PREVALENCE AND FACTORS ASSOCIATED WITH CARE DEPENDENCY OF CANCER PATIENT UNDERGOING CHEMOTHERAPY

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ABSTRACT
Increasing the number of cancer patients need exploration of the impact of cancer and chemotherapy. Care dependency is one impact of chemotherapy treatment and can affect the quality of life. Therefore, the prevalence and factor associated with care dependency of cancer patients undergoing chemotherapy need to be explored. This study aimed to determine the prevalence of care dependency and correlation among depression, hemoglobin level, pain, and fatigue to care dependency of cancer patients undergoing chemotherapy. Cross-sectional study was performed. 388 cancer patient undergoing chemotherapy in Baladhika Husada Hospital Jember, Indonesia was recruited using a consecutive sampling technique. Multivariate logistic regression was used to determine the association..The age of the samples was 51.49 (± 9.71) years old. This study found 29.9% of people have care-dependent conditions. After multivariate analysis, hemoglobin, pain, fatigue, and depression were statistically significant with care dependency. Conclusion: Fatigue has the most significant influence on care dependency of cancer patients undergoing chemotherapy. Further research needs to be analyzed care dependency in cancer patients using multi-center chemotherapy service. Also, the development of nursing interventions to reduce care-dependent conditions needs to be conducted.

Keywords ***:*** *Care dependency, Cancer, Chemotherapy*

ABSTRAK
Meningkatnya jumlah pasien kanker memerlukan eksplorasi terhadap dampak kanker dan kemoterapi. Ketergantungan perawatan adalah salah satu dampak dari pengobatan kemoterapi dan dapat memengaruhi kualitas hidup. Oleh karena itu, prevalensi dan faktor yang terkait dengan ketergantungan perawatan pada pasien kanker yang menjalani kemoterapi perlu dijelajahi. Studi ini bertujuan untuk menentukan prevalensi ketergantungan perawatan dan korelasi antara depresi, kadar hemoglobin, nyeri, dan kelelahan dengan ketergantungan perawatan pada pasien kanker yang menjalani kemoterapi. Studi potong lintang dilakukan. Sebanyak 388 pasien kanker yang menjalani kemoterapi di Rumah Sakit Baladhika Husada Jember, Indonesia direkrut menggunakan teknik pengambilan sampel berturut-turut. Regresi logistik multivariat digunakan untuk menentukan hubungan. Usia sampel adalah 51,49 (± 9,71) tahun. Studi ini menemukan bahwa 29,9% orang memiliki kondisi ketergantungan perawatan. Setelah analisis multivariat, hemoglobin, nyeri, kelelahan, dan depresi secara statistik signifikan berhubungan dengan ketergantungan perawatan. Kelelahan memiliki pengaruh yang paling signifikan pada ketergantungan perawatan pasien kanker yang menjalani kemoterapi. Penelitian lebih lanjut perlu menganalisis ketergantungan perawatan pada pasien kanker menggunakan layanan kemoterapi multi-pusat. Selain itu, pengembangan intervensi keperawatan untuk mengurangi kondisi ketergantungan perawatan perlu dilakukan.

Kata Kunci : Ketergantungan perawatan, Kanker, Kemoterapi

INTRODUCTION

Cancer is a disease with a high mortality rate and increases rapidly year by year (Ferlay et al., 2015). Cancer requires complex medical treatment and a multi-dimensional approach

to care (Silver et al., 2015). Furthermore, the impact of cancer is complicated, not only physical problems but also psychological problems (Strömgren, Groenvold, Pedersen, Olsen, & Sjogren, 2002). Moreover, as one of the cancer treatments, chemotherapy can also add to the cancer patient's suffering.

