THE ASSOCIATION OF NUTRITIONAL STATUS WITH PSYCHOLOGICAL DISTRESS AMONG CANCER PATIENTS AT HOSPITAL UNIVERSITI SAINS MALAYSIA

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ABSTRACT

Malnutrition in cancer patients is common and is always related to psychological distress due to the disease and the treatment process. The aim of this study is to determine whether the nutritional status of cancer patients at Hospital Universiti Sains Malaysia is associated with psychological distress. The study included a total of 102 participants by means of a purposive sampling. The information was obtained from medical records on the sociodemographic and clinical data. The weight and height were measured, and the BMI calculation was carried out. The nutritional status was determined using the Patient-Generated Subjective Global Assessment (PG-SGA) and psychological distress was measured using the Depression, Anxiety and Stress Scale-21 (DASS-21). The study group included 53.9% females and 46.1% males (mean age: 55 ± 25 years). Colorectal cancer (21.6%) followed by breast cancer (20.6%) and lymphoma (13.7%) were the most common types of cancer. In PG-SGA 50.0% of the participants suffered from malnutrition (41.2% moderately, 8.8% severe) and 50.0% were well-nourished. Overall, depression, anxiety and stress were 6.9%, 31.4% and 15.7% respectively. The analysis indicated that nutritional status significantly affect the depression score $H(2)=11.73$, $P=0.003$, anxiety score $H(2)=19.51$, $P<0.001$ and stress score $H(2)=9.40$, $P=0.009$. Bonferroni test was further used to compare all pair of groups. There was a significant difference for depression score in Stage A and C ($P=0.003$), all pair had significant difference for anxiety; Stage A with Stage B ($P=0.026$), Stage A and C ($P<0.001$), Stage B and C ($P=0.032$) and for stress score had significant difference for Stage A and C ($P=0.024$) only. To conclude, the psychological score was lower in Stage A (well nourished) than Stage C (malnourished). Our findings suggest the need for more study to clarify the association between nutritional status and psychological distress and ascertain suitable screening and management strategies.

KEYWORDS: nutritional status, cancer, psychological distress, malnutrition.

INTRODUCTION

Cancer is a growing health problem in Malaysia and it is currently the fourth most serious cause of death (Lim, 2002). As far as the risk is concerned, 1 in 5.5 Malaysians will experience lifelong cancer andconsidering the non-registered cases, the chance would be 1 in 4 for Malaysians.The most common cancers among men include lung, nasopharynx, colon, leukaemia, rectum and prostate cancer while breast, cervix, colon, ovary, leukaemia and lung cancer are more common in women (Lim et al., 2003).

In a study done at the National Cancer Institute in Malaysia, nearly 43.5% of patients were malnourished upon admission (Jamhuri et al., 2017), based on the ratings from the PG-SGA. Malnutrition may result in negative outcomes in cancer patients which include an increased rate of infection and risk of postoperative complications, reduced tolerance or response to chemotherapy or radiotherapy, increased costs, significantly reduced performance status, social burden and lower quality of life (Marín Caro et al., 2007).

Malnutrition is strongly associated with psychological distress in cancer patients (Ma et al., 2013). Furthermore, depressed patients were found to be nearly four times more likely to die than non-depressed patients (Suthahar et al., 2008). Most of the cancer patients suffering from malnutrition often reported higher psychological distress (Mehnert et al., 2018). In Malaysia, there is limited research conducted on the prevalence of malnutrition and nutritional status and their association with psychological distress. However, knowledge from these indicators would be useful to healthcare professionals in recognising the prevalence of malnutrition and patients in need of psycho-social assistance, especially those patients who have difficulties to publicly communicating their emotional queries and seeking nutritional support. This research was therefore conducted to establish the prevalence of malnutrition and the combination of nutritional status and psychological distress (depression, anxiety and stress) among cancer patients at Hospital Universiti Sains Malaysia.

METHODOLOGY

This study was a cross-sectional study conducted at Hospital Universiti Sains Malaysia, involving both inpatients and outpatients from January 2019 to March 2019. The inpatient setting consisted five wards; 2 surgical wards, 1 haematological ward and 2 oncology wards while the outpatient setting included the the oncology clinic. The inclusion criteria were adults aged 18 years and older, diagnosed with cancer regardless of newly diagnosed or established malignancy, undergoing chemotherapy and/or radiotherapy treatment and/or surgery or without undergoing treatment, Karnofsky Performance Status Scale Score of ≥ 50%, ambulatory, and able to communicate with either in Bahasa Malaysia or English. The Karnofsky Performance Scale Index was measured to determine the functional capacity level and the worse survival rate for the lower score (Péus et al., 2013). In this study, only those who had scored 50% and above were recruited. The exclusion criteria included those with acute medical or cognitive impairment, pregnant, had hematopoietic cell transplantation, under palliative care and on ventilation support.

