



Factors Related to Depression Score among Colorectal Cancer Patients in Digestive Surgery Outpatient Clinic of Haji Adam Malik General Hospital, Medan

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Abstract

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BACKGROUND: Colorectal cancer has been known as the leading cause of death with depression as the most common coexisting morbidity. Factors related to depression among cancer patients are required to be explored.

AIM: This study aims to investigate factors related to depression among colorectal cancer patients in Medan.

METHODS: This cross-sectional predictive analytical multivariate study was conducted through March–May 2021 in Haji Adam Malik General Hospital, Medan, involving 105 colorectal patients visiting digestive surgery outpatient clinic who fulfilled inclusion and exclusion criteria. Subjects were requested to fill in personal data on participant's form. Direct interview was conducted in accordance with COVID-19 health protocols. To assess depression score, Hospital Anxiety and Depression Scale-Depression subscale questionnaire was used in the study.

RESULTS: Our study found among independent variables that we assessed, five variables; length of education, number of comorbidities, gender, occupation, and marital status are independent risk factors related to the occurrence of depression among colorectal cancer patients (adjusted $R^2 = 68.5\%$).

CONCLUSION: By acknowledging risk factors related to depression among these patients, early intervention and tailored education for both patients and their loved ones can be done.

Introduction

According to 2020 World Health Organization statistical data, cancer is the second most prevalent cause of death worldwide. In 2018, 18.1 million new cases of cancer were found and 9.6 deaths occurred due to cancer. Global Cancer Statistics noted that in 2018, colorectal cancer was the third most prevalent cases among both sexes. Furthermore, among various types of cancer, colorectal cancer was noted as the second leading cause of death. 1.8 million new cases of colorectal cancer were found in 2018 and approximately 881,000 deaths occurred. Interestingly, more than half of cases were actually related to modifiable risk factors, such as smoking, diet, alcohol consumption, physical activity, and obesity [1], [2], [3]. In Indonesia, especially in North Sumatera, RISKESDAS (Basic Health Research) noted that colorectal cancer is at the peak of the chart [4] with depression as the most common coexisting morbidity among those with colorectal cancer [5].

It is approximated that in every five colorectal cancer survivors, one will report a persistent and prolonged depression. This has been linked to decreased quality of life, indicating that survivors with

depression are exposed to increased risk for any other comorbidities that may result in death [5], [6], [7], [8]. Various studies have investigated factors related to depression among colorectal cancer patients. A cohort study, investigating factors related to depression among colorectal cancer patients from 1988 to 2002 by Zhang *et al.*, found that age, gender, and ethnicity are related [9]. Another study from Lavdaniti *et al.* in 2012 also found that marital status, occupation, and educational stage are linked to depression among colorectal cancer patients [10]. Thus, the aim of this study is to investigate factors related to depression among colorectal cancer patients in Medan.

Methods

Population and sample

This cross-sectional predictive analytical multivariate study was conducted through March to May 2021 in Haji Adam Malik General Hospital, Medan, involving colorectal patients visiting digestive

surgery outpatient clinic who fulfilled inclusion and exclusion criteria. Sample was gathered consecutively in accordance with inclusion criteria as in the following; (1) age of 30–80 years old and (2) diagnosed with third or fourth stadium of colorectal cancer. On the other hand, those with any ongoing or history of psychiatry morbidities and those with known diagnosis of substance abuse (except nicotine and caffeine) were excluded from the study. A total of 105 subjects were given informed consent before the study and were requested to fill in personal data on participant's form. Direct interview was conducted in accordance with COVID-19 health protocols.

Variable identification

Independent factors assessed in this study are the following; age, gender, ethnicity, length of education, occupation, marital status, monthly income, number of comorbidities, treatment, onset, stadium, and tumor location. On the other hand, dependent variable is Hospital Anxiety and Depression Scale-Depression subscale (HADS-D) score.

