consisting of 21 items, scored between 0-3. The scale evaluation is as follows; 0 points "none", 1 points "mild", 2 points "moderate", and 3 points "severe". The highest score that can be obtained from the scale is 63. The patient is asked to evaluate the symptoms "in the last week, including today". The scores obtained from the scale are evaluated as 0-7 points of "minimal anxiety/normal", 8-15 points of "mild anxiety", 16-25 points of "moderate anxiety" and 26-63 points of "severe anxiety". Although it is not certain, it is generally recommended to start medical treatment for individuals above 16 points. The treatment should be given by considering the clinical condition of the patient as well as the score obtained from the scale. The Turkish validity and reliability study of the scale was conducted by Ulusoy, Şahin and Erkman (1998), and the Cronbach alpha coefficient value of the scale was found to be 0.93. In this study, Cronbach's coefficient for the scale was 0.91, which was very high.

Table 1: Distribution of Findings on Socio-Demographic and Disease Characteristics (n = 136)

	n	%
Age		
45 years old and under	21	15.4
46-55 years	23	16.9
56-65 years	40	29.4
66-75 years	45	33.1
76 years and older	7	5.2
Mean ± SD: 59.70 ± 12.07 (Min: 31; Max: 78)		
Gender		
Male	78	57.4
Woman	58	42.6
Marital status		
Married	124	91.2
Single	12	8.8
Education		
Primary school	72	52.9
Middle school	19	14.0
High school	35	25.7
Bachelor's degree	10	7.4
Working condition		
Yes	16	11.8
No	21	15.4
Retired	54	39.7
Housewife	45	33.1
Occupation		
Self-employment	76	55.8
Officer	47	34.6
Health employee	10	7.4
Teacher	3	2.2
Income		
Income less than expenses	29	21.3
Income equal to expenses	107	78.7

Ethical Considerations

Ethical approval was received by the University Non-Interventional Clinical Research Ethics Committee (Date: 06.03.2020 and Issue:2020/38-02). Permission was obtained from hospital administrators, and approval to use the scale was also obtained from the author. The patients were informed about the study and written informed consent was provided from all patients.

Data Collection

During the treatment period, the patients were allowed to fill

Table 1 (Continues): Distribution of Findings on Socio-Demographic and Disease Characteristics (n = 136)

	n	%
Type of cancer		
Gastrointestinal system	102	75.0
Urogynecology system	18	13.2
Respiratory system	15	11.0
Hematology	1	0.8
Duration of the cancer		
Less than 1 year	30	22.1
1-3 years	66	48.5
3-5 years	27	19.9
More than 5 years	13	9.5
Treatment method		
Chemotherapy	109	80.1
Radiotherapy and Chemotherapy	27	19.9
Training before port catheterization		
Yes	21	15.4
No	115	84.6
The person providing training in port catheterization (n = 21)		
Physician only	13	9.6
Nurse only	6	4.4
Both physician and nurse	2	1.5
Encountering any problems after port catheterization		
Yes	9	6.6
No	127	93.4
Feeling safer during the treatment process after port catheterization		
Yes	126	92.6
No	10	7.4
In general assessment of health		
Perfect	13	9.6
Good	93	68.4
Middle	26	19.1
Bad	4	2.9

SD: Standart Deviation; Min:Minimum; Max:Maximum

in the surveys by adjusting the time so as not to disrupt their treatment. The patients were informed that the data would be kept confidential and not shared with anyone. It was stated it may take 10-15 minutes to fill out the questionnaires.

Data Analysis

Data were evaluated using the SPSS 21 program. In the analysis of the data, descriptive statistics, t-test, ANOVA test, Pearson correlation test, and linear and simple linear regression analysis were used. A parametric test was used because the scale skewness and kurtosis values were between +2 and -2. The difference was significant if the p-value was less than 0.05.

