

Assessing The Severity of Oropharyngeal Dysphagia and its Relation to Quality of Life Status in Head and Neck Cancer Patients After Undergoing Chemoradiotherapy in DR Sardjito Public Hospital, Yogyakarta, Indonesia: A Cross Sectional Prospective Study

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Abstract

Head and neck cancer treatment frequently causes oropharyngeal dysphagia, which may impair nutritional status, psychological well-being, social functioning, and overall quality of life. This study aimed to assess dysphagia severity and swallowing-related quality of life, compare changes in these outcomes during early follow-up, and determine the relationship between dysphagia severity and quality of life among patients after chemoradiotherapy. A prospective observational study was conducted among 60 patients with head and neck cancer at the ENT Outpatient Clinic of Dr. Sardjito General Hospital, Yogyakarta. Oropharyngeal dysphagia was evaluated using the Gugging Swallowing Screen, while quality of life was measured using the Indonesian version of the Swallowing Quality of Life questionnaire during the first and 12th weeks after treatment. Data were analyzed using the Kruskal–Wallis, Gamma correlation, and Friedman tests. Dysphagia severity was significantly associated with quality of life at the first week ($r = 0.729$; $p < 0.001$) and the 12th week ($r = 0.827$; $p < 0.001$). However, dysphagia severity ($p = 0.782$) and quality of life ($p = 1.000$) did not change significantly between assessments. Delayed swallowing was the predominant symptom, whereas burden and eating desire were the most affected quality-of-life domains. In conclusion, persistent dysphagia was strongly associated with poorer quality of life, emphasizing the need for early screening, multidisciplinary management, and continuous swallowing rehabilitation.

INTRODUCTION

Head and neck cancer (HNC) is one of the most prevalent cancers worldwide and consists of a broad spectrum of heterogeneous neoplasms originating from the oral cavity, nasopharynx, oropharynx, hypopharynx, larynx, nasal cavity, salivary glands, paranasal sinuses, and skin of the head, neck, and ear (Thankappan et al., 2020). The incidence is approximately 533,100 cases annually worldwide. The National Cancer Registration in Indonesia reported that HNC was the fourth most frequent cancer among the top ten neoplasms in both sexes. Approximately 98% of all HNC patients were aged 40 years or older, and males accounted for 52.77% of all cases (Sabirin et al., 2016; To'Bungan et al., 2015).

Dysphagia was described as difficulty in swallowing and is considered a common clinical problem worldwide. Dysphagia as a sequela of HNC and its treatment is a frequent complication experienced by patients throughout disease progression. Various treatment modalities for HNC, including surgery, radiotherapy, chemotherapy, and their combinations, can cause dysphagia with varying degrees of severity regardless of histological type, tumor location, or cancer stage (Thankappan et al., 2020; Yifru et al., 2021). Previous studies have reported that the overall incidence of dysphagia after HNC treatment ranges from 50% to 60% among HNC patients worldwide. Among these patients, approximately 30% to 50% develop malnutrition as a complication of dysphagia. The combination of dysphagia, inadequate nutrition, significant weight loss, and immunocompromised conditions may result in cachexia, fatigue, increased susceptibility to infection, impaired wound healing, and mortality (Kusuma et al., 2021; Silveira et al., 2014).

HNC treatment modalities, including surgery, radiotherapy, chemotherapy, and their combinations, can trigger dysphagia as a treatment-related consequence. Patients experiencing dysphagia may feel frustrated, distressed, and less confident. Even among patients who remain capable of eating and swallowing, compensatory behaviors such as prolonged eating duration, difficulty chewing, and limited food choices may lead to reduced eating desire, social embarrassment, and restricted interaction with family members and participation in social activities (Ackerstaff et al., 2002; Gustafsson & Tibbling, 1991). Further deterioration in swallowing function can affect patients' quality of life (QoL) throughout the course of therapy. A previous hypothesis suggests that the severity of oropharyngeal dysphagia may be a critical determinant of quality of life. However, no previous study in Indonesia has examined the relationship between the severity of oropharyngeal dysphagia and quality-of-life deterioration among patients with head and neck cancer following chemoradiotherapy.

