The Journal of Nutrition and Food Sciences

Journal Home Page: https://nutritionsocietyofsrilanka.org/the-journal-of-nutrition-and-food-sciences-2/

Nutritional Status and its Association with Quality of Life among Cancer Patients in Southern Sri Lanka: A Cross-Sectional Study

D.R.D.S.M.S. Bandara.[1] and E. De Zoysa [2]

[1]*Department of Nursing Faculty of Allied Health Sciences, University of Ruhuna*
[2]*Department of Biochemistry,Faculty of Medicine, University of Ruhuna*

ARTICLE INFO

Article history:
Received: 13.06.2023
Revised version received: 09.12.2023
Accepted: 15.12.2023
Available online: 30.01.2024

Keywords:
Cancer
Nutritional assessment
PG-SGA SF
Quality of life
Southern Sri Lanka

Citation
Bandara, D.R.D.S.M.S. & De Zoysa, E. (2023). Nutritional Status and its Association with Quality of Life among Cancer Patients in Southern Sri Lanka: A Cross-Sectional Study. *The Journal of Nutrition and Food Sciences*, 2(1), 1-13

*Corresponding author:
ericdezoysa@yahoo.com

ABSTRACT

Background and objectives: Malnutrition is a prevalent yet frequently overlooked issue among cancer patients, contributing to diminished quality of life (QOL). This study aimed to evaluate the nutritional status and QOL of cancer patients in a tertiary healthcare setting in Southern Sri Lanka.

Materials and methods: This descriptive cross-sectional study included 425 participants from the Oncology Unit of Teaching Hospital, Karapitiya. Data on socio-demographic characteristics were gathered through an interviewer-administered questionnaire. The nutritional status and QOL were assessed using the Patient-Generated Subjective Global Assessment Short Form (PG-SGA SF) and the validated Sinhala version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30), respectively. Data analysis was conducted using SPSS Version 25.

Results: From the total subjects (n=425), majority (67.1%, n= 285) were females and 174 (40.9%) belonged to the age group of 51- 61 years. Among them, 168 (39.5%) subjects had cancers in the digestive tract and 110 (25.9%) had breast cancers. Nutritional status according to PG-SGA SF demonstrated that 191 (44.9%) patients were well-nourished and the majority (55.0%, n=234) were malnourished. Among malnourished, 158 were moderately and 76 were severely malnourished. Mean (SD) score for the overall quality of life defined as global health status according to EORTC QLQ-C30 was 54.36 ± 27.5 indicating poor overall QOL (reference value >61.3). All the dimensions of the functioning scale and the symptoms scale had low and high mean scores respectively indicating poor QOL. The association between the overall QOL and different nutritional stages ($p< 0.001$) and all the dimensions of the functional scale and symptoms scale ($p< 0.05$) were statistically significant.

Conclusions: The study reveals a high prevalence of moderate to severe malnutrition among cancer patients, accompanied by poor QOL. A statistically significant correlation between nutritional status and QOL scores reflects the imperative requirement of nutritional interventions aimed at enhancing QOL in this specific population.

INTRODUCTION

Cancer is a multifaceted global health issue and the second leading cause of death globally (Sung et al., 2021). According to WHO, approximately 70% of deaths due to cancer occur in low and middle-income countries (WHO, 2022). The increasing burden of cancer has become a major challenge faced by Sri Lanka and the overall incidence of cancer in Sri Lanka has doubled over the past 25 years and it has become the second commonest cause of hospital mortality in Sri Lanka constituting 14% of all hospital deaths (Gunasekera, Seneviratne, Wijeratne, & Booth, 2018). Nutrition is an important factor in the treatment, management and progression of cancers (Sharma, Kannan, Tapkire, & Nath, 2015). However, it is often ignored in the treatment and follow up and hence, malnutrition is a common though under recognized problem in cancer patients (Leuenberger, Kurmann, & Stanga, 2010). Malnutrition associated with cancer has been shown to precipitate a range of adverse outcomes, such as worsened prognosis, diminished survival rates, heightened sensitivity to treatment toxicity, and reduced tolerance to therapeutic interventions. Furthermore, it exerts a detrimental impact on patients' quality of life (Muscaritoli, Corsaro, & Molfino, 2021). Remarkably, disease-related malnutrition accounts for approximately 20% of mortality among cancer patients, surpassing the direct effects of the cancer itself as a cause of death (Silva, de Oliveira, Souza, Figueroa, & Santos, 2015).Prompt identification of malnutrition or risk of malnutrition is fundamental to its treatment and prevention or reversal of aforementioned negative clinical outcomes (Barker, Gout, & Crowe, 2011). Therefore, it is necessary to use appropriate, locally validated tools to assess the patient's nutritional status and to identify the cases. This enables the estimation of prevalence and classification of them allowing the provision of a suitable dietary plan for them (Lochs & Dervenis, 2003).

