The Influence of Age And Coping Mechanism on The Resilience of Cancer Patients Undergo Chemotherapy

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Abstract: **Background :** Resilience is the dynamic capacity of individuals to successfully retain their mental health in the face of life difficulties. Chemotherapy makes patients who have been diagnosed with cancer have a sense of worry, anxiety and fear of facing death threats. Resilience may depend on positive emotions, flexible thinking, age and spirituality. This study aims to determine the effect of age and coping mechanism on the resilience of cancer patients undergo chemotherapy. **Method:** The study was conducted on 60 respondents. The coping mechanism was measured using 21 items of The Cancer Coping Questionnaire, and the resilience was measured by The 14 item Resilience Scale. Multivariate multiple linear regression analysis was used to predict the effect of age factor and coping mechanism on the resilience of cancer patients undergo chemotherapy. **Results :** The result showed that 60% of respondents had maladaptiv coping mechanism 83,33% had low enough resilience and only 5% had high resilience. Pearson corelation shows an association between age and resilience, as well as coping mechanisms with resilience. The effect size of age and coping mechanism on resilience is 44, 9%. **Conclusion :** Age, coping mechanism and resilience are interrelated factors in cancer patient. Adaptive coping mechanism in cancer patients can increase their resilience undergo chemotherapy.

1 INTRODUCTION

Cancer is still a major health problem in the world and the second leading cause of death after heart and blood vessel disease. A total of 8.2 million people died from cancer each year (Komiya et al. 2017). According to data from GLOBOCAN, the International Agency for Research on Cancer (IARC) found that in 2012 there were 14,090,100 new cases of cancer and 8,201,600 deaths from cancer worldwide. A total of 5.3 million deaths occurred in developing countries and 2.9 million occurs in developed countries (American Cancer Society 2015). This number increased to 8.8 million deaths by 2015. Globally, almost 1 in 6 deaths are caused by cancer and approximately 70% of deaths caused by cancer occur in poor and developing countries.

The number of cancer cases has been increased in Indonesia, slowly began to replace the position of heart attack as the main caused of death. Basic Health Research Reported (2003) the prevalence of cancer was 1.4 per 1,000 residents or approximately (347,000) people and the cause of death number 7 (5.7%) from all death in Indonesia (KEMENKES RI 2013).

The current efforts undertake to manage cancer, carried out in various way including surgery followed by radiotherapy, treatment with three combinations of surgery, radiation and chemotherapy. Chemotherapy is the treatment of antineoplastic preparation for an attempt to kill tumor cells by interfering with cellular function and the reproduction (Yusof et al. 2016). According to Jacobson (2009), the problem of chemotherapy is a very harmful and adverse side effects. The side effect of chemotherapy on physical problems has been clearly illustrated by Chan & Ismail (2014);Lorusso et al. (2016), the most common signs and symptoms are nausea and vomit, decreased appetite, hair loss, bone marrow damage, neuropathy, gastrointestinal disorders and skin damage. Chemotherapy also greatly affects the sexual life, daily activities and work.

According to Sana et al. (2016) cancer treatment can cause many health problems and treatment-related symptoms may last longer and can add great pressure on patients to cope with demands and treatment of disease. In addition, the accompanying consequences on chemotherapy make the majority of patients that have been diagnosed with cancer filled with worry, anxiety and fear of facing the threat of death and pain while undergo therapy. They also experience problems of interpersonal relationship so that cancer patients need individual psychological adjustment. Another opinion by Partridge et al (2007) depression and stressors that appear during treatment, length of therapy, poor communication between health worker and patient, high medical costs and poor side effects are the contribution for patients to not comply chemotherapy.

Beside that, at the time patient being diagnosed with cancer these circumstances was very difficult to accept. The long-term effects of cancer among adolescents and young adults have been known to disrupt normal developmental processes, poor mental health, impaired quality of life, social isolation, and impaired education (Rosenberg et al. 2017). In a large-scale survey 73% of cancer patients who undergo treatment two years after diagnosed with cancer, Wolff (2007) found that over 70% of respondents reported being depressed due to the disease, 60% reported relationship problems, and 83% reported declines on income. More than a quarter indicates that they have insufficient resources to fulfil the emotional needs.