Previous studies indexed in major scholarly databases have established an important relationship between swallowing dysfunction and patient-reported outcomes. Nguyen et al. (2005) found that patients with moderate-to-severe dysphagia after head and neck cancer treatment experienced poorer quality of life and greater emotional difficulties compared with patients with mild dysphagia. Carmignani et al. (2018) similarly demonstrated that dysphagia among patients with advanced-stage head and neck cancer was associated with impaired quality of life and emphasized the importance of preventive swallowing management. In a prospective cohort study, Ihara et al. (2022) observed changes in oral function, swallowing function, and quality of life after treatment, demonstrating that functional deterioration significantly contributed to patients' post-treatment experiences. More recently, Gomes et al. (2025) reported significant associations among dysphagia, nutritional status, and quality of life in patients undergoing radiotherapy, further confirming that swallowing impairment represents a multidimensional survivorship issue rather than an isolated symptom.

Research has also increasingly examined strategies for preventing or reducing radiation-associated dysphagia. The phase III DARS trial demonstrated the clinical

relevance of dysphagia-optimized intensity-modulated radiotherapy by evaluating whether radiation exposure to swallowing structures could be reduced without compromising disease control (Nutting et al., 2023). Ku et al. (2023) evaluated early proactive swallowing rehabilitation among patients with nasopharyngeal carcinoma after radiotherapy and reported improvements in swallowing function and quality-of-life outcomes. Randomized and prospective studies have also investigated preventive swallowing exercises, voice training, and structured adherence interventions (Hajdú et al., 2022; Liu et al., 2024; Shinn et al., 2024). Collectively, these studies support early screening and rehabilitation; however, their effectiveness depends on accurately identifying the severity, progression, and patient-perceived consequences of dysphagia during the vulnerable post-treatment period.

Despite this expanding evidence, several limitations remain. Many previous studies were conducted in high-income countries, focused on specific tumor sites, evaluated swallowing function or general quality of life separately, or relied exclusively on self-reported symptoms. Other investigations primarily assessed long-term survivors or rehabilitation intervention effectiveness rather than the early progression of dysphagia following chemoradiotherapy. Evidence from Indonesia remains particularly limited, despite the high burden of nasopharyngeal carcinoma and potential differences in disease stage at diagnosis, nutritional status, access to rehabilitation services, and follow-up practices. Moreover, few Indonesian studies have simultaneously classified the clinical severity of oropharyngeal dysphagia and assessed swallowing-specific quality of life at multiple early post-treatment time points.

Addressing this gap is important because unrecognized swallowing impairment may progress before patients receive appropriate nutritional support, instrumental assessment, or rehabilitation. Routine oncology follow-up often focuses on tumor response and treatment toxicity, whereas less visible problems, such as delayed swallowing, altered food preferences, fear of choking, and social withdrawal, may receive insufficient attention. A practical screening instrument, such as the Gugging Swallowing Screen (GUSS), can classify dysphagia severity and aspiration risk, while the Swallowing Quality of Life questionnaire (SWAL-QOL) can assess patient-perceived burdens across multiple functional and psychosocial domains. Combining these instruments may provide a more comprehensive clinical assessment and assist in identifying patients requiring fiberoptic endoscopic evaluation of swallowing, videofluoroscopic swallowing studies, nutritional intervention, counseling, or early swallowing rehabilitation.

The novelty of this study lies in its integrated and longitudinal comparative assessment of oropharyngeal dysphagia severity and swallowing-related quality of life among Indonesian patients with head and neck cancer after chemoradiotherapy. Rather than examining dysphagia solely as a binary complication, this study categorized dysphagia severity using GUSS and examined its relationship with SWAL-QOL outcomes. Assessments conducted during the first and 12th weeks after treatment enabled evaluation of whether swallowing function and quality of life improved,

deteriorated, or remained impaired during the transition from acute treatment effects to the early post-treatment phase. The study also identified the most prominent swallowing symptoms and the quality-of-life domains most affected, thereby providing clinically relevant information that could not be obtained from a single overall assessment.