Many different tools are available for the assessment of the nutritional status in cancer patients. Patient-Generated Subjective Global Assessment (PG-SGA) is an assessment tool of nutritional status and it is broadly used in academic research and clinical practice as well. The first part of PG-SGA is to be completed by the patients and is referred to as PG-SGA Short Form (PG-SGA SF) (Balstad et al., 2019). PG-SGA SF has been validated as an independent screening tool and it is one of the most commonly used nutrition assessment tools that assess nutritional status (Abbott et al., 2016).Quality of life (QOL) of a cancer patient is an important issue, especially for disease survivors, their families, and caregivers. It is a multidimensional perspective that includes dimensions such as physical, psychological, social and spiritual (Jitender, Mahajan, Rathore, & Choudhary, 2018). In cancer patients, QOL is significantly affected by the specific diagnosis, patient's perception about the condition, the disease's impact on the patient's physical and mental condition, short- and long-term adverse effects of treatment, the patient's coping mechanisms, and the reactions of their family members or other individuals (Ośmiałowska, Misiąg, Chabowski, & Jankowska-Polańska, 2021).

It is intended that QOL measures are for the assessment of patients' perspectives on the impact of health and healthcare interventions on their lives and to allow these perspectives to be considered in clinical decision-making (Addington-Hall & Kalra, 2001).The European Organisation for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire (QLQ-C30) stands as a prominent instrument for evaluating quality of life in oncology research, having been utilized in over 3,000 scholarly studies since its introduction in 1993. Many studies have been conducted to assess the nutritional status and QOL separately on oncology patients worldwide and studies done in Sri Lanka may be very few according to the existing literature. It is a well-known fact that patients with better nutrition can tolerate the anti-cancer treatment and their outcome would be better. Many studies supported a complementary role for dietary interventions in improving patient quality of life across

multiple cancer types by reducing toxicity and perhaps a benefit in treatment efficacy (Mercier et al., 2022). Further, it was recommended that baseline screening for malnutrition risk using a validated instrument following cancer diagnosis and repeated screening during and after treatment to monitor nutritional well-being of cancer patients (Hiatt et al., 2023).If the treatment outcome is better, their QOL will be much better and that must be the holistic management target of cancer patients. Further, a good understanding of the nutritional status of patient helps the clinician and the management team to plan the most appropriate treatment for a better QOL of the patient. Therefore, this study was conducted to assess the nutritional status and the QOL of cancer patients and to identify the correlation between the two parameters. The findings of this study will be useful to generate baseline data on nutritional status and the QOL of life of local patients with cancers and the findings can be used in the decision making in the management and implementation of programs to improve the nutritional status and QOL of cancer patients in future.

This study aimed to evaluate the nutritional status using the Patient-Generated Subjective Global Assessment Short Form and to examine the association between nutritional status and quality of life using European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 among cancer patients managed at Teaching Hospital, Karapitiya,

MATERIALS & METHODS

This research was conceived as a descriptive cross-sectional study conducted over a period spanning from June to July 2022. The study comprised of patients receiving treatment in the oncology and onco-surgical wards, in addition to cancer patients attending the respective outpatient clinics. The study sample was calculated based on the formula from Lowanga & Lameshow (1991). Based on the limited available data suggesting an under-exploration of the nutritional status among cancer patients in Sri Lanka, an anticipated population proportion of 50% for malnutrition was posited. Consequently, the minimum required sample size for robust analysis was determined to be 385 participants. To account for potential attrition, the sample size was augmented by 10%, resulting in a final sample size of 425 individuals. Participants were recruited via convenience sampling method until the target sample size was attained.

Patients who were diagnosed with cancer, aged more than 18 years and who were under treatment or on follow-up were included in the study. Patients below 18 years of age, uncertain diagnosis of neoplasm, those who did not give consent, serious chronic co-morbidities which may interfere with the perception of one's own health situation, cognitive dysfunction or dementia were excluded from the study.

Data collection was performed after obtaining ethical approval for the study from the Ethical Review Committee of the Faculty of Allied Health Sciences, University of Ruhuna, Galle, Sri Lanka (Reference No:2021.11.58). Administrative clearance was obtained from the Director of the Teaching Hospital Karapitiya and relevant consultants. Informed written consent was obtained from each of the participants who were selected for the study. Study participants were informed that they could leave the study at any time. Confidentiality of the information collected was assured.

Basic information of the subjects was collected by using a pretested interviewer-administered questionnaire which. included socio-demographic data such as age, gender, religion, ethnicity, marital status, occupation, number of children and income level, type of cancer, mode of treatment, time from primary diagnosis and satisfaction with the present health condition according to the patient's perception.