According to Loprinzi et.al (2011) one of the possible ways for newly diagnosed cancer patients to control emotional stress are through good coping mechanism. Krohne (2002) says coping strategy is an individual adaptation mechanism that is done consciously and directed towards overcoming pain or facing stressor. According Yunitasari (2016) adaptive coping in cancer patients can be achieved by minimizing and even eliminating the cause of stressor. A good coping mechanism in cancer patients undergo chemotherapy will improve resilience.

According to Hodges et al (2010) resilience is a transformation, a deliberate desire to withstand environmental complexity and unfavorable uncertainty. Resilience is a dynamic process that includes positive adaptation in the context of significant difficulties, hazardous, and may change with time and in different environments (Fletcher & Sarkar 2013).Resilience may depends on several factors including positive emotions, flexible thinking such as acceptance, active copping and spirituality. (Portzky et al. 2010). Wagnild (2003) identify five characteristics of resilience that become the main component of a person in responding to the difficulties they might experiences. The five components are meaningfulness, Equanimity, Self Reliance, Perseverance and Existential Aloneness ((Boyle et al. 2015)

Some studies related to resilience in cancer patients showed that most cancer patients have less resilience to the diagnosis of cancer and chemotherapy they undergo undergo (Pertiwi et al. 2011; Dubey et al. 2015; Proyogi & Agung 2016).

Individuals diagnosed with cancer in younger ages (before 45) has been found to be at high risk of psychological problems, which can survive in the development of life (Hoffman et al. 2013). Research Gaffey et al (2016) on stress and resilience in the elderly showed that resilience sources could modulate cortisol in elderly health. This study aimed to determine the effect of age factor and coping mechanism on the resilience of cancer patients undergo chemotherapy.

2 METHODS

2.1 Study Design

This research is an analytic descriptive research, with cross sectional design. In this design, researchers wanted to know the effect of age and coping mechanisms on the resilience of cancer patients who undergo chemotherapy at the General Hospital of East Nusa Tenggara province Indonesia in patients with cancer diagnosis from 2016 to January 2018.

2.2 Sampling

A total of 60 respondents that were undergo chemotherapy were taken as a research sample of 93 cancer patients treated in oncology ward and outpatient department of general hospital area with purposive sampling technique.

Purposive sampling is a technique of determining samples by selecting the population sample in accordance with the researcher desired so that the sample can represent the characteristics of the previously known population (Nursalam 2017)

Samples were selected with the following inclusion criteria: (1) Patients with cancer

diagnose, who undergo chemotherapy aged 21-70 years, (2) able to read and written in Indonesian, (3) level awareness is composmentis, (4) cancer patients who undergo maximum 5 sessions of chemotherapy, (6) wanted to be respondents by signing the informed consent. While the exclusion criteria of this study were: (1) pediatric patients, (2) cancer patients undergo chemotherapy who had comorbidities more than 2, (3) cancer patients with psychiatric disorders.

2.3 Procedure

The study protocol was approved by the research ethics commission of the University of Airlangga Surabaya Indonesia. Prior to the data collection the researcher gave the respondent information conducted by 3 enumerators with the qualification professional of nursing. Data were collected in the beginning of February 2018 on respondents who were undergo chemotherapy.

Patient demographic data were collected through questionnaires while clinical data were collected from patient medical records, Patient completed coping questionnaire and resilience in the outpatient department and chemotherapy ward prior to scheduled chemotherapy sessions or after chemotherapy. Questionnaire filling takes about 10 minutes for each respondent and accompanied by an enumerator.

2.4 Research Instrument

The measuring tool used in this study was questionnaire with aim to measure coping mechanism and resilience. While age is the basic data obtained directly from the patient through the demographic data questionnaire.

2.4.1 Resilience Measurement

Resilience was measured using the Resilience Scale Resource Kit developed by Wagnild & Young (1993). The selection of this measuring instrument because this tool is the widest use until now. This measuring tool has also been used in adolescents, adults, and elderly for assessed according to the characteristics of respondents. Initially this measuring instrument consist of 50 items, after the analysis, the item was reduced to 25 items and repaired into 14 items reflecting the five components of Resilience: Equanimity, Meaningfulness, Perseverance, Self-reliance and Existential aloneness.

