ORIGINAL ARTICLE

Clinical Characteristics of Dysphagia in Adults: A Five-Year Retrospective Analysis at Hospital Pakar Universiti Sains Malaysia

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ABSTRAK

Disfagia, iaitu masalah penelanan pada fasa oral, faring dan esofagus memerlukan rawatan yang berkesan. Peningkatan insiden disfagia setiap tahun menunjukkan keperluan untuk lebih banyak kajian di Malaysia. Kajian ini bertujuan untuk menentukan prevalens dan ciri-ciri disfagia di kalangan pesakit dewasa di Klinik Patologi Pertuturan, Hospital Pakar Universiti Sains Malaysia (HPUSM). Rekod perubatan 125 pesakit berumur ≥ 18 tahun, yang didiagnosis secara klinikal dengan disfagia antara 2018 dan 2023 telah dianalisis secara retrospektif. Data mengenai sosiodemografi, kaedah diagnosis, jenis pemakanan, dan ciri-ciri disfagia dikumpulkan. Analisis regresi logistik menentukan hubungan antara jenis disfagia dan ciri-ciri sosiodemografi. Prevalens disfagia di kalangan pesakit dewasa adalah 5.5%. Kebanyakan pesakit adalah Melayu, berumur 61 tahun, dengan lelaki lebih ramai berbanding wanita. Sejarah perubatan termasuk penyakit pencernaan dan gastrointestinal diikuti oleh strok. Kaedah penilaian 'fiberoptic endoscopic evaluation of swallowing' (FEES) adalah kaedah penilaian utama (61.6%). Disfagia esofagus adalah paling lazim berlaku (51%), diikuti oleh disfagia orofaring (28.8%). Masalah yang sering dihadapi termasuk batuk semasa menelan, penurunan berat badan, pergerakan lidah yang terhad dan aspirasi. Pemakanan oral dengan pengubahsuaian diet dan pemakanan tiub nasogastrik adalah intervensi yang biasa. Umur ≥ 61 tahun (OR = 6.016, 95% CI: 2.189, 16.531, p = 0.001) dan sumber rujukan (OR = 0.111, 95% CI: 0.029, 0.419, p =

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0.001) secara signifikan boleh meramalkan jenis disfagia. Kesimpulannya, disfagia adalah isu kesihatan yang signifikan di kalangan dewasa, terutamanya individu yang lebih tua dengan pelbagai jenis sejarah perubatan. Penekanan pada strategi pengurusan dan kajian berterusan di Malaysia adalah diperlukan.

Kata kunci: Ciri-ciri klinikal; disfagia; Malaysia; pesakit dewasa; prevalens

ABSTRACT

Dysphagia, a swallowing disorder affecting oral, pharyngeal and oesophageal phases, requires effective treatment. The rising incidence of dysphagia each year highlights the need for more research in Malaysia. This study investigated its prevalence and characteristics among adult patients at the Speech Pathology Clinic, Hospital Pakar Universiti Sains Malaysia (HPUSM). Medical records of 125 patients aged $\geq$ 18, diagnosed with dysphagia between 2018 and 2023, were retrospectively analysed. Data on demographics, diagnosis methods, feeding types and dysphagia characteristics were collected. Logistic regression analyses determined associations between dysphagia types and socio-demographic factors. Dysphagia prevalence was 5.5%, predominantly affecting Malay patients aged 61, with a slight male predominance. Common medical histories included gastrointestinal diseases and was followed by stroke. The primary assessment method was fiberoptic endoscopic evaluation of swallowing (FEES) (61.6%). Oesophageal dysphagia was most prevalent (51%), followed by oropharyngeal dysphagia (28.8%). Issues included coughing while swallowing, weight loss, limited tongue mobility and aspiration. Oral feeding with diet modification and nasogastric tube feeding were common interventions. Age $\geq$ 61 years (OR = 6.016, 95% CI: 2.189, 16.531, p = 0.001) and referral sources (OR = 0.111, 95% CI: 0.029, 0.419, p = 0.001) significantly predicted dysphagia types. Dysphagia is a significant health issue among adults, particularly older individuals, necessitating focused management strategies and ongoing research in Malaysia.