Therefore, this study aimed to assess the severity of oropharyngeal dysphagia and swallowing-related quality of life among patients with head and neck cancer following chemoradiotherapy at Dr. Sardjito General Hospital, Yogyakarta, Indonesia. Specifically, it aimed to compare dysphagia severity and quality-of-life status between the first and 12th weeks after treatment, determine the relationship between dysphagia severity and quality-of-life impairment at each assessment period, and identify the most frequently affected swallowing symptoms and SWAL-QOL domains. This study is expected to contribute local evidence to the international literature regarding functional outcomes after head and neck cancer treatment. Clinically, the findings may support standardized early screening, risk-based referral, nutritional management, counseling, and multidisciplinary swallowing rehabilitation. For patients and families, earlier identification and management of dysphagia may help preserve safe oral intake, psychological well-being, social participation, and overall quality of life.

METHOD

This study used an observational analytic design with a cross-sectional approach. The study was conducted at the ENT Outpatient Clinic of Dr. Sardjito General Hospital from February 15 to November 22, 2022. Ethical approval was obtained from the Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, under registration number KE/FK/0163/EC/2022.

Participants

All HNC patients with the age of ≥ 17 years old, who received chemoradiotherapy with and without surgery, chemotherapy, and radiotherapy only, willing to participate in the study, cooperate very well and were able to communicate, had complete medical records, and were able to finish their follow up periods were included in this study. Those with laryngeal, tracheal, thyroid, and esophageal cancers were excluded from this study. There were 90 HNC patients who came to the ENT Outpatient Clinic DR Sardjito Hospital, 60 patients were included in the study for the fulfillment of inclusion and exclusion criteria, medical data completion, and finished follow up periods.

Assessment of oropharyngeal dysphagia

The severity of oropharyngeal dysphagia was categorized into severe, moderate, and mild based on Gugging and Swallowing Screening (GUSS) score. The classification was based on the reference: severe (score of 0-9), moderate (score of 10-14), mild (score of 15-19). The procedure for the swallowing test was equalized for each patient. The patient sat in chair or in 60 degree head up position. The examination was divided into 2 parts, including preliminary assessment and direct swallowing examination which was further divided into three steps. Each test was done

simultaneously, starting with preliminary test where vigilance, voluntary cough, saliva swallowing, and throat clearing were all identified. The direct swallowing test was done right after, in this the patient was asked to swallow semisolid, liquid, and solid. Aspiration risk signs such as cough/choking, delayed swallowing, drooling, and voice change were also observed. The swallowing function was measured twice at the 1st and 12th week after chemoradiotherapy.

Assessment of the quality of life

Quality of life of the patients was measured using Swallowing Quality of Life (SWAL-QoL) questionnaire. We chose dysphagia-related quality of life to ensure that the impairment of quality of life was related merely to the swallowing function. A validated Indonesian SWAL-QoL was used in this study that contain 44 questions divided into 11 subsites with Likert score 1-5. SWAL-QoL was a gold standard to assess quality of life in patients with oropharyngeal dysphagia. The SWAL-QoL includes 10 subscales including Burden, Eating Duration, Eating Desire, Food Selection, Communication, Fear, Mental Health, Social Functioning, Fatigue, and Sleep, along with 14 items addressing symptoms. The impairment of quality of life was determined based on its scoring, with the maximum score of 100 and minimum score of 0. According to the reference, a point decrease of ≥ 14 indicates an impairment of quality of life. We calculated our own score based on the score within the population. Cut off was defined based on percentile formula on Tukey's Hinges scale with classification of: Poor (score < 47), Fair ($47 < \text{score} < 81$), Good (score > 81). The quality of life was also measured twice at the 1st and 12th weeks after chemoradiotherapy.

Statistical analysis

The collected data was analyzed statistically using unpaired categorical test with Kruskal-Wallis test and Gamma Correlation test in order to observe the significant difference and correlation of oropharyngeal dysphagia severity and quality of life for each measurement period. Comparison using Friedman test was used to analyze the severity level of oropharyngeal dysphagia and quality of life between two measurement periods.

RESULTS AND DISCUSSION

Characteristic of the subjects

There were 90 HNC patients who visited the DR Sardjito Hospital ENT Outpatient Clinic, 60 of which were involved as the study subjects for inclusion and exclusion criteria fulfillment, medical data completion, and finished follow up periods. There were 35 patients excluded which consisted of 20 patients with laryngeal, thyroid, and esophageal cancers, 10 patients loss to follow up, 3 patients passing away before completing the treatment regimen, 2 patients passing away within less than one month after receiving treatment.