The sample size needed by this study was 105 participants calculated based on the formula by Daniel (1999) $n = \frac{Z^2\ P\ (1-P)}{d^2}$ (n=sample size, Z= z statistic for a level of confidence at 95%, P= expected prevalence of malnutrition in cancer, d=precision) with the P value being equal to 43.5% which is the value for the prevalence of malnutrition at the National Cancer Institute in Putrajaya, Malaysia, using PG-SGA tools. The calculation also considered the 10% drop-out rate. This study had received the approval from the USM Human Research Ethics Committee (USM/JEPeM/18100519).

Measurement of Nutritional Status and Psychological Distress

The medical records provided social-demographic information including the age, gender, ethnicity, marital status, education, occupation, income and clinical data. Clinical data included diagnosis, cancer type, admission time and treatment. The weight and height were measured using a calibrated mechanical weighing scale and a height rod in anthropometric measurements. The measurements were measured to the nearest 0.1 kg and 0.1 cm. Furthermore, measurements were taken twice, and the average was calculated. The BMI formula [BMI = weight (kg)/height $(m)^2$] was used to calculate BMI.

The PG-SGA was used to assess the nutritional status of the patient, as it is considered the gold standard in the evaluation of the nutritional status of cancer patients (Andreoli et al., 2011). A validated English version was used in this study. Two sections and seven questions were part of this assessment. The first section included four questions: weight history, intake of food, symptoms of nutritional impact and physical function. The second section consisted of three questions: disease and nutritional requirements, metabolic demand, and physical examination. Nutritional status was then assessed according to Stage A (well-nourished), Stage B (mild to moderately malnourished) and Stage C (severely malnourished) (Martineau et al., 2005).

DASS-21 was used to evaluate psychological distress. This assessment comprised of 21 items in Bahasa Malaysia-version to measure the level of psychological distress and was divided into 7 questions per scale (depression, anxiety, and depression). Each scale was rated from 0 to 3 and the scores were calculated according to the recommended cut-off scores of 5 categories: normal, mild, moderate, severe, and extremely severe. We hypothesized that there was an association between nutritional status and psychological distress and that patients who were considered malnourished are more likely to be distressed.

Statistical Analysis

Data was analysed using Version 24 of the Statistical Package for Social Science (SPSS). In the Pearson Chi square test, two categorical variables were explored, nutritional status and psychological distress level. The Kruskal-Wallis test was used to compare the nutritional status with depression, anxiety, and stress score. The statistical significance was determined at $p<0.05$.

RESULTS

Characteristics of participants

From 102 cancer patients, 53.9% were women (53.9%), and the mean age was 55 ± 25 years. The majority of the participants were Malay (92.2%), married (86.3%), from urban area (47.1%), had a secondary education (46.1%), were unemployed (44.1%), had no income (34.3%) and were inpatient (66.7%). Participants were diagnosed with different types of cancer based on their tumour localization. Colorectal cancer (21.6%) followed by breast cancer (20.6%), lymphoma (13.9%), head and neck cancer (12.7%) and leukaemia (7.8%) ere the leading types of cancer. The Karnofsky Performance Status Scale showed that most participants have a functional status equal to or higher than 80% (normal activity with effort but with certain signs or symptoms of disease). The characteristics of the participants are presented in Table 1.

Table 1 Characteristics of participants (n=102)

Variables	n = 102	%
Gender		
Male	47	46.1
Female	55	53.9
Ethnicity		
Malay	94	92.2
Non-Malay	8	7.8
Marital Status		
Single	13	12.7
Married	88	86.3
Divorce	1	1.0
Residing Area		
Rural	21	20.6
Urban	81	79.4
Education Status		
Primary	10	9.8
Secondary	47	46.1
Higher than secondary	45	44.1
Income (RM) per month		
< RM 2000	31	30.4
≥ RM 2000	34	33.3
No salary	35	34.3
Not sure	2	2.0
Hospitalization		
Inpatient	68	66.7
Outpatient	34	33.3
Tumour localization		
Colorectal	22	21.6
Breast	21	20.6
Lymphoma	14	13.7
Head and neck	13	12.7
Leukaemia	8	7.8
Bone	4	3.9
Brain	4	3.9
Lung	4	3.9
Gynaecological	4	3.9
Others	8	8.0
Karnofsy Performance Status Scale		
50-70%	18	17.6
≥ 80% - 100%	84	82.4

Prevalence of Malnutrition and Psychological Distress

With regards to PG-SGA, 50.0% of the participants were determined to be well-nourished, whereas 50.0% were malnourished (41.2% moderately and 8.8% severely).

The prevalence of psychological distress in this study for depression, anxiety and stress was 6.9%, 31.4% and 15.7% respectively. The prevalence of depression among cancer patients was higher among

women, inpatient, single, unemployed and without income. Moreover, the prevalence of anxiety among women, inpatient, married, unemployed and without income was higher. As a result of stress, the prevalence among men, inpatients, married, unemployed, and those without pay or income was found to be higher.