This measuring instrument has a high reliability coefficient of 0.84 until 0.94. (Pinheiro et al . 2015;Ntountoulaki et al. 2017). According to Kaplan and Sacuzzo (2005), one of the requirements of a good measuring instrument is to have a reliability coefficient of 0.7 until 0.8.

2.4.2 Coping Measurement

The respondents coping mechanism were measured using *The Cancer Coping Questionnaire* developed by Moorey et al. (2003). This *Self Rating Scale* measuring instrument consists of 21 items is a special measuring tool used to measure coping mechanism in cancer patients that have been tested in 201 cancer patients. This questionnaire has 2 general questions related to stress and anxiety about cancer, the next items question 1-14 about the individual scales consisting of sub-copping scale (items 2, 6, 7, 11, 12), positive focus (Items 1, 9, 14), Transfer (item 3, 4, 8), and Planning (Item 5, 10, 13). For items 15-21 is an assessment for interpersonal scale. This instrument has an internal consistency of 0.87 for individual scale and 0.82 for interpersonal scale. Patients copping mechanism then divided into adaptive and maladaptive based on the mean and standard deviation of the respondents.

2.5 Data Analysis

The categorical data is presented as the sum and percentage. The age data of coping mechanism and resilience are presented in the form of mean calculation. The Pearson product moment coefficient correlation was determined to evaluate the linear relationship between age and resilience, as well as coping mechanism and resilience. Multiple linear regression analysis was conducted to determine the factors independently affect the resilience factor of value $P<0.25$ on Pearson correlation test will be incorporated into multiple linear regression model. Statistical analysis was performed using IBM software statistics 21. $P<0.05$ on a two-tailed test was statistically significant.

3. RESULT

3.1 Demographic and Clinical Characteristics

Table 1. Summary of demographic and clinical characteristics of 60 cancer patients that undergo chemotherapy

Charactheristics		N= 60
Age	Mean ± SD	49,12 ± 10.37
	Adolescent	2 (3,3 %)
	Young Adult	4(6.7 %)
	Adult	13 (21.7 %)
	Young Elderly	26 (43,3 %)
	Elderly	15 (25 %)
Gender	Male	26 (43,3 %)
	Female	34 (56,7 %)
Education level	Primary School	13 (21,7 %)
	Junior High School	23 ((38,3 %)
	Senior High School	17 (28,3 %)
	College/ above	7 (11,7 %)
Marital status	Married	52 (86,7 %)
	Single	5 (8,3 %)
	Widow /Widower	3 (5 %)
Occupation	Civil Servant	7 (11,7 %)
	Housewife	25 (41,7 %)
	Private sector	5 (8,3 %)
	Farmer	23 (38,3 %)
Income	High sallary	19 (31,7 %)
	Low sallary	41 (68,3 %)
Type of cancer	SC/PC/OsC/TC /PaC/PrC/ EC/CoC/CR/N C/GSCC/OvC/ LNH/CeC/BC	1(1,7%)/1(1,7%)/1 (1,7)/1(1,7%)/1(1, 7)/1(1,7%)/2(3,3%)/2(3,3%)/2(3,3%) /3(5%)/4(6.7%)/4(6.7%)/6(10%)/7(1 1,7%) 24 (40%)
Stadium of cancer	Stadium II	24 (40 %)
	Stadium III	36 (60 %)
Chemotherapy sessions	1 Session	2 (3,3 %)
	2 Sessions	16 (26,7 %)
	3 Sessions	14(23,3 %)
	More than 3 sessions	28 (46,7 %)
Body mass index	<18,5	37 (61,7 %)
	18,5-25	18 (30 %)
	>25	5 (8,3%)
Comorbidity	Yes	14 (26,3 %)
	No	46 (76,7 %)

SC=scapula cancer, PC=Penis Cancer, OsC=Osteosarcoma Cancer, TC=Tongue Cancer, PaC =Parotid Cancer, PrC= peritoneal cancer, EC= Endometrium Cancer, CoC= Colon cancer, CR= Carcinoma Rectum, NC=Nasofaring Cancer,GSCC= Gingival Squamous Cell Carcinoma, OvC= Ovarian Cancer,LNH= Limfoma Non Hodgkin,CeC= Cervical Cancer,BC= Breast Cancer

A total of 60 cancer patients who undergo chemotherapy had an average age of 49.12 years (SD = 10.37 years), and 43% were young elderly, 25% of elderly, 21.7% adult, 6.7% young adult, and 3.3% are teenagers.