Measurement

HADS was used to measure the severity of depressive symptoms among our subjects. HADS-D has been widely used in early detection of depression. The previous study in 2014 from England, conducted by Gray *et al.*, also used HADS-D to assess depression among colorectal cancer patients undergoing pre-operative radiotherapy [11]. HADS consists of 14 questions that are divided into two subscales (anxiety and depression subscale), each consisting of seven questions. Score for each question is 0–3 indicating how often the patients experience the symptoms. In Indonesia, HADS has been validated by Widyadharna *et al.* in 2015. They also found that inter-rater agreement of HADS-D is 0.681, meaning that HADS-D has a good reliability [12].

Statistical analysis

Data collection and analysis were conducted using SPSS software version 25. Linear regression was used in this study after the following prerequisites are met; (1) normal residual spread can be proved by histogram, (2) residual mean from descriptive statistic equals to 0, (3) no outlier (as shown in casewise diagnostic), (4) constant (as shown in scatter graph between residues and independent variable), (5) independent (as shown by Durbin-Watson test), (6) no indication of multicollinearity (as proved by Pearson and correlation test on independent variables), and (7) linearity between independent and dependent variables (as shown in scatter graph) [13]. Kolmogorov–Smirnov test was conducted initially to assess normality

of the data. When data are normally distributed, Pearson test can be used, while, on the other hand, when data are not normally distributed, Spearman will be used. Only independent variables with $p < 0.25$ will proceed in the study [14].

Results

Table 1 is presented to show demographical characteristics of our subjects. Numerical variables, such as age, length of education, number of comorbidities, and onset, are presented in mean \pm SD as those variables are normally distributed ($p > 0.05$). The remaining variables are presented in median and min-max as they are not normally distributed. As shown in Table 1, majority of our subjects are male ($n = 53$, 50.5%) of 52.78 ± 11.83 years of age, and most come from Batak ethnicity ($n = 54$, 51.4%). Most of our subjects no longer have any occupation ($n = 64$, 61%) and more than half of our subjects are already married ($n = 71$, 67.6%). Seventy-six subjects (72.4%) undergo treatment without radiotherapy and more than half are diagnosed with third stadium of colorectal cancer ($n = 59$, 56.2%). We also found that in 65 subjects (61.9%), tumor is located in the rectal segment. Our subjects admitted that they spent 6–16 years for education and earn IDR 1.8–6.8 million per month. We also found that most of our subjects were already diagnosed with colorectal cancer for 12 (2–36) months.

Table 1: Demographic characteristics of colorectal cancer patients

Variables	Mean \pm SD	Median (min-max)	n %
HADS-D	11.55 \pm 3.823		
Age (years)	52.78 \pm 11.83		
Gender			
Male			53 (50.5)
Female			52 (49.5)
Ethnicity			
Bataknese			54 (51.4)
Non-Bataknese			51 (48.6)
Length of education (years)		12 (6–16)	
Occupation			
Yes			41 (39)
No			64 (61)
Marital status			
Married			71 (67.6)
Not married			34 (32.4)
Monthly income (IDR million)		4 (1.8–6.8)	
Number of comorbidities		1 (0–3)	
Treatment			
Radiotherapy			29 (27.6)
Without radiotherapy			76 (72.4)
Onset (months)		12 (2–36)	
Stadium			
III			59 (56.2)
IV			46 (43.8)
Tumor location			
Colon			40 (38.1)
Rectal			65 (61.9)

Table 2 shows that model number 2 has the highest determination coefficient (69.6%). Yet, we found that variable "monthly income" shows $p = 0.120$ ($p > 0.05$), indicating that model number 2 is still not fit enough. Therefore, it is suggested to exclude this "monthly income" variable from the first linear regression

Table 2: Summary model of the first linear regression analysis

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	0.848 ^a	0.719	0.695	2.110	
2	0.847 ^b	0.717	0.696	2.107	
3	0.842 ^c	0.709	0.692	2.123	1.975

analysis and that the second linear regression analysis is required. We again found that model 2 has the highest determination coefficient (69.2%), and yet, variable “stadium” shows $p = 0.084$ ($p > 0.05$). Therefore, this variable should be excluded and the third linear regression analysis is required.

Table 3: Summary model of the second linear regression analysis

Model	R	R Square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	0.844 ^a	0.712	0.691	2.125	
2	0.842 ^b	0.709	0.692	2.123	1.975

We again found that model 2 has the highest determination coefficient (69.2%), and yet, variable “stadium” shows $p = 0.084$ ($p > 0.05$). Therefore, this variable should be excluded and the third linear regression analysis is required (Table 3).