Care dependency arises from the effects of cancer or chemotherapy and could affect the treatment process (Karakurt & Ünsal, 2013); Lindahl-Jacobsen et al., 2015). Furthermore, Care dependency is a key concept that needs to be analysed and predicted in cancer patients and influenced by cancer patients' quality of life (Dijkstra et al., 2015). Care dependency is a particular form of dependency. Four general meanings and aspects of dependency were identified: restricted ability to do without, relying on someone for support, abnormal condition, and subjective perspective (Boggatz, Dijkstra, Lohrmann, & Dassen, 2007). Furthermore, this dependency care can be influenced by several factors (Nursiswati, Halfens, & Lohrmann, 2017).

Fatigue, haemoglobin level, depression, and pain may affect cancer patients' care dependency undergoing chemotherapy. Fatigue is a symptom that often appears in cancer patients. Fatigue may affect the care dependency of cancer patients. Fatigue in cancer patients is caused by physiological changes and caused by psychological problems of cancer patients (Abu Obead et al., 2014). Moreover, haemoglobin in cancer patients is a factor that affects fatigue and may correlate with care dependency (Cella, Kallich, McDermott, & Xu, 2004). Haemoglobin provides oxygen and nutrients to the cell so that if the haemoglobin level is low, cell activity will be disrupted. Haemoglobin is also influenced by chemotherapy in cancer patient (Sharma et al., 2020). Another factor that may affect care dependency is pain. Revealed that the problem of cancer patients in Indonesia is pain. Pain can affect the quality of life of cancer patients (Effendy et al., 2015). Pain is defined as the patient's subjective feeling of discomfort (Herdman & Kamitsuru, 2017).

On the other hand, the psychological problems in cancer patients that often appear are depression symptoms (Effendy et al., 2015). Symptoms of depression are the impact of treatment processes, social problems, and efficacy problems of cancer patients. Depression correlates with fatigue and the ability of daily activities (Bortolato et al., 2017).

Care dependency needs special attention to examine the cancer patient condition deeply related chemotherapy. Nevertheless, there is no study exploring prevalence and influencing factors analysis of care dependency in cancer patients undergoing chemotherapy. Therefore, this study aimed to determine the prevalence of care dependency and the correlation with depression, haemoglobin level, pain, and fatigue of cancer patients undergoing chemotherapy.

METHOD

This study used a quantitative approach with a cross-sectional design. The sample in this study was cancer patients in Baladhika Husada Hospital Jember from August to October 2018. The Sample size used the formula from Bujang et al (2018). Furthermore, four factors that affect care dependency in cancer patients with chemotherapy were used, so the minimum number of respondents is 300 respondents. Moreover, to anticipate dropouts, we added 10%, so that the number of respondents was 330 patients. In this study, 388 respondents were obtained. The sampling technique utilized consecutive sampling with inclusion criteria: cancer patients with chemotherapy, aged 18-60 years; being hospitalized for at least three days. The exclusion criteria are patients who get cancer treatment other than chemotherapy, such as radiotherapy or surgery.

The Care Dependency Scale (CDS) was utilized to measure care dependency as an independent variable. The Care Dependency Scale (CDS) was initially developed in the Netherlands to assess care dependency in people with dementia. Dependency care is divided into two categories, namely, care independent and care dependent. The cut-off point of 68 is considered as the minimum limit of dependency care from patients (Amir, Kottner, Schols, Lohrmann, & Halfens, 2014). In Indonesia, CDS has good reliability results (0.88).

Furthermore, independent variables, characteristic respondent questionnaire, Brief Fatigue Inventory (BFI), Numeric Rating Scale (NRS), Beck Depression Index (BDI), and haematology analysis tools were performed. In characteristic respondents, information about age, gender, marital status, level of education, race, occupation, economic status, national health coverage, and chemotherapy duration were collected. BFI used to measure fatigue experienced by patients during the previous 24 hours, with reliability in Indonesia was 0.956 (Paramita et al., 2016). In this study, BFI was categorized by not severe fatigue (BFI score <7) and severe fatigue (BFI score 7-10. NRS was utilized to analyse pain with three categories: ≤ 5 indicated mild pain-related interference with functioning, 6 and 7 indicated moderate interference, and; ≥8 indicated severe interference18. BDI is an instrument that is often utilized in the research of depression in Indonesia context with a high-reliability score (0.87). The depression category uses BDI total scores. If the score> 17 was categorized as depression, and if <17 is not depressed (Ginting, Näring, Van Der Veld, Srisayekti, & Becker, 2013). Moreover, for haemoglobin analysis tools, Emerland CELL-DYN type and number S / N 030914-005650 was utilized. Classification for haemoglobin status used the ROC method. The ROC results show that the cut-off point for haemoglobin level is.

