The prevalence of Dysphagia among head and neck cancer patients in tertiary public hospitals in Malaysia

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ABSTRACT

Introduction: Dysphagia is the most common problem among head and neck cancer patients. It can occur before, during, and/or after cancer treatment due to cancer growth or side effects from cancer treatment. To date, the data on the prevalence of dysphagia in Malaysia is very limited. Therefore, the present study aimed to examine the prevalence and contributing factors of dysphagia.

Materials and Methods: A total of 240 patients (mean age 53.1, 167 males and 73 females) from Hospital Kuala Lumpur and the National Cancer Institute were enrolled in this research. All patients were interviewed individually in which they completed a thorough case history and swallowing screening test, including the water swallow test.

Results: The results revealed that 43.3% of patients had dysphagia. In multivariate logistic regression, occupation of the patients was found to be associated with dysphagia, i.e., working in service and sales sector (adjusted Odds Ratio, aOR=0.36, 95% Confidence Interval, 95%CI: 0.13, 0.99). Compared to patients without treatment, those who had chemoradiotherapy (aOR=4.45; 95%CI: 1.10, 17.99) were at an increased odd of developing dysphagia.

Discussion: This study showed that occupation, cancer stage, and type of treatment received by the head and neck cancer patients were crucial factors associated with the development of dysphagia. These findings guide the clinicians in identifying head and neck cancer patients who are at greater risks of developing dysphagia.

KEYWORDS:
Deglutition disorders, head and neck cancer, dysphagia, the prevalence

INTRODUCTION

Head and neck cancers are defined as an abnormal growth in the nasal, pharyngeal, and/ or laryngeal structures, including the salivary glands.[1] Collectively, these cancers are the sixth and tenth most frequently occurring cancers in men and women worldwide.[2] It is also one of the most crucial obstacles influencing the life expectancy of every country in the 21st century. In 2018, an estimated 887,659 new cases of head and neck cancer (excluding thyroid cancers) were reported worldwide. Cancer of the thyroid was not included due to the differences in treatment modality. Cancers of the lip and oral cavity are highly prevalent in southern Asia. They are also the leading cause of cancer death among men in India and Sri Lanka.[2]

In general, cancer is the second leading cause of death in Malaysia.[3] According to GLOBOCAN (2020), the cumulative incidence of head and neck cancer (nasopharynx, thyroid, lip, oral cavity, larynx, salivary glands, hypopharynx, and oropharynx) was 9.97% of the overall new cancer cases. The cumulative number of cases placed head and neck cancer as the third most common cancer in Malaysia, after breast and lung cancer, with total cases of 4,075. The previous report stated a total of 2,884 cases of head and neck cancer cases in Peninsular Malaysia in 2006.[4] The number increased to 11,920 cases in 2012.[5] The number of new cases could be attributed to the ageing population and sedentary lifestyle habits.[6]

Malaysia is a multicultural country with people of three major ethnic groups: Malays, Chinese, and Indians. The incidence of head and neck cancers varies by ethnicity; Indians have the highest incidence of laryngeal, oral, and pharyngeal cancers, followed by Malays and Chinese. On the other hand, nasopharyngeal cancer is most common among Chinese, followed by Malays, indigenous East Malaysians, and Indians.[3] Males were 1.2 times more likely to be affected with head and neck cancer in terms of gender distribution. Nasopharyngeal, laryngeal, and pharyngeal cancers were all more prevalent in men.[3]

Dysphagia is a common problem among head and neck cancer patients due to the abnormal growth of cancer cells and/or the side effects of cancer treatment such as surgery and radiotherapy.[7,8] Previous studies have shown that the prevalence of dysphagia was 40-60% in head and neck cancer patients[9-11] including post-operative patients, or had received chemotherapy, radiotherapy, chemoradiotherapy, or a combination of surgery with these therapies. Certain risk factors may worsen the severity of dysphagia among these cancer patients. For example, occupational exposure to dust, smoke, or polycyclic aromatic hydrocarbon was found to contribute to the risk of head and neck cancer development. At the same time, these particles can also act as irritants that may lead to inflammation in the neck area, subsequently

This article was accepted: 08 September 2021
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affecting the swallowing mechanism.[12] Thus, it is vital to assess the types of occupation or the potential exposure at the workplace to estimate the risk of dysphagia and its severity among the patients.