Results

Socio-demographic and Disease-Related Characteristics of Patients

The majority of the patients were male (57.4%), married (91.2%), primary school graduates (52.9%), and their income was equal to their expenses (78.7%). Of the sample group, 75% had gastrointestinal system cancer, 48.5% had cancer for 1-3 years, and 80.1% received chemotherapy treatment. 15.4% of the participants had received training about the port catheter before the procedure. They stated that 9.6% of the trainers were physicians and 4.4% were nurses. The majority of the patients did not encounter any problems after port catheterization (93.4%) and felt more confident in the treatment process after port catheter application (92.6%). Sixty-eight point four percent (68.4%) of the participants evaluated their general health status as good (Table 1).

Port Catheterization Patient Information Survey and Beck Anxiety Inventory Scores

The total mean score of the Port Catheterization Patient Information Survey was found to be 20.12 ± 2.44, and the total mean score of the patients on the Beck Anxiety Inventory was determined as 8.17 ± 4.85 (Table 2).

There were no significant differences between the port catheterization knowledge score and age, gender, education, occupation, and income ($p > 0.05$), except marital status ($p < 0.05$). Accordingly, the knowledge scores of married people about port catheterization (20.25 ± 2.38) were higher than those of singles (18.75 ± 2.63) (Table 3).

The anxiety level of the participants did not differ significantly according to age, gender, marital status, education, occupation, and income ($p > 0.05$). In addition, no statistically significant differences were found in the anxiety level scores of patients by the type of cancer, duration of cancer, and taking education before port catheterization ($p > 0.05$). However, the level of anxiety differs significantly according to the type of treatment; the anxiety level of patients receiving radiotherapy and chemotherapy (9.96 ± 0.25) were higher than those receiving chemotherapy (7.72 ± 4.35) (Table 4).

Anxiety levels differed significantly according to the situation of encountering any problem after port catheterization ($p <$

Table 2: Port Catheterization Patient Information Score and Beck Anxiety Inventory Score (n = 136)

	n	Min	Max	Mean	SD	Skewness	Kurtosis
Port Catheterization Patient Information Score	136	7.00	23.00	20.12	2.44	-2.366	8.107
Beck Anxiety Inventory Score	136	1.00	28.00	8.17	4.85	1.724	5.096

Min: Minimum; Max: Maximum; SD: Standard Deviation.

Table 3: Comparison of Port Catheterization Patient Information Score and Beck Anxiety Inventory Score by Socio-Demographical Characteristics of the Patients (n = 136)

	Port Catheterization Patient Information Score	Beck Anxiety Inventory Score
	Mean ± SD	Mean ± SD
Age		
45 years old and under	21.00 ± 1.34	8.80 ± 5.30
46-55 years	20.00 ± 1.85	9.43 ± 5.59
56-65 years	20.02 ± 2.28	6.69 ± 3.14
66-75 years	19.95 ± 2.52	8.31 ± 5.52
76 years and older	19.42 ± 5.56	8.00 ± 3.82
$c^{2\dagger}$	4.968	2.916
p	0.320	0.571
Gender		
Male	19.98 ± 2.53	8.00 ± 4.69
Woman	20.29 ± 2.30	8.39 ± 5.07
Z	0.828	0.259
p	0.408	0.796
Marital status		
Married	20.25 ± 2.38	8.06 ± 4.76
Single	18.75 ± 2.63	9.25 ± 5.70
$Z^{\ddagger}$	2.184	0.808
p^*	0.029*	0.421
Education		
Primary school	19.98 ± 2.82	8.37 ± 4.45
Middle school	20.10 ± 2.25	7.47 ± 4.32
High school	20.28 ± 1.94	8.22 ± 5.08
Bachelor's degree	20.50 ± 0.17	7.80 ± 7.68
$c^{2\dagger}$	0.067	0.591
p	0.995	0.902
Working condition		
Yes	20.56 ± 1.63	9.59 ± 6.06
No	20.76 ± 1.48	8.04 ± 3.16
Retired	19.64 ± 2.80	7.35 ± 0.57
Housewife	20.22 ± 2.51	8.71 ± 5.28
$c^{2\dagger}$	3.746	1.148
p	0.290	0.332
Occupation		
Teacher	20.66 ± 2.08	6.33 ± 5.50
Officer	20.50 ± 1.77	8.60 ± 3.94
Self-employment	19.87 ± 3.06	8.14 ± 4.62
Health employee	20.27 ± 1.19	7.20 ± 4.58
$c^{2\dagger}$	1.033	0.458
p	0.793	0.713
Income		
Income less than expenses	19.58 ± 2.44	7.72 ± 5.40
Income equal to expenses	20.26 ± 2.42	8.28 ± 4.70
$Z^{\ddagger}$	1.718	0.556
p	0.086	0.579