Patients diagnosed with cancer on stage III were 60%, the remaining 20% were stage II, with the most common type of breast cancer being 24 (40%) patients. Other details of the patient's demographic and clinical characteristics are listed in Table 1. Coping and resilience mechanism in Table 2.

Table 2. Measuring instrument scores from 60 cancer patients undergo chemotherapy

Resilience	Mean ± SD	68,62 ± 5,415
	High Resilience	3 (5%)
	Average Resilience	50 (83,3%)
	Low Resilience	7 (11,7%)
Coping Mechanism	Mean ± SD	56,33± 5,332
	Adaptive	30 (50%)
	Maladaptive	30 (50%)
Individual Scale of Coping Mechanism		
Positive focus	Mean ± SD	8.100± 1.03
	High	44 (73,3%)
	Low	16 (26,7%)
Coping	Mean ± SD	12.87± 1.96
	High	32 (53,3%)
	Low	28 (46,7%)
Diversion	Mean ± SD	7.53± 1.112
	High	28 (46,70%)
	Low	32 (53,3%)
Planning	Mean ± SD	7.43± 1.14
	High	29 (48,3%)
	Low	31 (51,7%)
Interpersonal Scale of Coping Mechanism		
	Mean ± SD	20.48± 2.05
	High	31 (51,7 %)
	Low	29 (48,3%)

Adaptive coping mechanism = score > 56,33, maladaptive coping mechanism = score < 56,33. Total score resilience >90 = very high resilience, 82-90 high resilience, 65-81 moderate resilience, 57-64 low resilience and score resilience <57 = very low resilience.

3.2 Relationship between age and coping mechanism with resilience

Table 3. Summary of Pearson correlation coefficients of age and coping mechanism with the resilience of cancer patients undergo chemotherapy

	Resilience
Age	0.274*
Coping mechanisme All score	0.654**
Positive focus score	0.481**
Coping score	0,586**
Diversion score	0,524**
Planning score	0,513**
Interpersonal scale of Coping mechanisme	0,457**

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

The result showed a positive correlation between age and resilience ρ = 0.34, meanwhile for coping mechanism showed a positive correlation between coping mechanism and resilience ρ = 0,000. Furthermore, for individual scale the coping mechanism of 60 respondents indicates a positive correlation for each sub item positive focus ρ = 0,000, coping ρ = 0,000, diverse ρ = 0,000, and planning ρ = 0,000. On the interpersonal scale also shows a positive correlation between resilience ρ = 0.000 (table 3).

3.3 The Effect of age and coping mechanism on resilience

Multiple multivariate linear regression showed a large contribution of age influence and coping mechanism to the resilience of cancer patients undergo chemotherapy in this model was 44.9% (ρ = 0,000), while the remaining 55.1% was influenced by other variables than age and coping mechanism. Partially, the contribution of age to resilience is 2.19% (correlation part = 0.148, ρ = 0.139) while for coping mechanism is 37.45% (correlation part = 0.612, ρ = 0,000) (table 4). From this analysis it is known that age has no significant effect on resilience whereas opposite coping mechanism significantly affect the resilience of cancer patients undergo chemotherapy. The large prediction of age variable with coping mechanism to resilience can be seen from the following regression equation.

Resilience = 29.052 + 0.079 **(age)** + 0,634 (**coping mechanism**).

The following equation can be explained as:

- The constant value about 29,052 means that the magnitude of resilience when the age value, and the coping mechanism is 0.
- An increase in 1 unit age score can increase the resilience value by 0.079 with age constant.
- An increase of 1 unit of coping mechanism score may increase resilience by 0.634 with a constant age.