Keywords: Adult patients; clinical characteristics; dysphagia; Malaysia; prevalence

INTRODUCTION

Dysphagia is caused by impaired neurology and musculature, and involves more than 30 pairs of muscles and nerves working together to move food from the mouth to the stomach (Hermabessière et al. 2019). This condition, marked by trouble or discomfort when eating, drinking or taking medication (Sotirović 2022), can result in delayed or misdirected movement of food (Argov & de Visser 2021; Ugonabo et al. 2022). Researchers have classified the swallowing process into four distinct phases: (i) oral preparatory; (ii) oral transport; (iii) pharyngeal; and (iv) oesophageal. Difficulties in any of these phases can lead to dysphagia, significantly impacting nutritional status, hydration, weight and overall well-being (Jones 2020; Ogino et al. 2021).

The global prevalence of dysphagia varies widely, with estimates ranging from 12% in community settings to 60% in nursing homes (Doan et al. 2022; Freeman-Sanderson et al. 2023). It affects up to 27% of older adults, 50% of hospitalised patients, 50% of stroke patients and 24-86% of those with neurodegenerative diseases (Rech & Goulart 2021; Riera et al. 2021). In Asia, prevalence among high-risk groups ranges from 27-86% (Zhang et al. 2018; Zhang et al. 2021a) .

Various health conditions can lead to swallowing difficulties. These include strokes (Khan et al. 2014), brain-related diseases (Gong et al. 2022), gastrointestinal problems (Mittal & Vaezi 2020), cancers of the head and neck (Tengku et al. 2023), and lung diseases like chronic obstructive pulmonary disease (COPD) (Lin & Shune 2020). Strokes are a significant cause, affecting over half of those who survive them (González-Fernández et al. 2013). In neurological diseases, prevalence ranges from 11.6-60% in Parkinson's disease and up to 91.1% in elderly patients with community-acquired pneumonia (Takizawa et al. 2016).

Sociodemographic factors contribute to dysphagia's prevalence and characteristics. The impact of age is significant, as the prevalence increases from 9.95% among individuals aged 65-70 years to 47.83% among those over 90 years old (Zhang et al. 2021a). This increase is driven by age-related declines in muscle strength, coordination, and sensory function, along with common medical conditions and polypharmacy in older adults, which collectively impair the swallowing mechanism and highlight the need for targeted interventions in this population (Zhang et al. 2021b). We still do not fully understand the influence of gender on the subject at hand. Some studies indicate that women may experience a greater impact (Pizzorni et al. 2021), while other studies fail to identify any notable disparities between males and females (Leslie & Smithard 2021).

Dysphagia is characterised by problems with controlling boluses, oral residue, the gag reflex, hyolaryngeal excursion and coughing during or after swallowing (Logemann 1998; Somasundaram et al. 2014; Watts & Dumican 2018; Weimers & Pillay 2021). These characteristics can vary depending on dysphagia's underlying cause and severity. Several techniques, including video fluoroscopy for swallowing study (VFSS), fiberoptic endoscopic evaluation of swallowing (FEES), high-resolution oesophageal manometry (HRM) and esophagogastroduodenoscopy (EGD), can identify swallowing disorders (Alkhowaiter 2023; Cordier et al. 2023; Miller et al. 2023; Kamal & Clarke 2020; Lazarescu et al. 2020).

Dysphagia can have serious effects. Patients may become undernourished, dehydrated, and have aspiration pneumonia. These issues can significantly reduce quality of life (Christmas & Rogus-Pulia 2019). Beyond physical health, swallowing difficulties can affect mental and social well-being (Kim et al. 2020; Rommel & Hamdy 2016; San et al. 2019). Some people may avoid eating with others, feel anxious during meals or lose the pleasure of eating (Thiyagalingam et al. 2021).

In Malaysia, dysphagia is a common yet often underdiagnosed and undertreated condition, with research in this field remaining relatively scarce but gradually expanding. While previous literature