Table 1 demonstrated patient's characteristic which includes gender, age group, tumor location, histopathology, and treatment modality. It was identified that majority

of subjects were male 36 (60%) and 24 (40%) females with the ratio of 1,5: 1. The predominant histopathologic feature was squamous cell carcinoma 39 (65%). Based on the anatomical location, nasopharyngeal cancer was the most numerous cases found in 33 patients (55%), and the lowest distribution was hypopharyngeal cancer (3,33%). Most patients were at their late stage of disease, there were 43 patients (71,7%) at stage IV and III.

Table 1. Characteristics of the research subjects

Gender	(n)	(%)
Male	36	60
Female	24	40
Age group	(n)	(%)
≤ 45 years old	15	25
> 45 years old	45	75
Histopathology	(n)	(%)
Undifferentiated Carcinoma	7	11,6
Squamous Cell Carcinoma	39	65
Non-Hodgkin's Lymphoma	5	8,3
Adenoid Cystic Carcinoma	4	6,7
Adenocarcinoma	1	1,67
Biphenotypic Sarcoma	1	1,67
Lymphoepithelial Carcinoma	1	1,67
Mucoepidermoid Carcinoma	1	1,67
Basal Cell Carcinoma	1	1,67
Anatomical Location	(n)	(%)
Nasopharynx	33	55
Sinonasal	12	20
Oropharynx	4	6,67
Hypopharynx	2	3,33
Oral Cavity	6	10
Ear	3	5
Stage	(n)	(%)
I	2	3,3
II	15	25
III	12	20
IVA	24	40
IVB	7	11,7
Treatment	(n)	(%)
Chemoradiotherapy	34	56,7
Radiotherapy only	6	10
Chemotherapy only	5	8,3
Chemoradiotherapy + Surgery	15	25

There were total 49 patients (81,7%) who received chemoradiotherapy, among these, 15 patients (25%) also underwent surgery. Single modality was a minority in this study where only 6 patients (10%) and 5 patients (8,3%) received only chemotherapy and radiotherapy respectively. The age group was classified into < 45 y.o and > 45 y.o

based on cut-off point of age group between adults and elderly. The mean age was 54,5 years old, the oldest was 84 y.o and youngest was 17 y.o.

Comparison of oropharyngeal dysphagia severity and patients' quality of life in the first vs twelfth weeks after chemoradiotherapy.

Kruskal Wallis test was carried out to identify the difference significance of severity of oropharyngeal dysphagia and QoL for each period, then Gamma correlation test was held for both ordinal variables to confirm the association between the two variables. The results of the analysis were presented in Table 2. Both measurements from each period obtained p-value <0.001, indicating a significant difference in the severity degree of dysphagia and quality of life status relationship in HNC patients after chemoradiotherapy. Patients with high severity of oropharyngeal dysphagia tend to experience worse quality of life, on the other hand, patients with mild severity of oropharyngeal dysphagia will less likely to experience poor quality of life. Table 2 also concluded that there was no patient with high severity of oropharyngeal dysphagia who endured good quality of life within the first and twelfth week after chemoradiotherapy. Nevertheless, few patients with mild severity of oropharyngeal dysphagia also faced poor quality of life. This result was confirmed further with gamma correlation test resulting in an acquired p value of <0.001 and significant coefficient correlation (r) of 0.729 in the 1st week and 0.827 in the 12th week.

Table 2. Difference in severity of oropharyngeal dysphagia and quality of life between 1st and 12th week after chemoradiotherapy

		1 st Week				12 th Week			
		Quality of Life			<i>r</i> (<i>p</i>)	Quality of Life			<i>r</i> (<i>p</i>)
		Poor	Fair	Good		Poor	Fair	Good	
Severity of Oropharyngeal Dysphagia	Severe	9 (64,3%)	5 (35,7%)	0 (0%)	0,729 (<0,001)	10 (71,4%)	4 (28,6%)	0 (0%)	0,827 (<0,001)
	Moderate	4 (14,3%)	19 (67,9%)	5 (17,9%)		4 (14,8%)	19 (70,4%)	4 (14,8%)	
	Mild	2 (11,1%)	6 (33,3%)	10 (55,6%)		1 (5,3%)	7 (36,8%)	11 (57,9%)	

Table 3. Changes in severity of dysphagia and quality of life between 1st and 12th week after chemoradiotherapy.