Descriptive statistics were utilized to analyse characteristic respondents and prevalence of care dependency. Furthermore, Chi-square analysis was performed to analyse the bivariate correlation of characteristic respondents, fatigue, pain, depression, and haemoglobin level with care dependency. The results were presented as determined by the crude odds ratio (OR) and their 95% confidence interval (CI) for each factor. Multivariate logistic regression was utilized to analyse factors that influence care dependency. For parsimony, dependent variable used in multivariate models was correlation < 0.05. Multicollinearity between the independent variables was checked by using the SPSS version 22 software packages. The results were presented as adjusted odds ratio (AOR) and their 95% confidence interval (CI). Ethical approval for this research was obtained from the Institutional Review Board in the University of Jember with Number 2812/UN25.3.1/LT/2018.

RESULTS

After selected sampling by inclusion and exclusion criteria, the total of 388 among cancer patients undergoing chemotherapy of both males and females were stratified randomly selected (89 persons of males and 299 persons of females). The age of the samples was 51.49 (±9.71) years old, and 82.7% are married. This study's samples were educated to none, elementary, junior high school, senior high school, or graduate/post-graduate (11.6%, 47.2%, 18%, 14.9%, and 8.2%, respectively). More than half of them were Javanese 263 (67.8%).

Table 1 showed the prevalence of care dependency among cancer patients undergoing chemotherapy. People who have care independent was 272 (70.1%, 95% CI: 65.2 – 74.5). Furthermore, the number of people who have a care-dependent was 116 (29.9, 95% CI: 25.5 – 34.8).

Table 2 showed the crude analysis using simple logistic regression to analyse factors that statistically significant (p-value ≤ 0.05) were processed into the initial model based on simple

logistic regression. Following analyses indicated that haemoglobin, pain, fatigue, and depression were statistically significant with care dependency.

The final model of a multivariate logistic regression indicated that had haemoglobin <11 (AOR. =2.17, 95%CI 1.34 to 3.51, p=0.002), severe pain (AOR. = 1.54, 95%CI 1.14 to 2.09, p=0.005), severe fatigue (AOR. =3.59, 95%CI 1.90 to 6.78, p=<0.001), and depression (AOR. =1.71, 95%CI 1.05 to 2.79, p=0.033) were significantly associated with care dependency in representative sample. Moreover, fatigue becomes the main factor of dependency care in the cancer patient undergoing chemotherapy

Table 1. Prevalence of Care Dependency among Cancer Patient Undergoing Chemotherapy (N = 388)

Variable		Number	%	95%CI
Dependent Care	Care Independent	272	70.1	65.2 – 74.5
	Care Dependent	116	29.9	25.5 – 34.8

Table 2. Crude Odds Ratios (OR) for Each Category of Factors on Care Dependency among Cancer Patient Undergoing Chemotherapy on Simple Logistic Regression (N = 388)