$^{\dagger}x^2$: Chi-square; ‡Z: Mann Whitney U Testi; * p < 0.05

Table 4: Comparison of Port Catheterization Patient Information Score and Beck Anxiety Inventory Score According to Disease-Related Characteristics (n = 136)

	Port Catheterization Patient Information Score	Beck Anxiety Inventory Score
	Mean ± SD	Mean ± SD
Type of cancer		
Respiratory system	20.33 ± 1.63	9.80 ± 6.15
Gastrointestinal system	20.22 ± 2.57	8.06 ± 4.70
Urogynecology system	19.44 ± 2.17	7.44 ± 0.54
Hematology	18.00 ± 0.00	7.00 ± 0.00
$X^{2\dagger}$	5.670	0.730
p	0.129	0.536
Duration of the cancer		
Less than 1 year	20.00 ± 0.53	7.70 ± 5.10
1-3 years	20.50 ± 0.31	8.25 ± 4.87
3-5 years	19.77 ± 2.53	8.44 ± 4.47
More than 5 years	19.15 ± 4.01	8.23 ± 5.35
$X^{2\dagger}$	7.099	1.334
p	0.069	0.721
Treatment method		
Chemotherapy	19.91 ± 2.62	7.72 ± 4.35
Radiotherapy and chemotherapy	20.92 ± 0.14	9.96 ± 0.25
$Z^{\ddagger}$	1.547	2.170
p^*	0.122	0.030*
Training before port catheterization		
Yes	20.66 ± 1.42	8.95 ± 6.02
No	20.03 ± 2.55	8.02 ± 4.65
$Z^{\ddagger}$	0.793	1.216
p	0.428	0.426
Encountering any problems after port catheterization		
Yes	19.55 ± 2.55	10.44 ± 3.57
No	20.15 ± 2.43	8.00 ± 4.89
$Z^{\ddagger}$	0.853	2.062
p^*	0.394	0.039*
Feeling safer during the treatment process after port catheterization		
Yes	20.19 ± 2.19	7.87 ± 4.59
No	19.20 ± 4.61	11.90 ± 0.50
$Z^{\ddagger}$	0.191	2.253
p^*	0.848	0.024*
A general assessment of health		
Perfect	20.30 ± 1.93	5.69 ± 3.68
Good	20.20 ± 2.55	8.39 ± 4.58
Middle	19.61 ± 2.41	9.15 ± 5.95
Bad	20.75 ± 0.95	4.50 ± 2.88
$X^{2\dagger}$	2.284	7.982
p^*	0.516	0.046*

†: Chi-square; ‡Z:: Mann Whitney U Testi; * p < 0.05

Table 5: The Relationship Between Port Catheterization Patient Information Score and Beck Anxiety Inventory Score (n = 136)

		Port Catheterization Patient Information Survey	Beck Anxiety Inventory
Port Catheterization Patient Information Survey	r†	1.000	0.13
	p	.	0.128
	n	136	136
Beck Anxiety Inventory	r†		1.000
	p		.
	n		136

†r: Pearson correlation

0.05). The anxiety perceptions of patients who encountered any problems after port catheterization (10.44 ± 3.57) were higher than those who did not (8.00 ± 4.89). Encountering a problem increased the anxiety perceptions of the participants (Table 4).