To date, the vast majority of head and neck cancer epidemiological studies focused on dysphagia post-radiotherapy and chemoradiotherapy.[13-15] Factors including age, type of cancers, cancer location, type of cancer treatment, primary sites of cancer, and surgical location were reported to contribute to dysphagia.[16] In addition, the presence of comorbidities such as diabetes or hypertension may also influence the disease severity. For example, diabetes is often associated with periodontal infection, resulting in tissue destruction, altered inflammatory response, and subsequently cast a negative impact on the swallowing mechanism.[17] Another study reported that hypertension doubled the odds of dysphagia among patients with comorbidities[18] but this was not confirmed particularly among cancer patients. Although dysphagia is recognised as a head and neck cancer symptom at presentation, it is still necessary to comprehensively examine dysphagia before initiating cancer treatment so that its effects can be compared across all treatment modalities. By identifying the associated factors of dysphagia, necessary actions can be taken to prevent or reduce its severity so that the quality of life of the cancer patients can be improved.

In Malaysia, studies on the prevalence of dysphagia among patients with head and neck cancers are still scarce. Most of the studies are confined to a single centre or a single type of cancer such as nasopharyngeal cancer.[10,19] A study showed that 59.1% of patients complained of dysphagia before, during, or after the treatment of head and neck cancers.[10] To date, in Malaysia, dysphagia was mainly explored as the outcomes of oesophageal cancer,[19,20] stroke,[21] and malnutrition[22] while existing studies on the prevalence did not assess the associated factors.[10,20] A study on the prevalence of the health-related condition is crucial in the planning of human resources, facilities, and budget distribution in public hospitals.[20] This study, therefore, aimed to investigate the prevalence of dysphagia and its associated factors among head and neck cancer patients.

MATERIALS AND METHODS

Study Location

Data collection was carried out at the National Cancer Institute, Putrajaya (NCI), and Hospital Kuala Lumpur (HKL). NCI is the national referral centre for cancer patients[23] and HKL is the largest public hospital equipped with radiotherapy facilities. HKL is also the main referral hospital for head and neck cancer patients from other hospitals under the Ministry of Health, Malaysia.[24]

Patient selection

This was a cross-sectional study involving 240 patients with histologically-confirmed head and neck cancer from HKL and NCI. Newly diagnosed head and neck cancer patients and those who were on follow-up were recruited from both institutions. The sample size for this study was calculated using Daniel (1999) formula with a 10% non-response rate.[25] The research was carried out from November 2018 to May 2019. Head and neck cancer patients who were above 18 years old and could give consent to participate in the study were eligible to be recruited as study subjects. Patients were excluded if they had been diagnosed with dysphagia in conjunction with another medical condition such as a stroke or severe respiratory problems, if they had another type of cancer, or if they had low consciousness level and cognitive problems.

Study Instrument

A medical history form and swallowing screening form, i.e., the Modified Mann Assessment of Swallowing Ability (MMASA) developed by Antonios et al.,[26] was used in this study. The medical history form was created to assess previous and current medical histories, as well as the presence of comorbidities such as hypertension or obesity. It also recorded cancer characteristics such as primary sites of cancer, cancer stage, cancer treatment, side effects of radiotherapy, method of feeding, and types of diet. Data regarding age, gender, ethnicity, education level, and occupation level were also recorded.

The MMASA is one of the four most widely used dysphagia screening tests in the world. It has adequate reliability and validity with a sensitivity and specificity of more than 90%.[27] MMASA included 12 main indicators (alertness, ability to cooperate, comprehension of auditory, respiration, dysphasia, dysarthria, saliva, palate, tongue movement, tongue strength, gag, and ability to cough voluntarily) and one optional indicator (water swallow test). The maximum score is ten for each indicator. While administering MMASA, overall alertness level, oral preparation, oral and pharyngeal integrity (tongue strength, soft palate function, and gag reflex) of the patients were assessed. For the optional indicator, all patients were required to drink consecutive sips of 90ml of water. Patients showing signs of choking, coughing, or wet voices were asked to stop drinking. Patients with a score of less than 95 were considered as having dysphagia.[27,28] Their condition would be informed to their primary care doctors to be referred to speech and language therapists for dysphagia management.

Study procedures and analyses

Institutional approval and ethics clearance from the Universiti Kebangsaan Malaysia, Ministry of Health of Malaysia (NMRR-17-3460-34710), the NCI, and the HKL were obtained. On the day of data collection, potential patients were identified and approached. The purpose, procedure, and role of the patients as study subjects were explained clearly. The information sheet was provided to the potential study subjects, and they were screened based on the inclusion and exclusion criteria. Informed consent was obtained from all eligible study subjects before data collection.