	Pesistent	Improvement	Deteriorate	p
Severity of Oropharyngeal Dysphagia	47 (78,3%)	7 (11,7%)	6 (10%)	0,782
Quality of Life	40 (66,6%)	10 (16,7%)	10 (16,7%)	1

Analysis of the proportion difference in the oropharyngeal dysphagia severity degree and quality between the first and twelfth week after chemoradiotherapy was also carried out in this study. Table 3 reports 13 patients experiencing changes in severity of oropharyngeal dysphagia, 3 of which (5%) faced improving severity from severe to moderate, 4 of which (6.7%) endured severity improvement from moderate to mild, while other 3 of which (5%) experienced deterioration from mild to moderate. The significance value obtained was 0.782, showing that there was no significant difference in changes of the oropharyngeal dysphagia severity between the 1st and 12th week after chemoradiotherapy.

Table 3 reports 40 patients (66.7%) did not experience changes in quality of life, 8 of which (13.3%) still experienced persistent poor quality of life, 20 of which (33.3%) reported fair quality of life, and 12 of which (20%) still witnessed good quality of life. There were 20 patients (33.3%) who endured quality of life fluctuations. Patients with an improvement in quality of life from poor to fair include 7 subjects (11.7%), and the number of patients reporting improvement from fair to good is 3 (5%). Patients with worsening quality of life from fair to poor were 7 (11.7%) and the patients reporting a change from good to fair were 3 (5%). The p value showed result of 1, indicating that there was no significant difference in the quality of life between the first and the twelfth week after chemoradiotherapy.

Symptoms of oropharyngeal dysphagia

Figure 1 showed the most severe symptoms experienced by HNC patients in each follow up period where majority of patients in both periods experienced delayed swallowing in which the patient takes > 2 seconds to swallow liquids and > 10 seconds for solids. There were 42 patients (70%) with delayed swallowing in the first week, reaching 51 (85%) by the twelfth week. The second most common symptom was choking/coughing which was experienced by 14 patients (23.3%), subsiding to 9 (15%) by the twelfth week. Symptoms of drooling and gurgling were only found at the first week, consisting of 3 (5%) and 1 (1.7%) cases, respectively.

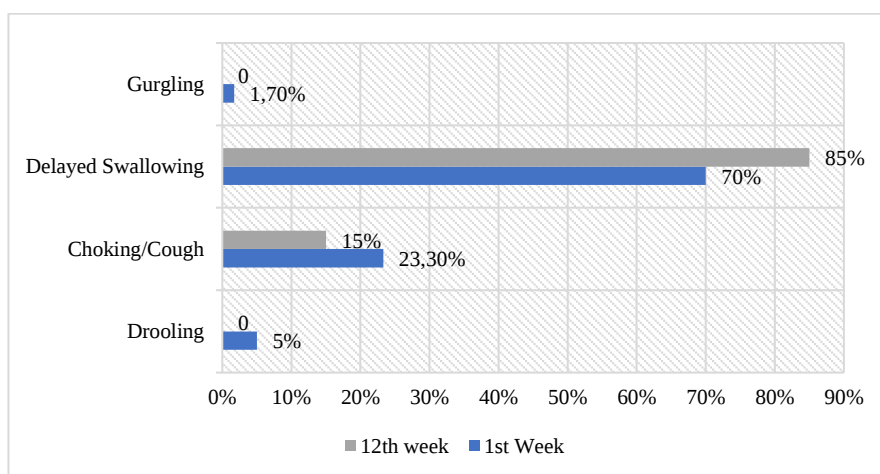


Figure 1. Dysphagia symptoms according to GUSS

Quality of life components

Figure 2 shows the dominant QoL component of the SWAL-QoL instrument for each measurement period. The majority of the components in the 1st week was Burden (20%) and Eating Desire (23.3%) for the 12th week. Social Functioning and Burden components decreased, while Fear, Food Selection, Mental Health, Communication, and Eating Duration increased between the 1st to 12th week. Fatigue & Sleep component only began to appear in the 12th week period.