Table 4. Summary of regression model, resilience on cancer patients undergo chemotherapy

Model	Coefficient	Classic assumption
R = 0,670	Constant = 29.052	Existency: mean residual= 0,000
R square = 0,449	β age = 0.079	Independency : Durbin-Watson=1,230
Adjusted R square = 0,430	β coping=0,634	Linearity: anova: p=0,000
Anova (p=0,000)	Correlations Parrt age : 0,148 Part coping mechanism :0,612	Multikolinearity : variance inflation factor : VIF age =1,041 VIF coping mechanism =1,041

Normality: age (p=0,232), coping mechanism (p=0,602), resilience (p=0,472).

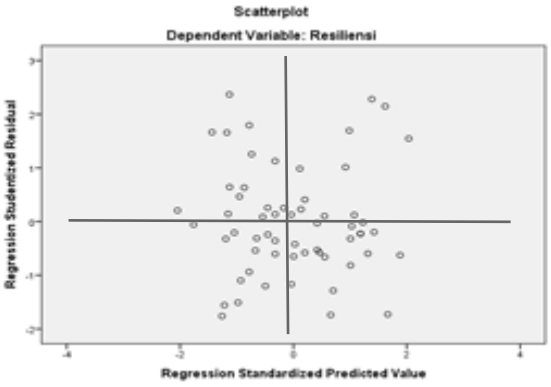

Figure1. Clasic assumption : Homocedasticity

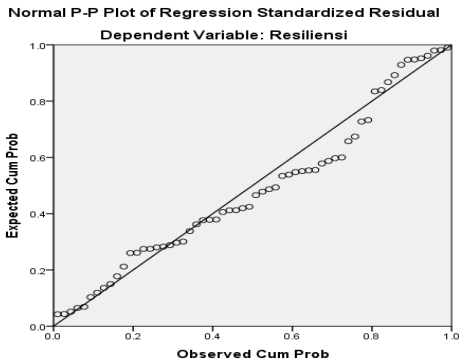

Figure2. Classic Assumption: Multivariat Normality

4. DISCUSSION

Cancer and chemotherapy are very distressing life events, and this is the real case for cancer patients undergo chemotherapy at the General Hospital Prof. Dr. W.Z. Johannes Kupang, East Nusa Tenggara Province, Indonesia. Cancer patients mostly experience stress and anxiety because of nature of the disease and the treatment. Patients said anxious and think about the disease for several times 29 (48,3%), almost whole time 27 (45%) and the rest 4 (6,7%) patients said worried and thinking about the disease everytime. Regard to question what stress felt in the last week, the patient said less stress as much as 30 (50%) patients, quite stressful 26 (43.3%) and very stressful 4 (6.7%) patients. The impact of cancer and chemotherapy on these psychological problems lead to a worse disease progression for the individual (Zhang et al. 015). One effort that can be done is by build a good coping mechanism. According to Baqutayan (2015) there are two main ways in which people cope with stress. The first approach, one can decide to follow or reject the stress experienced. This is a passive approach. Alternatively, the other one can decide to face the reality of the stress experienced and to clarify the problem through negotiation. The second approach is an active approach.

The result showed 50% of patients still have maladaptive coping mechanism against cancer and chemotherapy. This can be seen from the score of coping mechanism on individual and interpersonal scale. The findings of this study are also known that patients use several actions to overcome the problems faced in the form of diversion efforts, coping, positive focus and planning that all of them is a kind of emotional focus coping. The result of this study is accordance with Ahadi et al. (2014) in 80 cancer patients has found that the average value of coping in cancer patients lower than non-cancer. This study also known the cancer patients used more emotional focus coping to overcome problems related to cancer.

Dunkel et la. (1992) is known in general, cancer patients make a variety of coping choices. In the face of cancer-causing symptoms that cause pain, they usually choose to use problem focused on coping strategies, such as seeking alternative medicine or taking drugs, while facing future uncertainty they tend to use emotional focused on coping strategies such as dodge or denial. Furthermore, Faye et al. (2006) found that emotional focused coping is more commonly used by cancer patients to address existential problems, while problem focused on coping is more commonly used to overcome physical problems.

Researchers see the tendency of selecting coping problem in cancer patients to overcome the existing problems due to disease conditions that have entered the advanced stage and the success rate of low disease healing, where the patient has no other efforts to recover, in addition to continue to survive and fight with the disease cancer. Despite being in a stressful situation, cancer patients actually still have an inner strength that can help them to adapt to the conditions and make sense of life.