Characteristics	Care dependency		OR	95%CI	P-value
	Independent (%)	Dependent (%)			
Characteristics respondent					
Age					0.929
<52	135 (49.6)	57 (49.1)	1		
>=52	137 (50.4)	59 (50.9)	1.02	0.66-1.58	
Gender					0.156
Female	215 (79)	84 (72.4)	1		
Male	57 (21)	32 (27.6)	1.44	0.87-2.372	
Marital Status					0.246
Married	229 (84.2)	92 (79.3)	1		
Unmarried	43 (15.8)	24 (20.7)	1.39	0.80 – 2.42	
Level Education					0.348
None / Elementary	164 (60.3)	64 (55.2)	1		
Junior High School / Senior High School / Graduate / Post Graduate	108 (39.7)	52 (44.8)	1.23	0.80 – 1.92	
Race					0.533
Javanese	187 (68.8)	76 (65.5)	1		
Madura/Others	81 (31.2)	40 (34.5)	1.16	0.73 – 1.84	
Occupation					0.728
No Occupation	75 (27.6)	30 (25.9)	1		
Have an Occupation	197 (72.4)	86 (74.1)	1.09	0.67 – 1.79	
Economic Status					0.711
Above Standard	195 (71.1)	81 (69.8)	1		
Bellow Standard	77 (28.3)	35 (30.2)	1.09	0.68 – 1.76	
National of Health Coverage					0.622
Yes	269 (98.9)	114 (98.3)	1		
No	3 (1.1)	2 (1.7)	1.25	0.51 – 3.09	
Duration of Chemotherapy					0.063
<2 years	240 (88.2)	94 (81.0)	1		
>=2 years	32 (11.8)	22 (19.0)	1.76	0.97 – 3.18	
Type of Cancer					0.724

Characteristics	Care dependency		OR	95%CI	P-value
	Independent (%)	Dependent (%)			
Breast	183 (67.3)	74 (63.8)	1		
Gastrointestinal	12 (4.4)	9 (7.8)	1.21	0.43 – 3.46	
Genitourinary and reproductive organ	9 (3.3)	6 (5.2)	2.25	0.60 – 8.52	
Head and neck	30 (11)	10 (8.6)	2	0.47 -8.50	
Haematology	13 (4.8)	6 (5.2)	1	0.29 – 3.45	
Lung	10 (3.7)	6 (5.2)	1.39	0.34 – 5.61	
Others	15 (5.5)	5 (4.3)	1.80	0.43 – 7.53	
Associated Factors					
Haemoglobin					<0.001
>=11	192 (70.6)	59 (50.9)	1		
<11	80 (29.4)	57 (49.1)	2.32	1.48 – 3.63	
Pain					<0.001
Mild / Moderate	243 (89.3)	80 (69)	1		
Severe	29 (10.7)	36 (31)	1.94	1.48 – 2.56	
Fatigue					<0.001
Non Severe	250 (91.9)	80 (69.0)	1		
Severe	22 (8.1)	36 (31)	5.1	2.84 – 9.20	
Depression					<0.001
No Depression	193 (71)	59 (50.9)	1		
Depression	79 (29.0)	57 (49.1)	2.36	1.51 – 3.70	

Table 3 Adjusted Odds Ratios (AOR) for Each Category of Factors on Care Dependency among Cancer Patient Undergoing Chemotherapy on Multivariate Logistic Regression (N = 388)

Variable	OR	AOR	95%CI	P-value
Haemoglobin				0.002
>=11	1	1		
<11	2.32	2.17	1.34 – 3.51	
Pain				0.005
Mild / Moderate	1	1		
Severe	1.94	1.54	1.14 – 2.09	
Fatigue				<0.001
Non Severe	1	1		
Severe	5.1	3.59	1.90 – 6.78	
Depression				0.033
No Depression	1	1		
Depression	2.36	1.71	1.05 – 2.79	

DISCUSSION

This study revealed that the prevalence of dependent care was 29.9%, and care independent was 70.1% in cancer patients undergoing chemotherapy. It is the first study related to the prevalence of dependency care in a cancer patient undergoing chemotherapy. Care dependency is a new concept that the literature was scarce. Care dependency is a limited ability to do without relying on support, abnormal condition, and subjective perspective. Previous studies were conducted on dementia and stroke patients. In dementia patients, looked at changes in care dependency by using numeric data from the CDS, not categorical data (Schüssler & Lohrmann, 2015).