Assessment of nutritional status was done by using the Sinhala version of the Patient-

Generated Subjective Global Assessment Short Form (PG-SGA SF) (Abbott et al., 2016). PG-SGA SF, consists of four components and each of the component patients report on current and former body weight (Box 1); changes in food intake and current type of food/nutritional intake (Box 2); nutritional impact symptoms and other factors that negatively influence food intake/absorption/utilization of nutrients (Box 3); and activities and function based on Eastern Cooperative Oncology Group performance status, converted to layman's language (Box 4). In the PG-SGA Short Form numerical scoring system is used which range from 0 (no problems) to 36 (worst problem). Box 1 of PG-SGA SF has a maximum score of 5, Box 2 has a maximum score of 4, Box 3 has a maximum score of 24, and Box 4 has a maximum score of 3.(Balstad et al., 2019). This tool can be used for the diagnosis of malnutrition and to classify patients as either: A) well-nourished (0-3 points); B) mildly/moderately malnourished (≥4 points); or C) severely malnourished (≥9 points) (Hiatt et al., 2023). Sinhala translation of PG-SGA SF was done by using translation and back translation method by two bilingual experts and face validation of the translated version was done by two experts in nutrition and Community Medicine.

Data on QOL was collected by using the validated Sinhala version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ- C30) (Jayasekara, Rajapaksa, & Aaronson, 2008).This questionnaire includes 30 questions in 15 subscales relevant to patients with cancer, five distinct aspects of functioning (physical, role, emotional, cognitive, and social), eight symptoms (fatigue, nausea/vomiting, pain, dyspnoea, insomnia, appetite loss, constipation, and diarrhoea), financial difficulties, and global health/quality of life (Fayers & Bottomley, 2002).

All data were coded and entered into a database, which was created using the Statistical Package of Social Sciences (SPSS) version 25. Data cleaning and checking were done. Data were expressed as means and standard deviations where appropriate. Differences between the proportions of groups were tested for statistical significance using the chi-square test. Descriptive analysis (frequencies) was used to analyse the socio-demographic characteristics of the cancer patients. Pearson correlation was used to assess the correlations of two continuous variables. Two-tailed p-value less than 0.05 was selected as the level of statistical significance.

RESULTS

Among the, 425 cancer patients, 285 (67.1%) of them were females and 140 (32.9%) were males. The majority of the subjects (n=174, 40.9%) were in the age group of 51-61 years and from the others, 121 (28.5%) and 61 (14.4%) were in the age groups of 62-72 years and 40-50 years respectively (Table 1).

In this sample, the majority of the study subjects were Sinhala (n=410, 96.5%) and 11 (2.6%) and 4 (0.9%) were Muslim and Tamil respectively. The majority of the subjects (n=351, 82.6%) were married and most of them (n=256, 60.2%) had one to three children whereas 59 (13.9%) had no children. When considering the occupation of the study subjects 199 (46.8%) were housewives, 134 (31.5%) had lost their employment because of the disease and 33 (7.8%) were self-employers. The monthly income of most of the subjects (n=211, 49.6%) was 15 000-30 000 LKR and 106 (24.9%) subjects had a monthly income of less than 15 000 LKR.

The participants were given a chance to express their satisfaction about their present health condition according to their perception and the level of satisfaction of most of the study participants (n=237, 55.8%) was bad or worse whereas 44.2% (n=188) of the subjects had excellent or good satisfaction about their present health condition. Patients were classified according to the site of the tumor/cancer and the majority of the subjects had cancers in the digestive tract (Figure 1).

Table 1. Socio-demographic characteristics of the cancer patients in Cancer Unit of Teaching Hospital, Karapitiya

Character	Frequency (n)	Percentage (%)
Age (years)		
18-28	11	2.6
29-39	17	4.0
40-50	61	14.4
51-61	174	40.9
62-72	121	28.5
< 72	41	9.6
Gender		
Female	285	67.1
Male	140	32.9
Religion		
Buddhist	408	96.0
Islamic	11	2.6
Hindu	04	0.9
Christian	02	0.5
Ethnicity		
Sinhala	410	96.5
Muslim	11	2.6
Tamil	04	0.9
Marital Status		
Married	351	82.6
Unmarried	37	8.7
Widowed	31	7.3
Divorced	06	1.4
Occupation		
House wife	199	46.8
Left the employment because of disease condition	134	31.5
Private sector	46	10.8
Self- employer	33	7.8
Government sector	13	3.1
Number of children		
1-3	256	60.2
>3	110	25.9
No children	59	13.9

Table 1. Cont.