All the data were obtained during the interview session with the patients. Next, they underwent the MMASA screening test followed by drinking 90ml of water. The test was conducted by a speech language therapist in the research team. For safety purposes, the patient was asked to drink the water in stages, starting from 2ml, 5ml (one teaspoon), followed by 10ml, 20ml, and a maximum of 90ml of water in a cup. Any patients who showed signs of aspiration when the fluid entered the airway at any stage were refrained from further

participation. Significant signs of aspiration included coughing and wet voice 7. During the swallowing trial, the researcher used the standard clinical bedside swallowing assessment by the Ministry of Health Malaysia.[29] During the procedure, the researcher would palpate the area at the level of the thyroid notch to examine laryngeal elevation during the swallow response. A normal laryngeal elevation is between 2 to 4 centimetres.[7] At the same time, the researcher placed the stethoscope at the side of the neck to auscultate for any acoustic information of the swallow response.

Patients were scored based on their swallowing ability. At the end of the test, the patient's scores were summed up and the maximum score would be 100. If the patient scored 95 and above as well as passing the water swallow test, the patient would be classified as having no dysphagia. In contrast, if the patient failed the water swallow test and obtained a score below 95, the patient would be classified as having dysphagia. For patients with dysphagia, the researcher informed the medical officer in charge to refer the patients for further dysphagia assessment by a speech language therapist in the same hospital.

All the data were entered and analysed using SPSS version 23. The categorical data were described in frequency and percentage. Chi-square analysis was conducted to assess the association of the study variables and the presence of dysphagia. In addition, univariate and multivariate logistic regression analyses were conducted to determine the strength of the variables in contributing to the odds of the presence of dysphagia among head and neck cancer patients.

RESULTS

Patient Demographics, Prevalence of Dysphagia and its characteristics

A higher proportion of patients were aged 51-60 years old (32.5%), males (69.6%), Chinese (43.4%), had secondary school education (50.0%) and were unemployed, pensioners, or housewives (42.1%). In this study the prevalence of dysphagia among the head and neck cancer patients was 43.3% (n=104). The majority of study subjects were able to feed orally (76.9%), and 10.6% had the nasogastric tube. The percutaneous gastrostomy tubes were used by 9.6% of the study subjects while only 2.9% of them had oral and nasogastric tubes. Only 18.1% consumed a normal diet, while a higher proportion (32.5%) had either a blended or a soft diet. Another 14.5% had a minced diet while 2.4% depended on nourishing fluid. A higher proportion of the patients had xerostomia (62.8%), while 22.1% reportedly had pain, followed by trismus (12.0%) and dysgeusia (9.4%) (Table I).

A higher proportion of patients had cancer of the pharynx, specifically nasopharynx (53.3%), followed by lip and oral cavity cancer (22.9%), larynx (9.6%), paranasal sinuses cancer (5.4%), and major salivary glands cancer (2.9%).

The proportion of patients with dysphagia was significantly higher among Indians (60.0%), followed by Malays (44.9%) and Chinese (34.6%). Type of occupation was found to be significantly associated with dysphagia among head and neck cancer patients (p=0.026). Majority of the study subjects were inpatients (61.7%), while outpatients mainly came from ENT and Oncology clinics. The type of admission was not associated with the presence of dysphagia. The presence of dysphagia was significantly higher among patients with lip and oral cavity cancer (67.3%) (p=0.001) as well as among patients with stage IV cancer (47.8%) (p=0.021). More than one-third of the head and neck cancer patients had chemoradiotherapy (CCRT) (37.5%). Another one-quarter received chemotherapy only (26.3%). There was a significant association between the types of cancer treatment and the presence of dysphagia (p=0.038). A higher proportion of patients who underwent surgery and chemotherapy presented with dysphagia (66.7%), followed by those who had surgery and radiotherapy (59.1%), radiotherapy only (50.0%), and CCRT (45.6%). A higher proportion of head and neck cancer patients presented with comorbidities such as hypertension or diabetes at the time of diagnosis (53.8%). However, it was not significantly associated with the presence of dysphagia.