Association Between Nutritional Status and Psychological Distress

Table 2 displays the frequency distribution of the depression, anxiety and stress among participants based on the PG-SGA rating of nutritional status. The results showed that the psychological distress for depression *(P*=0.028), anxiety *(P*<0.001), and stress (*P*=0.002) were associated with nutritional status. However, based on the results, only 7 from 102 patients experienced mild/moderate/severe or extremely depression. This similar pattern was seen for anxiety and stress in which only 32 and 16 from 102 patients had either anxiety or stress, respectively.

Table 2 Levels of psychological distress (depression, anxiety, and stress) as classified by nutritional status (PG-SGA)

Variables	Stage A n=51 n (%)	Stage B n=42 n (%)	Stage C n=9 n (%)	*P value*
Depression				
Normal	50 (98.0)	38 (90.5)	7 (77.8)	0.028[a]
Mild	1 (2.0)	3 (7.1)	1 (1.1)	
Moderate	0 (0)	1 (2.4)	0 (0)	
Severe	0 (0)	0 (0)	1 (11.1)	
Extremely severe	0 (0)	0 (0)	0 (0)	
Anxiety				
Normal	42 (82.4)	26 (61.9)	2 (22.2)	<0.001[a]
Mild	3 (5.9)	5 (11.9)	0 (0)	
Moderate	6 (11.8)	9 (21.4)	5 (55.6)	
Severe	0 (0)	1 (2.4)	0 (0)	
Extremely Severe	0 (0)	1 (2.4)	2 (22.2)	
Stress				
Normal	48 (94.1)	33 (78.6)	5 (55.6)	0.002[a]
Mild	3 (5.9)	5 (11.9)	1 (11.1)	
Moderate	0 (0)	4 (9.5)	2 (22.2)	
Severe	0 (0)	0 (0)	1 (11.1)	
Extremely severe	0 (0)	0 (0)	0 (0)	

n=number of participants

[a] Tested using Chi Square test

Kruskal-Wallis test showed that nutritional status of patients (Stage A, B or C) was significantly different by the psychological state (Table 3). Specifically, the nutritional status differed by the depression score $H(2) = 11.73$, $P=0.003$. Patients in Stage A (median=0.0) had lower score compared to Stage B (median=2.0) and Stage C (median=6.0). Meanwhile, the score for anxiety $H(2) = 19.51$, $P<0.001$ was similar for Stage A (median=4.0) and Stage B (median=4.0) but higher for Stage C (median=12.0). The stress score $H(2) = 9.40$, $P=0.009$ also showed a lower score for Stage A (median=4.0) compared to Stage B (median=7.0) and Stage C (median=12.0).

In terms of depression score, from the post-hoc test with Benferroni correction, the significant difference was shown between Stage A with Stage C only (P=0.003) while others were not significantly different. This indicates that the depression score of Stage A was significantly lower compared to Stage C.

Additionally, for the anxiety score, the post-hoc test with Benferroni correction demonstrated significant differencse in all stages; Stage A with Stage B (P=0.026), Stage A and C (P<0.001) and Stage B and C (P=0.032). This indicates that the anxiety score of all stages was significantly different in which Stage A had lower score than Stage C.

Moreover, the stress score from the post-hoc test with Benferroni correction showed asignificant difference between Stage A with Stage C only (P=0.024) while others were found to be not significant. This shows that the stress score of Stage A was significantly lower compared to Stage C.

Table 3 Comparison of Nutritional Status According to PG-SGA with DASS-21 Scores q(median ± IQR)

Parameter	PG-SGA			
	A (n=51)	B (n=42)	C (n=9)	*P-value*[a]
Depression score	0.0 (2.0)	2.0 (4.0)	6.0 (7.0)	0.003
Anxiety score	4.0 (6.0)	4.0 (8.0)	12.0 (12.0)	<0.001
Stress score	4.0 (8.0)	7.0 (10.0)	12.0 (16.0)	0.009

[a] Tested using Kruskal-Wallis test

DISCUSSION

Cancer and its treatments can adversely affect the nutritional status of patients and may also cause distress. This study examined the association between nutritional status and psychological distress among patients with cancer.

The current study reported a slightly higher prevalence of malnutrition (50.0%) relative to the previous research performed at the National Cancer Institute in Putrajaya, Malaysia, which documented 43.5% of moderate to severely malnourished patients (Jamhuri et al., 2017). In another study, Bauer et al. (2002) recorded an almost equivalent prevalence of malnutrition using the same tools in Australia whereby 24% were well nourished, 59% were moderately nourished, and 17% were seriously malnourished (Bauer et al., 2002). Pressoir et al. (2010) reported a dissimilar rate of malnutrition (30.9%) in France. The difference in the rate of malnutrition among cancer patients may be due to different malnutrition tools used in different settings.