Character	Frequency (n)	Percentage (%)
Income level (LKR)		
>15000	106	24.9
15000-30000	211	49.6
30000-45000	94	22.1
>45000	14	3.3
Patient's satisfaction about their present health condition (according to the patient's opinion)		
Excellent	30	7.1
Good	158	37.2
Bad	182	42.8
Worse	55	12.9

LKR = Sri Lankan Rupees

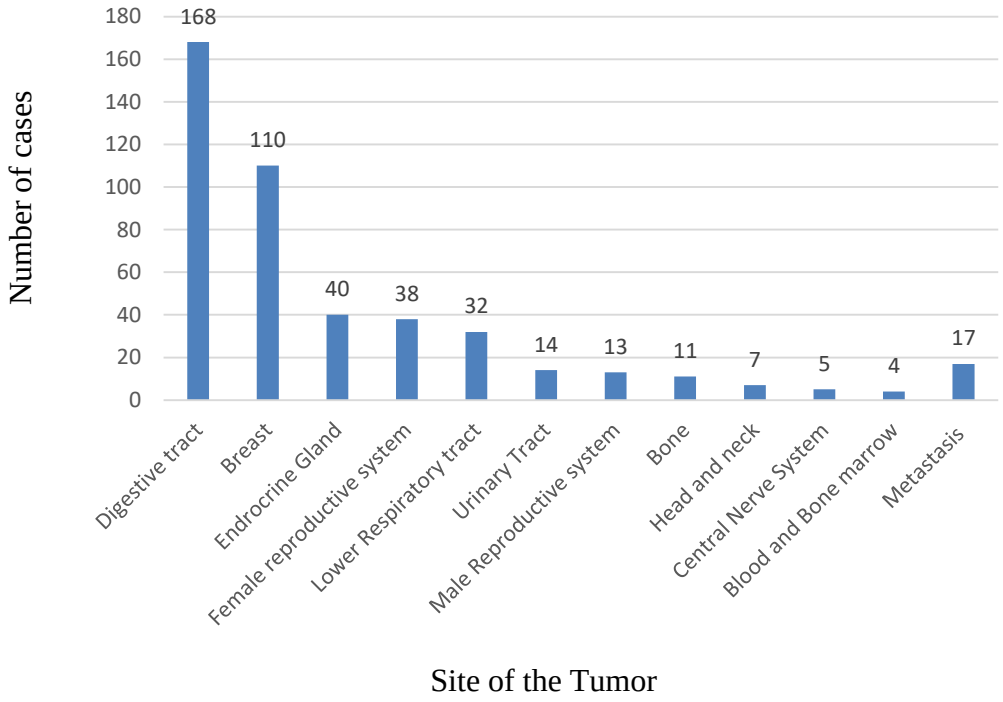

Figure 1. Distribution of the site of the tumour/cancer

Time duration from the primary diagnosis, in most of the study subjects (181, 42.6%) was more than twelve months and 131 (30.8%) subjects were diagnosed during the last six months and others (n=113, 26.6%) between six to twelve months. At the time of data collection, 170 (40%) were on chemotherapy, 70 (16.5%) underwent surgery and 55 (12.9%) were on radiotherapy. Of the remaining subjects, 116 (27.3%) were on other treatments such as hormone therapy (thyroxine) and 14 (3.3%) were not on any treatment.

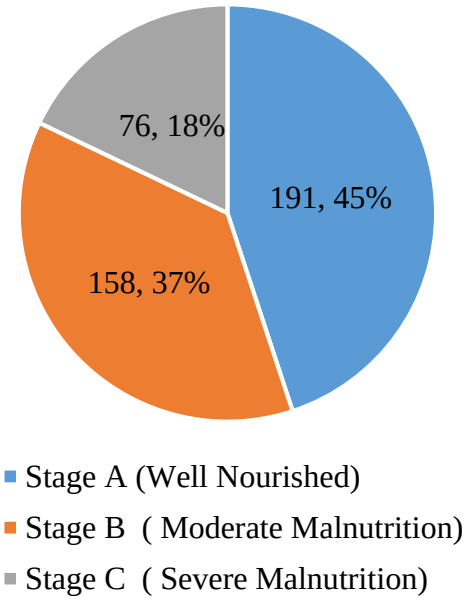

Figure 2. Frequency distribution of nutritional status of the cancer patients in the Cancer Unit of Teaching Hospital Karapitiya by PG-SGA Short Form.
PG-SGA = Patient-Generated Subjective Global Assessment Short Form

According to the analysis of the PG-SGA SF, the majority of the subjects (n =234, 55.0 %) had moderate (Stage B) or severe malnutrition (Stage C) and 191 (45.0%) of subjects were well nourished (Stage A) (Figure 2). From the study subjects who were well nourished, 76 (39.79%) had tumours of the digestive tract, 57 (29.84%) had breast cancers and 19 (9.9 %) had cancers in the endocrine glands such as thyroid. Among the participants with moderate malnutrition, 55 (34.81%) had tumours of the digestive tract, 34 (21.51%) had breast cancers and 19 (12.02 %) had tumours of the female reproductive system. Of those who were severely malnourished, 37 (39.79%) had tumours of the digestive tract, 19 (29.84%) had breast cancers and 8 (9.9 %) had lung cancers.