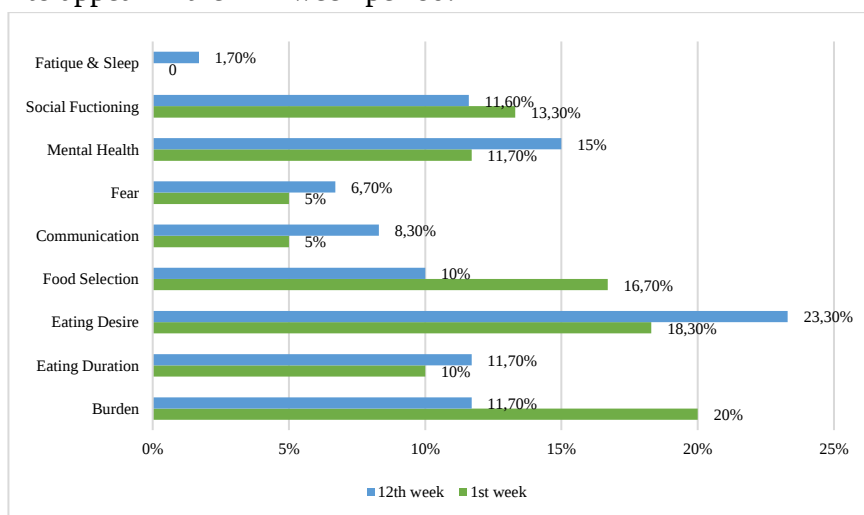


Figure 2. Quality of Life component according to SWAL-QoL

These results indicate that oropharyngeal dysphagia was endured by all of the patients. This finding lines with an older study held which stated the incidence of oropharyngeal dysphagia among HNC patients after treatment which might be more abundant than the cases reported (Machtay et al., 2008). This result also alligned with a study carried out by Nguyen et al. (2005) to 104 HNC patients after chemoradiotherapy that showed a significant difference in quality of life between subjects with moderate-severe dysphagia and those with mild dysphagia. In addition, the depression and anxiety scores of those with moderate-severe dysphagia were lower compared to those with mild dysphagia, identifying that moderate-severe dysphagia was capable of inducing more formidable symptoms of depression and anxiety (Nguyen et al., 2005). Eating together, as an inevitable social event that promotes sharing, friendship, social and emotional connection, became an important aspect in life. Therefore, an existence of barrier to eat showed social disability influencing not only one's physical function, but also mental wellbeing (Menzies, 1970; Murcott, 1982; Pauloski et al., 1993; Stringer, 1999).

Moreover, the result in Table 3 was parallel with radiation tissue damage theory which stated that in three months after exposed to radiation, most acute clinical effect was already resolved and swallowing function was supposed to return to normal in some patients. Although so, continous cascade in cytokines stimulation could still extend the radiation side effect. Tissue fibrosis and stiffening occuring may cause functional disturbance. Ongoing hypoxia and chronic oxidative stress after chemoradiation are potential to trigger permanent tissue damage (Machtay et al., 2008;

Saputro & Susworo, n.d.; Tsai et al., 2017). This comprehension could explain the reasons some patients did not experience any improvement in dysphagia severity within the 1st as well as the 12th week after chemoradiation. The improvement failure may be caused by a radiation tissue damage transition from acute to chronic phase which clinically was felt as no difference by the patients. Oropharyngeal dysphagia could take place in any phase in the cycle of chemoradiation side effects (Heijnen et al., 2020; Tsai et al., 2017).

The results of our study are also parallel with the previous study done by Paleri et al. (2014), which was implemented on 112 HNC patients 3, 6, and 12 months after chemoradiotherapy, concluding that most patients underwent the swallowing function before undergoing treatment until 3 months following the treatment. In spite of an objective improvement in swallowing function, subjectively, most of the patients did not report any improvement (King et al., 2016; Paleri et al., 2014).