The univariate logistic regression showed that patients' occupation, especially those from the service and sales sector (Odds Ratio, OR=0.37; 95% Confidence Interval, 95%CI: 0.15, 0.92) or those working as labourers (OR=0.45; 95%CI: 0.23, 0.89) were significantly associated with reduced odds of dysphagia compared to other types of occupations. As for types of cancer, patients with lips and oral cavity cancer were almost four times more likely to present with dysphagia compared to NPC patients (OR=3.92; 95%CI: 2.01, 7.68). On the other hand, stage II head and neck cancer patients were significantly associated with reduced odds of dysphagia compared to stage IV cancer patients (OR=0.15; 95%CI: 0.03, 0.66). Besides the three significant factors (types of occupation, sites of cancer, and stage of cancer), gender, ethnicity, type of admission, type of cancer treatment, and presence of comorbidity were also included in multivariate logistic regression as these variables showed a p-value of less than 0.25.

In multivariate logistic regression, occupation, especially those working in service and sales sector (adjusted Odds Ratio, AOR=0.36; 95%CI: 0.13,0.99, p=0.048) remained significantly associated with reduced odds of dysphagia compared to other types of occupations. The multivariate logistic regression also showed that patients who had chemoradiotherapy (AOR=4.45; 95%CI: 1.10, 17.99) were significantly associated with increased odds of dysphagia, as compared to patients without treatment, those.

DISCUSSION

This study showed that the prevalence of dysphagia among all head and neck cancer patients was 43.3%, inclusive of those before the treatment procedure and patients across all treatment modalities (Table III). This was consistent with a study by Pezdirec, Strojan, and Boltezar,[11] in which 41.3% of their head and neck cancer patients who underwent surgery, radiotherapy, chemoradiotherapy, or combined surgery and radiotherapy complained of dysphagia. On the other hand, Garcia-Peris et al.,[9] reported a higher prevalence of 50.6%. Similarly, Linn et al.,[10] who conducted a similar study among

Table I: Patient Demographics, Prevalence and Characteristics of Patients with Dysphagia

	Frequency (n)	Percentage (%)
Age		
≤40 years	38	15.8
41 to 60 years	135	56.3
≥61 years	67	27.9
Gender		
Male	167	69.6
Female	73	30.4
Race		
Malay	98	40.4
Chinese	104	43.4
India	35	14.6
Others	3	1.6
Education		
No Formal Education	26	10.8
Primary	58	24.2
Secondary	120	50
Post-secondary	36	15
Occupation		
Professional	19	7.9
Technicians and Associate Professionals	17	7.1
Service and Sales Workers	29	12.1
Craft and Related Trade Workers	16	6.7
Plant and Machine-operators and Assembler	25	10.4
Elementary Occupations	19	7.9
Unemployed/ pensioner	82	34.2
Housewife	19	7.9
Others	14	5.8
Dysphagia		
Yes	104	43.3
No	136	56.7
Method of Feeding (n=104)		
Oral	80	76.9
Nasogastric Tube	11	10.6
Percutaneous Gastrostomy Tube	10	9.6
Oral and Nasogastric tube	3	2.9
Types of Diet (n=104)		
Regular diet	15	18.1
Pureed diet	27	32.5
Soft and bite-sized diet	27	32.5
Minced and moist diet	12	14.5
Liquidised diet	2	2.4
Side Effect of Radiotherapy and Chemoradiotherapy*		
Pain	19	22.1
Xerostomia	54	62.8
Trismus	21	12.0
Dysgeusia	16	9.4
Completed Radiotherapy	55	59.1
Undergoing Radiotherapy	38	40.9
Week 1	10	26.3
Week 2	3	7.9
Week 3	7	18.4
Week 4	6	15.8
Week 5	5	13.2
Week 6	3	7.9
Week 7	4	10.5

*Multiple selection variable

head and neck cancer patients in dental clinics also reported a higher prevalence of 59.1% of dysphagia. These differences in prevalence could be attributed to the variation in study population and study design. Furthermore, some centres are equipped with more advanced treatment options that can reduce acute and late toxicities. On the other hand, some of the previous studies only included patients who were undergoing the treatment or had completed the treatment as compared to our study that also included patients who had yet to undergo treatment. In terms of study design, as a cross-sectional study, this is the most appropriate design in assessing the prevalence of health condition.[30]

In this study, age and gender were not associated with the presence of dysphagia. Thus, all age groups had a similar chance to be diagnosed with dysphagia due to head and neck