It is shown that model 1 has the highest determination coefficient (68.6%). But again, we also found that variable “age” has $p = 0.279$ ($p > 0.05$), thus we excluded this variable and proceed to the fourth linear regression analysis (Table 4).

Table 4: Summary model of the third linear regression analysis

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	0.839 ^a	0.704	0.686	2.143	
2	0.837 ^b	0.700	0.685	2.145	2.096

We found that model 1 is the fittest model with determination coefficient of 68.5% and tolerance value of >0.4 , indicating that there is no multicollinearity (Table 5).

Table 5: Summary model of the fourth linear regression analysis

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	0.837 ^b	0.700	0.685	2.145	2.096

Using backward method, we generated linear regression equation as the following: Depression score = $14.363 - 0.414 \times$ length of education + $0.980 \times$ number of comorbidities + $1.034 \times$ gender + $2.845 \times$ occupation – $1.615 \times$ marital status (Graph 1 and 2). All prerequisites have also been fulfilled.

Our study found among independent variables that we assessed, five variables; length of education, number of comorbidities, gender, occupation, and marital status are independent risk factors related to the occurrence of depression among colorectal cancer patients (Table 6) (Figures 1 and 2).

Table 6: Factors related to depression score

Independent variables	Correlation coefficients	Regression multivariate β	p
Constant		14.363	<0.001
Lama pendidikan	-0.369	-0.414	<0.001
Jumlah penyakit penyerta	0.228	0.980	<0.001
Jenis kelamin	0.136	1.034	0.016
Status pekerjaan	0.365	2.845	<0.001
Status pernikahan	-0.199	-1.165	0.001

Discussion

Depression can be due to any stressors in which certain individuals fail to adapt or overcome, resulting in depressed mood, despair, and anhedonia (lack of interest in activities). Particularly in individuals struggling with cancer, the effect of cancer alone, along with treatment side effects, contributes majorly in ones self-actualizations, independence, and finance. Therefore, strong and continuous emotional support from loved ones is strongly required and plays a protective role to prevent cancer patients from experiencing depression. Studies also show that biological mechanism may also contribute to the occurrence of depression, such as the increased free circulating cytokines, such as TNF-alpha and IL-1 which enhance serotonin and noradrenaline reuptake, and decrease the level of brain-derived neurotrophic factor [15].

From our study, length of education is found to be related to depression among our subjects. It is known that those with higher education (at least high school graduate) experience more severe form of depression, but this can also be due to the fact that those with lower education usually are reluctant to report their depressive symptoms [10]. Our study found that length of education is negatively and slightly correlated with depression. This result is also in line with a study from Mols *et al.* and Lavdaniti *et al.* which also found that the length of education is related to depression ($p < 0.001$) [8], [10].

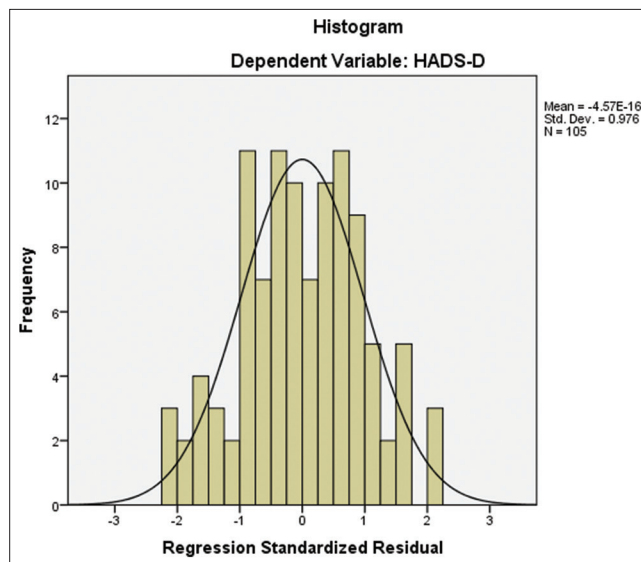


Figure 1: Histogram showing linearity assumption

Moreover, cancer patients tend to suffer from multiple comorbidities which may exaggerate the severity of depression they experience. We found that the number of comorbidities present in our subjects is slightly correlated with their depressive symptoms, indicating that more comorbidities they have are linked to higher HADS-D score. This is in line with a study from Braamse *et al.* from the Netherland in 2016 which found that the number of comorbidities is correlated with depression ($p = 0.02$) [5].