has investigated dysphagia among the Malaysian population and its state in Malaysian hospitals, comprehensive studies are still needed to fill significant gaps in understanding. Notable published works include studies focusing on patients with head and neck cancer (Husmeela et al. 2021; Linn & Wahab 2015) and another study (Asrori & Ying 2022) in Kuala Nerus examined the association between muscle strength and risk of dysphagia among the elderly, but the field lacks broader research across various patient groups. Mustaffa Kamal et al. (2013) highlighted the low utilisation of speech and language pathology services among those affected by dysphagia despite their availability. This underutilisation may stem from factors such as lack of awareness, limited access to care and cultural or socioeconomic barriers while Xinyi et al. (2018) reported low referral rates from healthcare professionals at Hospital Pakar Universiti Sains Malaysia (HPUSM). These findings highlight the need for increased awareness and training in dysphagia management. Future research should aim to characterise dysphagia more comprehensively, focusing on prevalence, characteristics, complications and associated risk factors. Such studies could contribute to increased awareness of this critical and potentially life-threatening medical condition among healthcare professionals and the public, ultimately improving targeted treatments and patient outcomes in Malaysia. To address this knowledge gap, this study aimed to conduct a five-year retrospective analysis of dysphagia cases at HPUSM. The research examined the clinical characteristics of dysphagia in adult patients and contributed to improving targeted treatments and patient outcomes in Malaysia.

MATERIALS AND METHODS

Study Design and Setting

The HPUSM Speech Pathology Clinic was chosen as a study area due to its role as a referral centre for East Coast Malaysian patients and its expertise in managing patients with dysphagia. The clinic's facilities and multidisciplinary team, which includes specialists in ear, nose and throat (ENT), gastrointestinal (GI) and speech-language pathology (SLP), offer important expertise in the management of dysphagia. This retrospective analysis examined the medical records of adult patients with dysphagia at the HPUSM Speech Pathology Clinic between 2018 and 2023. It compiled sociodemographic data, diagnosis methods, feeding types, dysphagia types and characteristics, providing a comprehensive overview of patient profiles and treatment approaches. The Health Research and Ethics Committee (HREC) of USM (USM/JEPeM/KK/23050370) granted ethical approval of this study.

The study population included all adult dysphagia patients treated at the HPUSM Speech Pathology Clinic. Inclusion criteria required patients to be at least 18 years old at the time of dysphagia diagnosis by a HPUSM dysphagia team (speech-language pathologist, otorhinolaryngologist, gastroenterologist). The diagnosis could be based on either a non-instrumental swallowing assessment (clinical swallowing examination [CSE] or clinical bedside examination [CBE]) or an instrumental assessment [FEES], oesophagogastroduodenoscopy

[OGDS], or manometry). Exclusion criteria encompassed pediatric patients and those with incomplete medical records. We used consecutive sampling to select adult patients with dysphagia for swallowing assessments. The sample size for this study was calculated using Raosoft online software. The parameters used in the calculation included a margin of error of 10%, a confidence level of 95%, a population size of 1691, and a response distribution of 50%. Using these parameters, the initial sample size required was 91. However, to account for a possible dropout rate of 10%, the final sample size needed for this study was adjusted to 100. Thus, a total of 125 medical records of adult patients diagnosed with dysphagia were included.

Data Collection Procedure

Following ethical approval, we retrieved a list of all adult patients (inpatient and outpatient) attending the HPUSM Speech Pathology Clinic between January 2018 and August 2023 (Figure 1). The total number of adults who attended the clinic during this period was determined. Subsequently, the number of adults who underwent various swallowing assessments within the clinic was identified, including CBE, FEES, OGDS and manometry. All of these assessments were not done for all patients simultaneously. Instead, specific diagnostic procedures were scheduled based on each patient's needs. Finally, the number of adults diagnosed with dysphagia was extracted from the medical
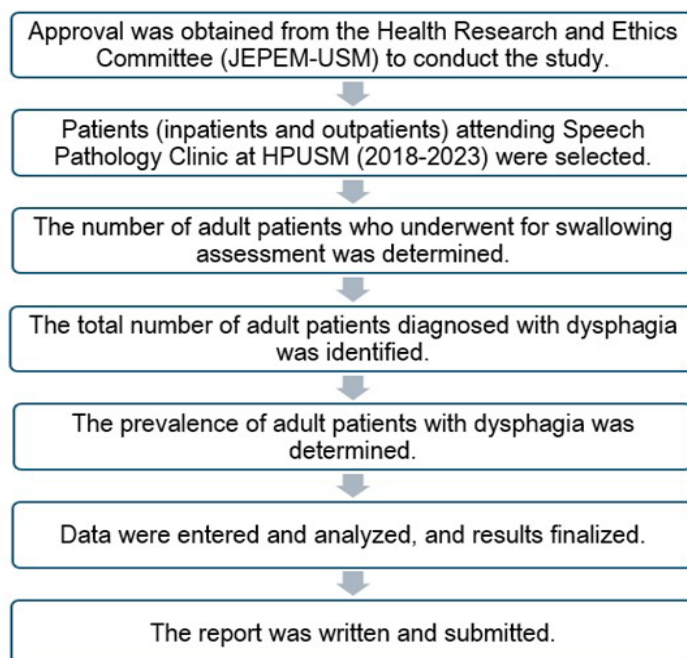