In the study, the level of anxiety differed significantly after the port catheter application compared to those who felt safe during the treatment process ($p < 0.05$). Patients who did not feel safe had higher anxiety levels (11.90 ± 0.50) than those who felt safe (7.87 ± 4.59). The fact that the patients did not feel safe increased their anxiety levels (Table 4).

In general, the level of anxiety differed significantly according to the assessment of health ($p < 0.05$). Accordingly, the anxiety perceptions of the patients who evaluated their health as good (8.39 ± 4.58) and middle (9.15 ± 5.95) were higher than those who evaluated their health as perfect (5.69 ± 3.68) and bad (4.50 ± 2.88) (Table 4).

In the study, when the relationship between the port catheterization patient information score and the Beck Anxiety Inventory score was examined, there was no significant relationship between the anxiety level of the patients and the port catheterization knowledge score ($r = 0.13$; $p = 0.128$) (Table 5).

Discussion

In many diagnostic and therapeutic procedures, patients' fear and anxiety levels may increase before and after the application. On the other hand, patient education reduces anxiety in patients and improves coping with stress (Uslu et al., 2019). Also, the education given in line with patient needs enables patients to better manage their diseases, cope with the disease process, reduce complications, and be more conscious and successful in their care (Çetinkaya & Karabulut, 2010). Determining the knowledge and anxiety levels of patients about port catheterization is important in the planning of education and patient care interventions in line with patient needs.

Discussion of Results of Port Catheterization Information Score

The fact that the average score obtained by the patients in the 23-question information form included in the study was 20.12 ± 2.44, indicates that their level of knowledge about port catheterization is above the average. In the study, it was found that less than a quarter of the participants received training before the port catheterization procedure and nurses did not play an active role in patient education. However, the majority of the participants did not encounter any problems after port catheterization. While the patients mostly felt safer in the treatment process after port catheter application, more than half of them evaluated their general health status as good. When similar studies are examined; Karaveli et al. (2012) indicated that 72% of the patients had knowledge about port catheters in their study on patients to whom port catheters would be applied. In another study conducted by Yeşilbalkan, Kır, Karadakovan and Uslu (2009), the knowledge of cancer patients about port catheters was insufficient (Yeşilbalkan et al., 2009). Although all members of the healthcare team are responsible for the education of the patients and their family, nurses have great responsibilities (Tan, Özdelikara & Polat, 2013; Kara & Arıkan, 2021). Similarly, according to Mercan's study (2017), port catheter training was important in the patients' compliance with treatment, and nurses, in particular, had important responsibilities. Consistent with the results obtained from our study, when the decision to insert a port catheter was given to the patients, there was no cooperation with the patients, and the patients were not informed before the procedure (Uslu et al., 2019). Similarly, in our study, nurses did not take an active role in patient education and patients were mostly informed by physicians (Demirkıran & Uzun, 2012; Soyer, Dönmez & van Giersbergen, 2018). Unlike these studies, Avcı et al. (2022) reported that 88% of the participants were informed before the insertion of the catheter, and 76.5% of them were informed by the nurses. However, the cancer patients were unable to maintain the port catheter care at home and they experienced complications that threatened their health, especially infection. It was emphasized that patients should be given hands-on training on port catheter care by trained nurses (Avcı et al., 2022). To maintain the optimal care of patients with port catheters, education should be given to the patients and their families continuously. Supporting the training given by nurses with written and visual materials is very important for the effectiveness of the training (Yeşilbalkan, 2005; Mercan, 2017). It is important to provide training in a way that patients can understand according to their needs and be supported by educational materials. In addition, nurses need to give patients confidence that they can reach them when there is a problem. This may positively affect patients' compliance with treatment and their active participation in the treatment process.