Analysis of the nutritional status with the type of cancers (Figure 3) demonstrated that from the subjects with cancers of the digestive tract (n=168), the majority (n=87, 54.8%) were moderately or severely malnourished and only 76 (45.2%) were well nourished.

Quality of life of cancer patients

Analysis of the EORTC QLQ - C30 is demonstrated in Table 2 and mean (SD) scores obtained for each of the sub-scales with the mean reference values are indicated. The mean (SD) score for the overall quality of life defined as global health status in this sample was 54.4 ± 27.5 and it indicated poor overall QOL in this group of patients when compared to the reference value. All the dimensions of the functioning scale had low mean sores and all the dimensions of the symptoms scale had high scores (except for diarrhoea) indicating poor QOL.

Correlation between the patient's quality of life and the nutritional status

In this study mean scores of different dimensions of EORTC QLQ - C30 were compared with the nutritional stages of the study subjects to assess the correlation between them (Table 3). According to the results, it was found that there was a statistically significant correlation ($p< 0.001$) between the overall QOL of the study subjects and their nutritional status. Further, similar correlations ($p< 0.001$) were observed between the dimensions of the sub-scales of the EORTC QLQ - C30 and the nutritional status except for "diarrhoea" in the symptoms scale.

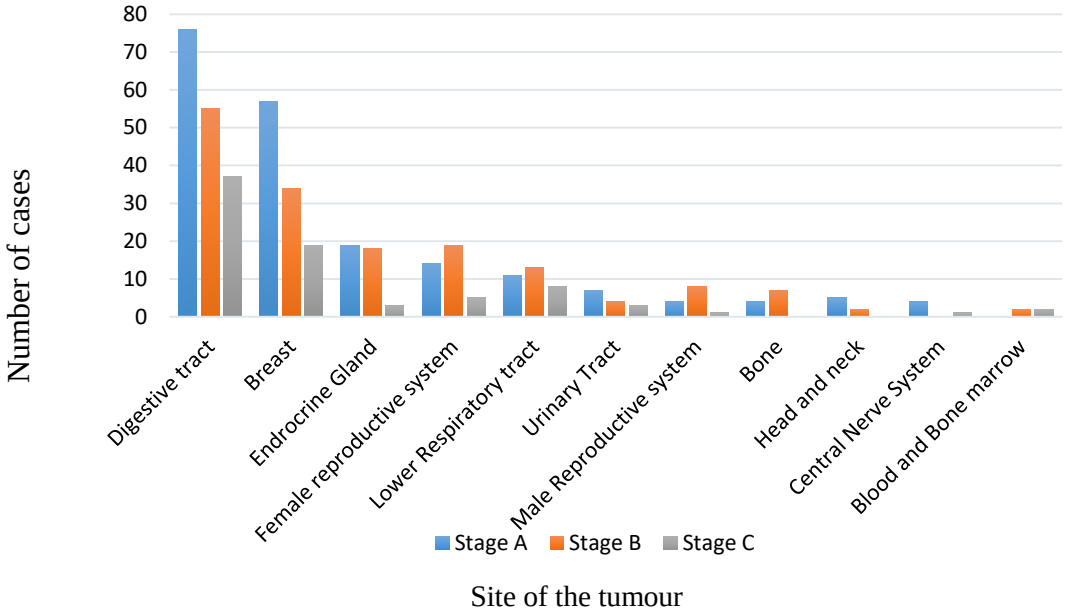

Figure 3. Distribution of nutritional status of cancer patients by the site of the tumour
A = Well nourished, B = Moderate malnutrition, C = Severe malnutrition

Table 2. Mean scores for quality of life by EORTC QLQ - C30

Variable	Mean (±SD)	Mean (EORTC) reference value
The overall quality of life		
Global health status	54.4 ± 27.5	61.3
Functioning scale		
Physical	53.6 ± 28.8	76.7
Role	40.0 ± 31.7	70.5
Cognitive	71.6 ± 28.5	82.6
Emotional	40.7 ± 29.5	71.4
Social	32.7 ± 31.3	75.0
Symptoms scale		
Fatigue	55.3 ± 27.9	34.6
Nausea and vomiting	13.8 ± 27.3	9.1
Pain	47.7 ± 33.0	27.0
Dyspnoea	17.5 ± 28.0	21.0
Insomnia	30.1 ± 38.8	28.9
Appetite loss	34.5 ± 40.6	21.1
Constipation	23.1 ± 38.0	17.5
Diarrhoea	6.5 ± 21.2	9.0
Financial difficulty	91.9 ± 22.1	16.3