Table II: Association between sociodemographic, cancer characteristics, and presence of dysphagia among head and neck cancer patients

Parameter	All	Dysphagia		χ^2	p	OR	95% CI	p
	n(%)	Yes n(%)	No n(%)					
Age (years)				2.36	0.500			
≤40	38 (15.8)	18 (47.4)	20 (52.6)			1		
41-50	57 (23.8)	20 (35.1)	37 (64.9)			0.60	0.26, 1.39	0.233
51-60	78 (32.5)	37 (47.4)	41 (52.6)			1.00	0.46, 2.18	0.995
≥61	67 (27.9)	29 (43.3)	38 (56.7)			0.85	0.38, 1.89	0.686
Gender				1.53	0.216			
Male	167 (69.6)	68 (40.7)	99 (59.3)			1		
Female	73 (30.4)	36 (49.3)	37 (50.7)			1.42	0.82, 2.46	0.217
Ethnicity								
Malay	98 (40.4)	44 (44.9)	54 (55.1)	11.20	0.008	1		
Chinese	104 (43.4)	36 (34.6)	68 (65.4)			0.65	0.37, 1.15	0.136
India	35 (14.6)	21 (60.0)	14 (40.0)			1.84	0.84, 4.04	0.127
Others	3 (1.6)	3 (100.0)	0					
Education								
No formal education	26 (10.8)	14 (53.8)	12 (46.2)	1.85	0.605	1.30	0.47, 3.59	0.607
Primary	58 (24.2)	23 (39.7)	35 (60.3)			0.73	0.32, 1.7	0.471
Secondary	120 (50.0)	50 (41.7)	70 (58.3)			0.80	0.38, 1.69	0.555
Tertiary	36 (15.0)	17 (47.2)	19 (52.8)			1		
Occupation								
Professional	36 (15.9)	17 (47.2)	19 (52.8)	8.50	0.037	0.87	0.41, 1.88	0.736
Service and Sales	29 (12.8)	8 (27.6)	21 (72.4)			0.37	0.15, 0.92	0.033*
Labourer	60 (26.5)	19 (31.7)	41 (68.3)			0.45	0.23, 0.89	0.021*
Unemployed/ Pensioner/ housewife	101 (44.7)	51 (50.5)	50 (49.5)			1		
Type of admission				1.70	0.192			
Outpatient	92 (38.3)	35 (38.0)	57 (62.0)			1a		
Inpatient	148 (61.7)	69 (46.6)	79 (53.4)			1.42	0.84, 2.42	0.193**
Primary Sites of Cancer				19.79	0.001*			
NPC	128 (53.3)	44 (34.4)	84 (65.6)			1a		
Lip and oral cavity	55 (22.9)	37 (67.3)	18 (32.7)			3.92	2.01, 7.68	<0.001*
Larynx	23 (9.6)	7 (30.4)	16 (69.6)			2.55	0.83, 7.80	0.102**
pharynx	14 (5.8)	6 (4.4)	8 (7.7)			0.84	0.32, 2.18	0.713
Paranasal sinuses	13 (5.4)	5 (38.5)	8 (61.5)			1.19	0.37, 3.87	0.768
Major Salivary Glands	7 (2.9)	3 (42.9)	4 (57.1)			1.43	0.31, 6.68	0.648
Cancer Stages				8.76	0.021*			
Stage I	4 (1.7)	1 (25.0)	3 (75.0)			1a		
Stage II	17 (7.1)	2 (11.8)	15 (88.2)			0.40	0.03, 5.96	0.506
Stage III	62 (25.8)	26 (41.9)	36 (58.1)			2.17	0.21, 22.0	0.513
Stage IV	157 (65.4)	75 (47.8)	82 (52.2)			2.74	0.28, 26.9	0.387
Cancer Treatment				13.31	0.038*			
No Treatment	16 (6.7)	5 (31.3)	11 (68.8)			1a		
Radiotherapy only	10 (4.2)	5 (50.0)	5 (50.0)			2.20	0.43, 11.22	0.343
Chemotherapy only	63 (26.3)	19 (30.2)	44 (69.8)			0.95	0.29, 3.11	0.932
Surgery only	8 (3.3)	2 (25.0)	6 (75.0)			0.73	0.11, 4.99	0.751
Surgery and Chemotherapy	9 (3.8)	6 (66.7)	3 (33.3)			4.40	0.77, 25.15	0.096**
Surgery and Radiotherapy	44 (18.3)	26 (59.1)	18 (40.9)			3.18	0.94, 10.72	0.062**
Chemoradiotherapy	90 (37.5)	41 (45.6)	49 (54.4)			1.84	0.59, 5.73	0.292
Comorbidity				1.64	0.200			
No	111 (46.2)	51 (39.5)	78 (60.5)			1a		
Yes	129 (53.8)	53 (47.7)	58 (52.3)			1.40	0.84, 2.34	0.201**