The patients should be informed before the catheter is inserted, and all risks and possibilities should be shared with the patient. If port catheter care and applications are performed by nurses who do not have sufficient knowledge and skills about them, it may cause infection and other catheter-related complications. Therefore, nurses should have sufficient knowledge and skills during port catheter care and application (Arch, 2007; Yeşilbalkan

et al., 2009). In Devrez's (2011) study, nurses' scores on port catheter use and care were very low (23.42 out of 100 points). In the same study, it was emphasized that in-service training should be given to prevent complications and increase the quality of care. In addition, written training materials should be given to patients to prevent difficulties arising from patients and written protocols should be established to provide standards and safe care to patients with port catheters (Devrez, 2011). Similarly, in a study examining complications related to port catheters in oncology patients undergoing chemotherapy treatment, it was stated that nurses should follow new developments in port catheter complications and care and improve themselves by actively participating in scientific meetings on this subject (Özyurt, 2011). Oncology nurses should be able to safely use implanted port catheters, which are frequently used in oncology patients, and to apply nursing interventions if complications develop. Therefore, nursing care should focus on interventions to prevent the development of catheter-related complications and eliminate them (Yeşilbalkan, 2005).

The results of the study there was a significant difference was found between the knowledge score of port catheterization according to marital status, and it was found married people had higher knowledge of port catheterization than single. In this case, helping and supporting each other in the care and treatment of the cancer process may have had a positive effect on the level of knowledge of the patients. Also, it was determined the knowledge level of port catheterization did not show a significant difference according to the type of cancer, treatment method, training before port catheterization, encountering any problems after port catheterization, feeling safer during the treatment process after port catheterization, and evaluating general health.

Discussion of the Results of the Beck Anxiety Inventory

Cancer diagnosis and treatments, fear of death, inability to meet self-care needs, and changes in body image may affect the patients' anxiety level and psychological state. This may adversely affect the patients' acceptance of the current disease, struggle with the disease, treatment adherence, and the patients' quality of life. In this process, nurses have important roles in determining the psychosocial problems experienced by cancer patients and in eliminating these problems (Güleç & Büyükkınacı, 2011; Traeger, Greer, Fernandez-Robles, Temel & Pirl, 2012; Yazgı & Yılmaz, 2020). In this study, the anxiety levels of the patients were mild. The fact that the majority of the patients were married and the diagnosis of cancer was made more than a year ago may have caused their anxiety levels to be low. In contrast to our study, the patients who were to be inserted with a port catheter experienced high levels of anxiety (Karaveli et al., 2012). Many studies found that the patients' fear and anxiety levels were high before and after the procedure in diagnostic and therapeutic procedures (Karadeniz, Tarhan, Yanıkkerem, Dedeli & Kahraman, 2008; Sidar, Dedeli & İşkesen, 2013). Aydoğan et al. (2012) reported that cancer patients thought of death more due to the difficult period they had experienced, and accordingly, their perception of anxiety increased.

In our study, the anxiety levels of the participants did not differ significantly according to age, gender, marital status, education, occupation, and income. Similarly, there was no significant difference in anxiety scores of patients who underwent implanted port catheters according to gender, age, occupation, education, and marital status (Karaveli et al., 2012). On the contrary, in some studies, the anxiety level of female patients was higher than that of male patients (Tokgöz et al., 2008; Karaveli et al., 2012). In the study of Göl and Aşılar (2017), the anxiety levels of patients receiving chemotherapy differed depending on their age, and their anxiety levels increased with age. Another study (Kabalak, Öztürk, Erdem & Akın, 2012) showed as the education level of the patients increased the perception of anxiety decreased.

We found that the anxiety levels of the patients did not differ significantly according to the type of cancer, duration of cancer disease, and training before port catheterization. Wondie, Mehnert and Hinz (2020) found a significant relationship between anxiety according to cancer classification, while Nordin, Berglund, Glimelius and Sjöden (2001) stated the longer the disease duration, the higher the perception of anxiety. On the other hand, Karaveli et al. (2012) reported there was no significant difference between the anxiety scores of the patients according to whether they knew the implanted port or not. In our study, patients who received radiotherapy and chemotherapy had higher anxiety levels than patients who received only chemotherapy. According to this result, the application of two different treatment methods increased the anxiety level of the patients. In addition, the anxiety levels of patients who encountered any problems after port catheterization were found to be higher than those who did not. Therefore, patients' communication with nurses in the presence of any problems and finding solutions to their problems can reduce patients' fear and anxiety. This may facilitate the self-management of patients and contribute to their feeling of safety and psychological comfort. Indeed, in our study, patients who did not feel safe during the treatment process after port catheterization were found to have higher anxiety levels than those who felt safe. Also, the anxiety levels of the patients who evaluated their health as good and moderate were higher than those whose health was excellent and bad. The feeling of well-being of the patients suggested that their response to treatment was positive and that they did not lose their hope for recovery.