A good coping mechanism in cancer patients is needed so the patient can undergo the disease and can survive despite the downturn. This condition is called resilience. The result showed that as many as 83.3% of patients had average resilience scores. The result of the analysis revealed the effect of coping mechanism on the resilience of cancer patients undergo chemotherapy. The result of this study is accordance to Haase (2004) study that resilience in cancer patients and chronic diseases is the result of an interaction between three protective factors and two risk factors. The three protective factors in question are individual protective factors (coping courageous in the face of stressful situations and meaningful situations), family protective factors (family atmosphere and family support or resources), and social protective factors (health care and social integration resources). The two risk factors faced by the study subjects include individual risk factors (defensive coping) and disease-related risk factors.

Furthermore, Peterson & Bredow (2013) describes risk factors as a factor that directly magnifies the potential risk for individuals which

can increase the likelihood of developing maladaptive behaviors and lifestyles while the protective factor is a healthy skill and ability possessed by individuals, which promotes resilience. The low resilience scores in cancer patients in this study may be influenced by low cognitive capacity, stage of cancer, chemotherapy series treatment, body mass index, comorbidities and other demographic characteristics. This condition results in low of confidence to recover, lack of confidence and lack of optimism. This assumption accordance to the opinion of Portzky et al, (2010) explained the high level of resilience in a person is usually positively correlated with high self esteem, self confidence, and discipline, courage and optimism in the face of failure, above average cognitive capacity, and greater possibilities for free from disease.

A study of 60 women with ovarian cancer, it is known that those who have a greater tendency to attribute negative meanings to illness are more likely to show poor adjustment. Some patients may withdraw socially in response to diagnosis or treatment and treatment measures (Deshields et al. 2016)

The study also found that age had no significant effect on resilience ($\rho = 0.139$). Resilience is not a static trait that a person possesses from birth or automatically persists in a person once he or she achieves it. Resilience is a dynamic process that includes positive adaptation in the context of significant difficulties, hazardous, and may change with time and in different environment environments (Fletcher & Sarkar 2013). This view is in line with Galli & Vealey (2008) research on resilience among the top athletes and concludes that an important aspect of resilience is the agitation process, in which the individual uses multiple coping strategies to deal with unpleasant emotional combinations and struggles mentally. Many athletes report that positive adaptation occurs gradually, often requiring a lot of shifting thoughts. These findings support that the resilience is a capacity that develops over time in the context of people's interactions with the environment, regardless of age.

The greater effect of age and coping mechanism both in the resilience of cancer patients undergo chemotherapy in this study about 44.9% while the remaining 55.1% is influenced by other variables than age and coping mechanism out of this model. Pentz research (2005) on resilience in elderly patients with cancer is known that the aspects that contribute to resilience are social support and spirituality aspect (ie belief in God and their hope). Another study was conducted by Duan porter et al. (2016) on factors that contribute to physical resilience in the elderly with cancer is known the majority of older cancer sufferer show physical resilience. This is related to basic health, physical function, self efficacy, and high social support.

Some of the research findings above in line with the opinions of (Vanderbilt-Adriance & Shaw 2009). There are several protective factors that make up resilience such as: (1) individual characteristics, such as gender, level of intelligence, personal characteristics, (2) family characteristics, such as warmth and family structure (3) availability of social support system outside the individual and family environment eg peers. Furthermore, according to Woodgate (1999) there are five categories of specific stressors that exist in cancer patients as risk factors affecting the resilience of cancer patients that is loss, disruption of relationships, events that change family status, events that require social adaptation, and acute negative event such as physical trauma. This stress may be direct or indirect result of major developmental changes occurring in the individual, or the consequences of the disease itself.

From the various opinion and result above it can be conclude that in principle resilience is influenced by internal and external factors of individuals, both protectives and risks. Age and coping mechanism are some of the factors that contribute to patient resilience. Both are mutually related internal protective factors in which the existing research evidence suggests that age maturity making individual coping mechanism more adaptive.

5. CONCLUSION

Age and coping mechanism are some of the protective factors that can affect the resilience of cancer patients. Increased age does not necessarily increase patient resilience or coping mechanism. A positive adaptation of cancer patients undergo chemotherapy is a key requirement for cancer patients to remain resilient in their lives.

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