The most common symptoms in HNC patients after chemoradiotherapy was the inability to control food/liquid/saliva inside oral cavity, inducing leaking of bolus/drooling, food residue behind the cheek, overabundant chewing, cough, choking, or throat clearing prior to, during, and after swallowing. This could also cause abnormal voice quality (gurgling/wet voice), difficulty initiating swallow, pain when swallowing, the sensation of food stuck in throat, and weight loss. Among all of the symptoms mentioned, most patients complained frequent choking/cough and difficulty in bolus control within the mouth, followed by difficulty initiating swallow (Denaro et al., 2013; Martin-Harris & McFarland, 2013).

Social and emotional aspects were also hampered due to dysphagia. Eating is one of the most essential social activities in life, hence the social isolation and oppressive psychological burden if one faces an eating disturbance, especially in those with gastric tube dependency, hefty anatomical defect from surgical procedure, and disruption in communication capability due to muscle stiffening and fibrosis or residual tumor mass. Each of these events plays role in deprivation of patients' quality of life (Carmignani et al., 2018; Ihara et al., 2022).

Results in Figure 2 was also corresponded with study held by Hunter et al. (2020), where social and emotional aspects of quality of life just emerged a month after chemoradiotherapy and could persist or degenerate by 6 to 12 months (Hunter et al., 2020; Ihara et al., 2022). Oropharyngeal dysphagia incidence in HNC patients was multifactorial and temporary. Several factors could predispose oropharyngeal dysphagia and its effects on a patient's quality of life. These factors include patient-related, tumor-related, and therapy-related factors, each of which creates diverse impacts on dysphagia in HNC patients individually. This study also concluded that oropharyngeal dysphagia severity and quality of life deterioration tend to persist from the 1st up to 12th week after chemoradiotherapy, indicating the essential need of early screening, counseling, and treatment related to swallowing problem and poor self-prosperity. Several limitations of this research were the subjectivity in evaluation and the restricted level of screening, which was only held for the active phase after chemoradiation exposure.

Further study is recommended for objective swallowing function examinations, preferably using endoscopic or videofluoroscopic methods of swallowing to ensure the severity of oropharyngeal dysphagia. Furthermore, there should be another continuous study aiming to evaluate the delayed impacts of chemoradiation on severity of oropharyngeal dysphagia as well as patients' quality of life.

CONCLUSION

This study concluded that the severity of oropharyngeal dysphagia was significantly associated with swallowing-related quality of life among patients with head and neck cancer after chemoradiotherapy at Dr. Sardjito General Hospital. Greater dysphagia severity was consistently associated with poorer quality of life during both the first week ($r = 0.729$; $p < 0.001$) and the 12th week ($r = 0.827$; $p < 0.001$), with a stronger association observed at the later assessment. However, neither dysphagia severity ($p = 0.782$) nor quality-of-life status ($p = 1.000$) changed significantly between the two assessment periods, indicating that these problems generally persisted during the early post-treatment phase. Delayed swallowing was the most frequently reported symptom, increasing from 70% in the first week to 85% in the 12th week, while burden and eating desire were the most affected quality-of-life domains. These findings emphasize the importance of incorporating early and repeated dysphagia screening, swallowing-specific quality-of-life assessment, nutritional management, counseling, and rehabilitation into routine post-chemoradiotherapy care.

Future studies should employ multicenter prospective cohort designs with larger and more diverse samples to improve the generalizability of the findings. Longer follow-up periods extending beyond 12 weeks are recommended to evaluate the transition from acute treatment-related toxicity to chronic radiation-associated dysphagia and to identify factors associated with recovery or deterioration. Objective assessments, such as fiberoptic endoscopic evaluation of swallowing or videofluoroscopic swallowing studies, should be combined with GUSS and SWAL-QOL assessments to reduce measurement subjectivity and identify silent aspiration. Future research should also control for factors such as tumor site and stage, radiation dose, treatment modality, nutritional status, comorbidities, and exposure to swallowing rehabilitation programs. Randomized controlled trials are further recommended to determine whether early multidisciplinary interventions involving otorhinolaryngologists, rehabilitation specialists, speech-language pathologists, dietitians, and psychologists can improve swallowing function, nutritional outcomes, and quality of life.

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