EORTC = European Organization for Research and Treatment of Cancer

Table 3. Correlation between the patient's quality of life and nutritional status

Variable	SGA A (n= 191)	SGA B (n=158)	SGA C (n=76)	Mean (EORTC reference value)	p value
	Mean				
The overall quality of life					
Global health status	66.5	51.7	29.6	61.3	0.001*
Functioning scale					
Physical	64.5	50.7	32.6	76.7	0.001*
Role	52.8	36.1	15.8	70.5	0.001*
Cognitive	75.4	71.8	61.6	82.6	0.001*
Emotional	48.2	34.6	34.4	71.4	0.001*
Social	42.8	25.9	21.1	75.0	0.001*
Symptoms scale					
Fatigue	41.5	58.8	82.4	34.6	0.001*
Nausea and vomiting	4.7	14.6	35.0	9.1	0.001*
Pain	37.2	50.1	69.5	27.0	0.001*
Dyspnoea	9.5	19.2	34.2	21.0	0.001*
Insomnia	17.8	35.9	49.2	28.9	0.001*
Appetite loss	10.1	48.3	67.1	21.1	0.001*
Constipation	9.8	24.3	54.0	17.5	0.001*
Diarrhoea	5.4	7.4	7.5	9.0	0.627
Financial Difficulty	94.2	92.8	84.2	16.3	0.001*

* Significant p-value at 0.05 level
EORTC = European Organization for Research and Treatment of Cancer,
SGA = Subjective Global Assessment

Correlation between the quality of life and mode of treatment

The different dimensions of QOL and the different modes of treatment (chemotherapy, radiotherapy, surgery etc.) were analysed to assess the correlation between them. According to the results, there was a significant ($p<0.001$) correlation between the overall QOL (global health score) and the mode of treatment. Further, all the dimensions of the functioning scale had significant ($p<0.001$) correlation with treatment modalities and most of the dimensions of the symptoms scale and modes of treatment did not show significant correlations.

DISCUSSION

In this study sample, the majority were females (67.1%) and the reason behind this may be the higher incidence of breast cancer (the commonest cancer) in Sri Lanka (Jayasinghe, Fernando, Jayarajah, & Seneviratne, 2021). It was also found that the majority of participants (40.9%) were in the age group of 51 to 61 years and it is a well-known fact that the incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age (WHO, 2022).This finding was compatible with two previous studies which were done in 2009 and 2021 in Sri Lanka (Lokuhetty, Ranaweera, Wijeratne, Wickramasinghe, & Sheriffdeen, 2009).

Most of the subjects (74.5%) had low monthly income (less than 30,000 LKR) in this sample and loss of employment due to cancer may be a contributing factor. In this sample, almost one-third of the subjects lost their employment due to the disease condition. Previous studies have reported that cancer survivors have a 1.4 times higher risk of unemployment when compared to healthy controls (de Boer, Taskila, Ojajärvi, van Dijk, & Verbeek, 2009). Low income may be associated with poor nutritional status observed in this study sample other than cancer itself.

According to the site of tumour, most of the patients had cancers in the gastrointestinal tract (39.5%) followed by the breast (25.9%). The Global Cancer Observatory (GCO) report in 2020 reported that breast, lip, oral cavity, colorectal, lung and oesophagus as the top six most prevalent cancers in Sri Lanka. We included cancers in the lip and oral cavity, oesophagus, colon and rectum into one category and that could be the reason for the reported higher prevalence of cancers in the gastrointestinal tract in this study sample.

The majority of subjects in this sample were not satisfied with their present health condition and it may be due to the effect of cancer itself, poor nutrition and the poor socio-economic status. The majority of subjects in this sample were malnourished and this observation confirms with previously published studies where the prevalence of malnutrition was 40-80% (Ferguson et al., 1999; Vergara, Montoya, Luna, Amparo, & Cristal-Luna, 2013). The different rates of prevalence of malnutrition in different studies can be attributed to several factors including differences in assessment tools, differences in ethnicity, food habits, and sample size etc.

In the present study, the quality of life of cancer patients was assessed using EORTC QLQ C30 version 3 which considers assessing the quality of life of cancer patients during the past week. This includes global health status which measures overall QOL, functioning and symptom scales with different dimensions. In this, each item measures a range in score from 0 to 100. A high score for the global health status represents a high QOL and a higher score for a functional scale represents a healthy level of functioning but a high score for a symptom scale represents a higher level of symptomatology or problems.