Moreover, Nursiswati et al. (2017) utilized CDS to see care dependency on stroke patients. Nursiswati et al. (2017) revealed that care dependent in stroke patients during

admission in the hospital was 84.4%. After discharge, the dependent care was 67.9%. in another context, care dependency was 67,7% in COVID-19 patient (Vaes et.al, 2020). In this study, although the prevalence of independent care is higher than dependent care and lower in other patient's contexts , care dependency needs to be a concern in treating cancer patients with chemotherapy.

Another result revealed no relationship between respondents' care dependencies and respondent characteristics (Age, Gender, ethnicity, marital status, working status, and duration status). These results indicated that the characteristics of respondents in this study did not affect the care dependency. Results were relevant with (Dijkstra et al., 2015). They revealed that in the elderly in Germany, care dependency was not affected by age, gender, cognitive status, and activity frequency. It was caused by care dependency related to the respondent's condition rather than the patient's characteristics. Cancer is a global condition that might make changes to care dependency. Therefore, we analysed other factors related to care dependency.

Regarding associated factors, the results showed a relationship between fatigue, pain, depression, and hemoglobin with care dependency. Moreover, fatigue becomes the most affecting factor after performing multivariate analysis. Conceptually, care dependency was broader than mobility or activity. However, some research on daily living activities has been conducted. Therefore, we used the result from the activity daily living study to compare care dependencies.

Regarding fatigue, this study's results are linear with Timmerman's et al. (2015) study that daily living activity is influenced by fatigue It is based on the fact that fatigue is a symptom of energy deficiency that may limit cancer patients' activity. Moreover, Neidlein et al (2021) stated that Fatigue was become a main factor in muscle strength of hospitalized patient. In dependency care, muscle strength was a one of symptom in dependency care. In addition to physical restrictions, fatigue may affect psychological restrictions. Moreover, Fatigue is a concept of subjective and physical symptoms so that that dependency care can be influenced by fatigue.

Pain is a factor that might affect care dependency. Revealed that daily living activity was influenced by chronic pain in adult respondents (Dueñas, Salazar, de Sola, & Failde, 2020). Also, Care dependency may be affected by pain, especially physical problems. Another study in nursing homes setting, Hoedl and Bauer (2020) found that pain affected the care dependency. Patients with pain will make physical restrictions in carrying out daily activities. Furthermore, found that depression affects daily living activity in COPD patients. Care dependencies may be affected by depression. Depression is a condition of patients who experience a decrease in mood (Handayani et al., 2019) This prolonged mood reduction will affect the activity and dependency of cancer patients. Cancer, as stressors, may cause patients to experience mood disorders and can affect dependency care. Hemoglobin may also affect care dependencies because energy is influenced by oxygen supply to cells. Therefore, low hemoglobin level will affect oxygen supply and affect the activity and care dependency (Neidlein et al, 2021).

Moreover, The unpleasant symptom theory (TUOS), founded can predict this result (Lenz, 2018). Theoretically, The physical and physiological aspects did not directly affect performance. Physical and Psychological factors might have a direct effect on performance on TUOS. Furthermore, fatigue is a factor that has the most significant effect on care dependency. According to the TUOS statement, performance outcomes are directly affected by symptoms. Therefore, fatigue is the highest odd ratio after performing multivariate analysis.

This study is the first study to look at the prevalence and factors associated with care dependency in cancer patients undergoing chemotherapy. Also, this study was conducted on a large sample. However, this research was only conducted for a single-center of the hospital with chemotherapy service. Thus, there is a need for further research on care dependency in cancer patients undergoing chemotherapy in a multi-center of chemotherapy service. Moreover, it is necessary to develop interventions to reduce care-dependent conditions.

CONCLUSION

This study found 29.9% of people have care-dependent conditions. Moreover, Low haemoglobin levels, severe pain, severe fatigue, and depression were statistically significant with care dependency. Severe fatigue is the most influencing factor in improving the patient's care-dependent conditions. Interventions in reducing the number of care-dependent cancer patients need to be developed.

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