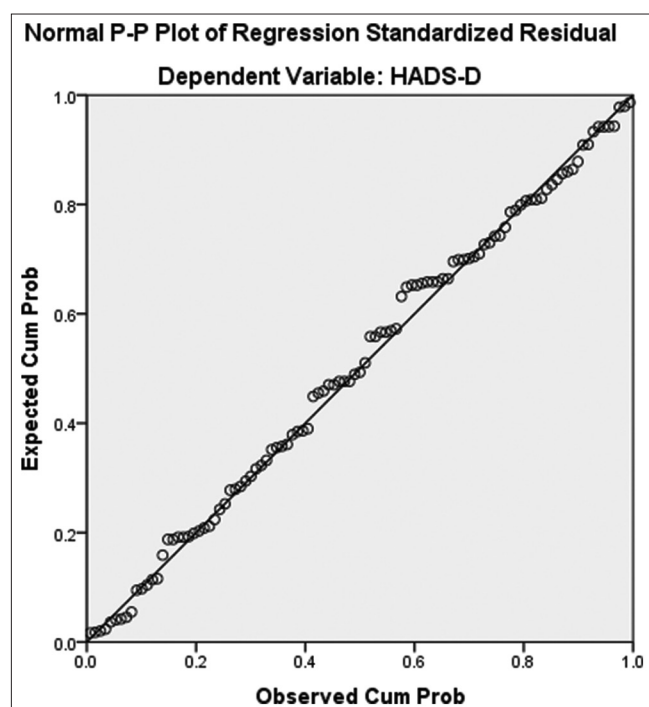


Figure 2: Normal P-P plot showing normality from residue

Gender difference is also found to be related to depression among our subjects. This is also shown in the previous study by Zhang *et al.* ($p \leq 0.01$) in 2010. In general, women are more likely to experience depression. This may be due to better awareness and seeking for help behavior among women, leading to more depression case identified. On the other hand, women are conventionally more sensitive and emotional, which indirectly expose women to higher risk of experiencing depression [5], [9].

Cancer patients are also at increased risk of depression when financial situation is worsened. By not having any job, cancer patients are being held stagnant in unfavorable social condition, putting more pressure and worry to them [16]. A study from Greece by Lavdaniti *et al.* in 2012 also supported this result ($p = 0.044$) [10]. On the other hand, being married is linked to decreased risk of experiencing depression. The previous study by Lavdaniti *et al.* also showed that marital status is significantly correlated with depression among cancer patients ($p = 0.034$) [10]. Possible explanation for this is the fact that marriage allows continuous support from the loved one's which plays an important role in alleviating depression [17]. Less quality of life and overall compliance of cancer patients to their treatment plan are shown in those who are not married [18].

Conclusion

Our multivariate study found that length of education, number of comorbidities, gender, occupation, and marital status are independent risk factors related

to the occurrence of depression among colorectal cancer patients in Medan.

Study Limitation and Future Direction

This study is first to assess factors related to depression among colorectal cancer patients in Medan, North Sumatera, using HADS-D questionnaire. Yet, we are also aware that our study is limited as it was only conducted at one place. Multicenter study with wider sample size or different approach may be necessary, considering that depression is dynamic. By acknowledging risk factors related to depression among these patients, early intervention and tailored education for both patients and their loved ones can be done.

Declarations

Authors' contributions

All authors contributed equally to this work.

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Ethics approval and consent to participate

The Research Ethics Committee approved this study at the Faculty of Medicine, Universitas Sumatra Utara, with the letter number 76/KEP/USU/2021 on February 26, 2021. All participants write and sign a consent to participate before attending this study. Data will not be shared to respect the privacy of the participant.

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