Discussion of Results on the Evaluation of the Relationship Between Port Catheterization Patient Information Score and Beck Anxiety Inventory Scores

The implanted port catheter, which is a comfortable, reliable, and effective method that prevents the recurrence of venous intervention, is long-lasting, does not restrict the patients' daily life activities, is more advantageous than other catheters (Yeşilbalkan, 2005; Madabhavi et al., 2017; Işıklı et al., 2023). However, since it is under the skin, aesthetically good, and preferred by patients

due to access to the vein with a single needle attempt compared to other invasive procedures, it causes patients to experience less anxiety (Süslü et al., 2012). It was reported that some patients were anxious, afraid, and had difficulty adjusting due to pain, edema, and hematoma around the port in the early period after port catheterization. The patients who were informed about the port catheter had less anxiety and fear, while the patients who were not informed were affected by the problems experienced in the early period (Uslu et al., 2019).

The results of the present study, there was no relationship between the knowledge level of the patients about port catheterization and their level of anxiety. Accordingly, the patients' knowledge levels about port catheters did not affect their anxiety levels (Karaveli et al., 2012). A different study examining the relationship between learning needs and anxiety determined that the anxiety was moderate and there was no significant relationship between patient learning needs and anxiety levels (Özşaker, Akan, Dolgun & Dönmez, 2022). The results of these studies showed parallelism with our study. However, some studies indicated that education level reduced the anxiety levels of patients (Karaokur, 2019; Tamer, 2019). In a study (Piedda et al., 2016), giving written information (booklet) about the port catheter to the patients in the pre-implantation period was effective in reducing the physiological anxiety indicators of the patients and improving the patients' knowledge about the port catheter immediately after the implantation. On the other hand, although there was no significant difference in anxiety scores between the two groups who received education and those who did not, the anxiety scores of the patients who did not receive education were higher than those who received (Akyüz, 2012). These different results may be due to the characteristics of the patient, the diagnosis and treatment process, and the physical and psychosocial problems experienced.

Limitations

Some limitations should be considered in interpreting the findings of this study. First, the sample size was small, and the study sample was drawn from only one hospital. Therefore, the results cannot be generalized to other cancer patients. The study aimed to measure the patients' anxiety about the port catheter. However, cancer patients' anxiety or distress levels can be affected by many different factors independent of this procedure, such as side effects of treatment and fear of progression of the disease. Therefore, further studies with larger sample sizes are needed to control these factors. The limited number of studies on this subject caused another limitation in the comparison of the results.

Conclusion

The knowledge level of the patients about port catheterization was above the average score, and their anxiety was mild. It was observed that the majority of the participants did not receive training before port catheterization and physicians took more roles in training than nurses. However, most of the participants did not encounter any problems after port catheterization. In the study, the knowledge scores on port catheterization of married people were higher than those of singles. Also, the results showed patients who received radiotherapy and chemotherapy and who encountered any problems after port catheterization had higher anxiety levels. There was no significant relationship between the patients' level of knowledge about port catheterization and their anxiety levels.

It is important to provide education to patients before port catheterization (indications of the procedure, advantages, care, follow-up, etc.) and to keep informed in line with patient needs. Patient education should be planned taking into account the personal characteristics and disease processes of the patients, and appropriate education methods should be selected. Nurses should be provided to play an active role in the training of these patients. In addition, it is recommended that nurses be sensitive to possible mental problems in cancer patients.

Ethical Considerations: Ethics committee approval was received for this study from the Biruni University Ethics Committee (Date: 06.03.2020 and Issue No: 2020/38-02).

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