Note: χ^2, chi-square; OR, Odds Ratio; 95%CI, 95% Confidence Interval.

cancer or the subsequent treatment. This was supported by Pezdirec et al.,[11] and Teguh et al.[31] Both studies revealed no statistically significant relationship between dysphagia with age and gender. There is a lack of studies on the ethnicity preponderance of head and neck cancer. To date, there is no data on overall head and neck cancer incidence across ethnicity reported in Malaysia. The National Cancer Registry (2019) reported that the incidence of nasopharyngeal cancer was relatively lower among Indians (age-standardised rate= 0.6 among males and 0.4 among females per) compared to Malays or Chinese. Overall, 57.5% of global cases of head and neck cancers are reported in Asia, especially in India.[32] Therefore, Indians in Malaysia may share the same genetic susceptibility of head and neck cancer. Our study was based in a multicultural country, and Indians were found to have a significantly higher proportion of dysphagia compared to

Table III: Multivariate logistic regression of factors associated with dysphagia among head and neck cancer patients

Variables	B	S.E.	AOR	95% CI		P
				Lower	Upper	
Gender						
Male			1a			
Female	-0.13	0.37	0.88	0.43	1.80	0.722
Ethnicity						
Malay			1a			
Chinese	-0.67	0.36	0.51	0.26	1.03	0.062
India	-0.38	0.53	0.69	0.24	1.94	0.479
Occupation						
Professional	0.03	0.44	1.03	0.43	2.47	0.940
Service and Sales	-1.02	0.52	0.36	0.13	0.99	0.048*
Labourer	-0.75	0.41	0.47	0.21	1.05	0.067
Unemployed/ Pensioner/ housewife			1a			
Type of admission						
Outpatient			1a			
Inpatient	0.14	0.36	1.15	0.57	2.32	0.694
Primary Sites of Cancer						
NPC			1a			
Lip and oral cavity	-0.18	0.95	0.83	0.13	5.39	0.848
Larynx	1.58	0.98	4.84	0.72	32.84	0.106
Pharynx	0.74	1.09	2.11	0.25	17.74	0.494
Paranasal sinuses	-1.07	1.02	0.34	0.05	2.55	0.296
Major Salivary Glands	-0.32	1.08	0.73	0.09	6.01	0.768
Cancer Treatment						
No Treatment			1a			
Radiotherapy only	0.67	0.99	1.95	0.28	13.73	0.501
Chemotherapy only	0.73	0.73	2.08	0.50	8.67	0.317
Surgery only	-0.50	1.11	0.60	0.07	5.38	0.652
Surgery and Chemotherapy	0.55	1.02	1.74	0.24	12.88	0.588
Surgery and Radiotherapy	1.44	0.77	4.20	0.92	19.12	0.063
Chemoradiotherapy	1.49	0.71	4.45	1.10	17.99	0.036*
Comorbidity						
No			1a			
Yes	0.55	0.33	1.80	0.95	3.43	0.074

other ethnicities. This showed that even though Indians in Malaysia have a lower incidence of head and neck cancer, they may be predisposed to a higher odd for advanced cancer or treatment outcomes such as dysphagia due to their genetic susceptibility. Nevertheless, this association needs be confirmed with genetic studies in the future. Other possibilities are late presentation due to poorer health education.

In addition, patients who were diagnosed with lip and oral cancers were three times more likely to have dysphagia. This is in agreement with studies by Pezdirec et al.,[11] and Valdez & Brennan,[33] both of whom detected a higher frequency of dysphagia among oral and/or oropharyngeal cancer patients.

Although the majority of the patients with dysphagia in this study (76.9%) were able to eat orally, only 18.1% of them were on a normal diet. The majority of them were unable to consume a normal diet as before after their cancer treatment due to swallowing difficulties. In a study among long-term head and neck cancer survivors, Kamal et al.,[34] found that only 28% were on normal diet.