In the current study, the score for global health is lower than the EORTC reference value for the global score for all cancer types and all stages. Mean scores for all dimensions of the functioning scale were significantly lower than the EORTC reference values and all symptom scales were significantly higher than the EORTC reference values. This could be due to the side effects of cancer disease itself and treatment indicating poor QOL. This finding is also supported by the findings of a recently conducted study in a similar setting in Sri Lanka (Seneviratne, 2020).

A statistically significant association between QOL and the nutritional status of the patients ($p < 0.05$) was observed in this group of patients. In patients who were well-nourished (Stage A), the global quality of life score is above average (66.4 ± 24.8) which is slightly better than the EORTC reference value (61.3 ± 24.2) for all cancer types and scores for all

functional scales were significantly lower than the EORTC reference values. Symptoms scales except for fatigue, pain and financial difficulties are better than the EORTC reference value in patients who were well-nourished. In comparison to the EORTC reference value, the quality of life of participants who were in nutritional stages B and C, the global quality of life score and scores for all functional scales were significantly lower. This indicated that the QOL was low in participants who were in stage B and C and they need more attention to improve QOL. In line with the findings of the current study, some of the previous studies which was done in Philippines and Bangladesh have also observed a high prevalence of malnutrition and there was statistically significant association between QOL and the patient's nutritional status (Alam et al., 2020; Vergara et al., 2013).

CONCLUSIONS

In this group of cancer patients, a predominant proportion of patients exhibited moderate to severe malnutrition and correspondingly poor overall quality of life (QOL). The general dissatisfaction with their current health status among the majority of patients are likely to be attributed to multiple factors which include the debilitating effects of cancer itself, inadequate nutrition, and suboptimal socio-economic conditions. Given the statistically significant correlation between nutritional status and overall QOL in this patient population, it becomes imperative to prioritize nutritional assessment which should be accompanied by appropriate intervention. Consequently, we recommend that comprehensive nutritional evaluations need to be integrated into the initial planning stages of overall cancer management. Such an approach serves to enhance QOL and improve patient general health and well-being of the patient.

ACKNOWLEDGEMENT

We would like to thank all the participants and the staff of the Oncology Unit of the Teaching Hospital Karapitiya for the support extended during data collection.

DECLARATION OF CONFLICT OF INTEREST

The authors declare that they have no competing interests.

REFERENCES

Abbott, J., Teleni, L., McKavanagh, D., Watson, J., McCarthy, A. L., & Isenring, E. (2016). Patient-generated subjective Global Assessment Short Form (PG-SGA SF) is a valid screening tool in chemotherapy outpatients. *Supportive Care in Cancer*, *24*(9), 3883–3887. https://doi.org/10.1007/s00520-016-3196-0

Addington-Hall, J. (2001). Measuring quality of life: Who should measure quality of life? *BMJ*, *322*(7299), 1417–1420. https://doi.org/10.1136/bmj.322.7299.1417

Alam, M. M., Rahman, T., Afroz, Z., Chakraborty, P. A., Wahab, A., Zaman, S., & Hawlader, M. D. (2020). Quality of life (QOL) of cancer patients and its association with nutritional and performance status: A pilot study. *Heliyon*, *6*(10). https://doi.org/10.1016/j.heliyon.2020.e05250

Balstad, T. R., Bye, A., Jenssen, C. R., Solheim, T. S., Thoresen, L., & Sand, K. (2019). Patient interpretation of the patient-generated subjective global assessment (PG-SGA) short form Patient Preference and Adherence, 13, 1391–1400. https://doi.org/10.2147/ppa.s204188

Barker, L., Gout, B., & Crowe, T. (2011). Hospital malnutrition: Prevalence, identification and impact on patients and the healthcare system. International

Journal of Environmental Research and Public Health, 8(2), 514–527. https://doi.org/10.3390/ijerph8020514

de Boer, A. G., Taskila, T., Ojajärvi, A., van Dijk, F. J., & Verbeek, J. H. (2009). Cancer survivors and unemployment. *JAMA*, 301(7), 753. https://doi.org/10.1001/jama.2009.187

Fayers, P., & Bottomley, A. (2002). Quality of Life Research within the EORTC—the EORTC QLQ-C30. *European Journal of Cancer*, *38*, 125–133. https://doi.org/10.1016/s0959-8049(01)00448-8

Ferguson, M., Bauer, J., Gallagher, B., Capra, S., Christie, D., & Mason, B. (1999). Validation of a malnutrition screening tool for patients receiving radiotherapy. *Australasian Radiology*, 43(3), 325–327. https://doi.org/10.1046/j.1440-1673.1999.433665.x