The prevalence of psychological distress in this study for depression, anxiety and stress was 6.9%, 31.4% and 15.7% respectively. The finding was almost comparable to a study performed by Ng et al. (2017) involving 200 cancer patients at the University of Malaya Medical Centre (UMMC), Kuala Lumpur, Malaysia, in which more than 35% of patients reported either anxiety or depression . Nevertheless, the present results have been lower than those in Saudi Arabia, which showed a high prevalence of depression, anxiety, and stress (44.8%, 52.5%, and 42.7% respectively) (Ahmed et al., 2018). In previous studies, 20-30% of cancer patients have also experienced significant psychological distress (Gao et al., 2010; Rao et al., 2019; Zabora et al., 2001). The varying prevalence of psychological distress in cancer patients may be attributed to a range of methods of analysis, such as the measuring instrument used to determine psychological distress and the variability of samples used in the research.

The nutritional status was found to be significantly associated with depression, anxiety, and stress, according to the Chi Square test. Then, through the Kruskal-Wallis test to compare the nutritional status with psychological score for each category of depression, anxiety, and stress, it was demonstrated that there

was a significant difference between Stage A and C for depression score. Cancer patients in Stage C (median=6.0) had a higher score compared to patients in Stage A (median=0). This was similar for stress score in which cancer patients in Stage C (median=12.0) had a higher score compared to patients in Stage A (median=4.0). Meanwhile, there was also significant differences for all stages in the anxiety score.

It is suggested that nutritional status was associated with psychological distress among cancer patients. In patients with higher psychological scores, there was a significant difference of scores between well nourished (Stage A) and severely malnourished (Stage C) cancer patients. These results are supported by findings from recent research in Western China, which found that higher nutritional status is significantly associated with higher psychological distress ($P< 0.001$) (Zhu et al., 2018). Certain work has shown that malnutrition has a strong association with psychological distress ($P< 0.01$); when malnutrition increases, as does the degree of psychological distress (Abid, 2016). Moreover, lower anxiety and depression levels are significantly associated with improved nutritional status ($P<0.001$) (Chabowski et al., 2018).

The poor nutritional status may increase the risk of mortality and morbidity among cancer patients. Furthermore, based on a systematic review, higher cancer-specific mortality and poorer cancer survival are associated with psychological distress (symptoms of depression and anxiety)(Wang et al., 2020). This indicates that the nutritional status and psychological distress of patients need to be explored to implement strategies aimed at improving nutritional status, mental well-being and perceived symptoms in the recovery process as soon as possible. In addition, the need for an interdisciplinary integrated plan developed by physicians, nurses, dietitians, social workers, psychologists and other health professionals to ensure an adequate quality of life and improve the clinical outcomes of cancer patients needs to be highlighted.

The potential strengths of this study included both outpatient and inpatient cancer patients. The overall prevalence of malnutrition at Hospital Universiti Sains Malaysia can therefore be estimated among cancer patients. Previous studies have validated the PG-SGA tools to be specially developed for cancer patients (Bauer et al., 2002; Isenring et al., 2003). In addition to thatDASS-21 is a simple and quick self-reported questionnaire that assess the psychological stress levels. Our study is limited to its cross-sectional nature and did not allow us to study the interaction between nutritional status and distress over time. Furthermore, the low number of participants experienced depression and stress gave a limited interpretation on the association. Other drawbacks included the usage of non-probability sampling and therefore could not represent the entire population of cancer patients. This study also did not include clinical factors such as cancer stage, malignancy and nutritional support. In spite of that, the results from this study may contribute to the body of knowledge in implementing an intervention that is appropriate for cancer patients.

CONCLUSION

The risk of malnutrition in cancer patients is higher because of their illnesses and treatments, which have an adverse effect on their nutritional status. Early identification and detection of the risk of malnutrition by health care professionals is considered effective to improve future care provision. More importantly, there may be certain levels of psychological distress in more people who suffer from cancer because of their physical, emotional or social consequences. This research showed that significant correlations exist between psychological distress and nutritional conditions. The positive association between depression, anxiety and stress was important for the nutritional status among the cancer patients. To conclude, there is a need to further examine the nutritional status and psychological distress of cancer patients that include effective strategies to improve their nutritional status, mental wellbeing and symptoms as early as possible during treatment.

For future study, consideration should be given to factors such as the disease stage, malignancy, medication, duration of stay and nutritional support that may affect the prevalence of malnutrition in cancer patients. Moreover, in order to ensure the consistency in the interview process, it is perhaps necessary to evaluate nutritional status using the PG-SGA in Malay version.

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CONFLICT OF INTEREST

The authors did not have a conflict of interest to declare.

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