The majority of the patients in the current study had xerostomia (62.8%), followed by pain (22.1%) due to the side effects of cancer treatment. Xerostomia is a common side effect of radiotherapy due to the damage to the salivary glands that results in reduced salivary flow and altered salivary composition [13]. Saliva plays an essential part in the formation of boluses [7]. It also moistens the food during chewing to ease the formation of a cohesive bolus that can facilitate swallowing. A study by Dirix et al., [13] found that more than half (54%) of head and neck cancer patients with xerostomia complained of eating problems, and 65% of them experienced restrictions in the amount and types of diet they consumed.

In this study, the head and neck cancer patients who worked in the service and sale sectors showed reduced odds of dysphagia. One possible reason was that patients with these types of occupations were generally more physically active at the workplace. The intensity of their daily physical activity can help them to develop higher resistance towards the toxicity of treatment. Another study highlighted that physical activity helped to maintain muscle structure and swallowing function in patients undergoing chemoradiotherapy for head and neck cancer [35].

Furthermore, many studies emphasised the need for all patients with head and neck cancer to undergo swallowing assessment as early as possible as they are more likely to

develop various degrees of dysphagia before starting the cancer treatment as well as throughout the disease and treatment. Past studies have shown that head and neck cancer patients who underwent early swallowing rehabilitation were associated with improved swallowing function.[11,16]

In this study cancer stage was not associated with dysphagia. In contrast to currrent finding, a study by Starmer et al.,[36] found that patients with stage IV cancer were more likely to have dysphagia than those at the early stages of cancer. Current study finding was in line to the findings by García–Peris et al.[9] also established that multimodality treatment was more likely to contribute to dysphagia compared to single treatment modality. Burnip, Owen, Barker, & Patterson[37] documented poor swallowing efficiency in patients who had both surgery and chemoradiotherapy. Mittal et al.,[38] explained that during the first few months, surgery is more likely to cause dysphagia, while after six months, the effect of neuromuscular damage and oropharyngeal fibrosis from radiotherapy is more obvious.

There are some limitations to our study. Firstly, only a water screening test was used to detect oropharyngeal dysphagia. In this study, consecutive sips of 90 ml of water during swallowing screening were used. A systematic review study by Brodsky et al.,[39] showed that consecutive sips of 90 ml during water swallow test were 91% sensitive (95%CI: 89%, 93%) and 53% specific (95%CI: 51%, 55%). Therefore, the water swallow test is useful for the early identification of dysphagia and screening for aspiration.[40] However, the test alone may not be adequate to predict aspiration.[40] For future studies, water screening tests should be complemented by the Fiberoptic Endoscopic Evaluation of Swallowing (FEES) or Modified Barium Swallow (MBS) to objectively rule out aspiration and to diagnose pharyngeal dysphagia.7 Furthermore, this study involved only two of the national referral hospitals. Other hospitals including university hospitals and private hospitals were not included. Thus, the prevalence of dysphagia might not be generalisable to the entire population of head and neck cancer patients in Malaysia. Therefore, future studies should consider a longitudinal study involving all referral hospitals in the country. Apart from examining the swallowing problems of head and neck cancer patients, future studies should also focus on eating difficulties, diet modification, and psychosocial effects following dysphagia to safeguard their physical wellbeing and quality of life.

CONCLUSION

In conclusion, the current study showed a relatively high prevalence of dysphagia in this study. More emphasis should be placed on early cancer detection or health-seeking behaviour. Our study highlighted that early detection significantly reduced the likelihood of dysphagia among head and neck cancer patients, thus producing a better quality of life. Due to environmental and workplace exposures, the occupation and lifestyle of patients are associated with the development of dysphagia after cancer diagnosis. Furthermore, the interaction between genetic and clinical factors should not be overlooked because they can produce a synergistic or confounding effect on the development of dysphagia in head and neck cancer. A longitudinal prospective study should be performed to determine the true effects on dysphagia or other treatment toxicities in patients with head and neck cancer using robust statistical analysis.

FUNDING

This study was funded by the Ministry of Health, Malaysia under Hadiah Latihan Persekutuan.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

ETHICAL APPROVAL

This study received the ethical approval from the Medical Research & Ethics Committee of the Universiti Kebangsaan Malaysia and the Ministry of Health Malaysia.

ACKNOWLEDGEMENT

We would like to thank the Director General of Health Malaysia for the permission to publish this article.

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