Gunasekera, S., Seneviratne, S., Wijeratne, T., & Booth, C. M. (2018). Delivery of cancer care in Sri Lanka. *Journal of Cancer Policy*, *18*, 20–24. https://doi.org/10.1016/j.jcpo.2018.10.001

Hiatt, R. A., Clayton, M. F., Collins, K. K., Gold, H. T., Laiyemo, A. O., Truesdale, K. P., & Ritzwoller, D. P. (2023). The Pathways to Prevention Program: Nutrition as prevention for improved cancer outcomes. *JNCI: Journal of the National Cancer Institute*, *115*(8), 886–895. https://doi.org/10.1093/jnci/djad079

Jayasekara, H., Rajapaksa, L. C., & Aaronson, N. K. (2008). Quality of life in cancer patients in South Asia: Psychometric properties of the Sinhala version of the EORTC QLQ-C30 in cancer patients with heterogeneous diagnoses. *Quality of Life Research*, *17*(5), 783–791. https://doi.org/10.1007/s11136-008-9345-2

Jayasinghe, R., Fernando, A., Jayarajah, U., & Seneviratne, S. (2021). Post treatment quality of life among Sri Lankan women with breast cancer. *BMC Cancer*, *21*(1). https://doi.org/10.1186/s12885-021-08055-5

Jitender, S., Mahajan, R., Rathore, V., & Choudhary, R. (2018). Quality of life of cancer patients. *Journal of experimental therapeutics & oncology*, *12*(3), 217–221

Leuenberger, M., Kurmann, S., & Stanga, Z. (2010). Nutritional screening tools in daily clinical practice: The focus on cancer. *Supportive Care in Cancer*, 18(S2), 17–27. https://doi.org/10.1007/s00520-009-0805-1

Lochs, H., & Dervenis, C. (2003). Malnutrition – the ignored risk factor. *Digestive Diseases*, *21*(3), 196–197. https://doi.org/10.1159/000074105

Lokuhetty, M. D., Ranaweera, G. G., Wijeratne, M. D., Wickramasinghe, K. H., & Sheriffdeen, A. H. (2009). Profile of breast cancer in a group of women in a developing country in South Asia: Is there a difference? *World Journal of Surgery*, *33*(3), 455–459. https://doi.org/10.1007/s00268-008-9860-x

Mercier, B. D., Tizpa, E., Philip, E. J., Feng, Q., Huang, Z., Thomas, R. M., Pal, S. K., Dorff, T. B., & Li, Y. R. (2022). Dietary interventions in cancer treatment and response: A comprehensive review. *Cancers*, *14*(20), 5149. https://doi.org/10.3390/cancers14205149

Muscaritoli, M., Corsaro, E., & Molfino, A. (2021). Awareness of cancer-related malnutrition and its management: Analysis of the results from a survey conducted among medical oncologists. *Frontiers in Oncology*, *11*. https://doi.org/10.3389/fonc.2021.682999

Ośmiałowska, E., Misiąg, W., Chabowski, M., & Jankowska-Polańska, B. (2021). Coping strategies, pain, and quality of life in patients with breast cancer. *Journal of Clinical Medicine*, 10(19), 4469. https://doi.org/10.3390/jcm10194469

Seneviratne, S. (2020). Cancer in Sri Lanka; trends, care and outcomes. Sri Lanka *Journal of Surgery*, 38(3), 1. https://doi.org/10.4038/sljs.v38i3.8772

Sharma, D., Kannan, R., Tapkire, R., & Nath, S. (2016). Evaluation of nutritional status of cancer patients during treatment by patient-generated subjective global assessment: A hospital-based study. *Asian Pacific Journal of Cancer Prevention*, 16(18), 8173–8176. https://doi.org/10.7314/apjcp.2015.16.18.8173

Silva, F. R., de Oliveira, M. G., Souza, A. S., Figueroa, J. N., & Santos, C. S. (2015). Factors associated with malnutrition in hospitalized cancer patients: A croos-sectional study. *Nutrition Journal*, 14(1). https://doi.org/10.1186/s12937-015-0113-1

Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: Globocan estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: *A Cancer Journal for Clinicians*, 71(3), 209–249. https://doi.org/10.3322/caac.21660

Vergara, N., Montoya, J. E., Luna, H. G., Amparo, J. R., & Cristal-Luna, G. (2013). Quality of life and nutritional status among cancer patients on chemotherapy. *Oman Medical Journal*, 28(4), 270–274. https://doi.org/10.5001/omj.2013.75

World Health Organization. (n.d.). Cancer. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/cancer