FIGURE 1: Flowchart showing the procedure of the study

records. The prevalence of dysphagia was then calculated by dividing the number diagnosed with dysphagia by the total number attending the clinic during the specified timeframe and multiplying by 100% (Figure 2). Extracted data included sociodemographic information, medical history, diagnoses, feeding methods and dysphagia characteristics. The feeding methods and dysphagia characteristics recorded referred to patients that were utilised at their first assessment before any diagnostic process or intervention was conducted (Figure 2). All data was recorded in a standardised Excel spreadsheet. Subsequently, we analysed the prevalence of dysphagia among adults and explored potential associations between sociodemographic factors and dysphagia types.

Data Analysis

Statistical analysis was performed using SPSS version 27, with $p<0.05$ set as the threshold for significance. Categorical variables (age, gender, ethnicity, marital status, employment, referral source, medical history) were presented as frequencies and percentages. Logistic regression analyses were then employed to investigate associations between dysphagia types and demographic characteristics.

RESULTS

A total of 3,486 adult patients (inpatients and outpatients) attended the speech pathology clinic at HPUSM between 2018-2023. Of these, 1,691 patients (48.5%) underwent evaluations for swallowing assessment. Following these assessments, 193 patients were diagnosed with dysphagia, representing 11.4% of those evaluated for swallowing difficulties. It's important to note that 88.6% of patients who underwent swallowing assessments were not diagnosed with dysphagia despite being referred for evaluation. The overall prevalence of dysphagia within the study population was calculated as 5.53%, determined by dividing the number of adult patients diagnosed with
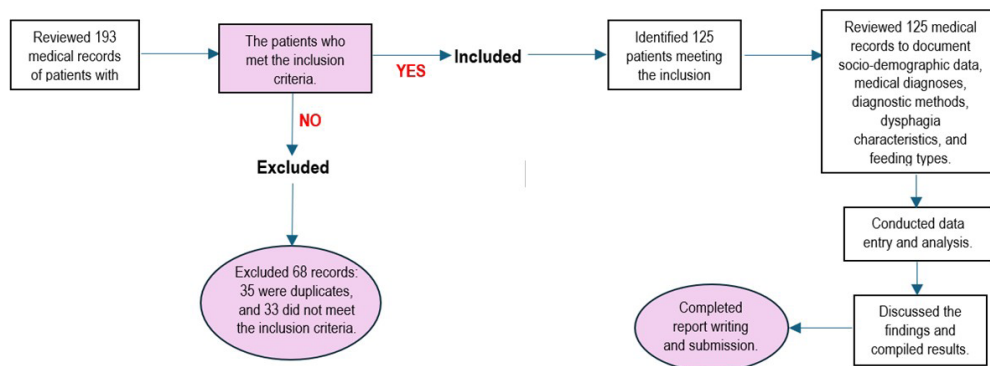

FIGURE 2: Flowchart illustrating the process of characterizing adult patients with dysphagia at the Speech Pathology Clinic, HPUSM

dysphagia (193) by the total number of adult patients who attended the clinic (3,486). These findings indicated that over the five-year period, approximately 5.5% of adult patients attending the HPUSM Speech Pathology Clinic were ultimately diagnosed with dysphagia, while a larger proportion underwent swallowing assessments as a precautionary measure (Figure 3).

Socio-demographic Profile

In addition to prevalence, we analysed the socio-demographics profile of the patients evaluated for dysphagia (Table

The total number of adult patients (inpatients and outpatients) at the Speech Pathology Clinic, HPUSM (2018–2023), was determined (n=3486).

↓

Adult patients undergoing swallowing assessment were identified (n=1691).

↓

Adult patients diagnosed with dysphagia were identified (n=193).

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The prevalence of dysphagia among adult patients was calculated as 5.53% (193/3486 x 100).

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Dysphagia prevalence among adult patients at HPUSM Speech Pathology Clinic was 5.5%.
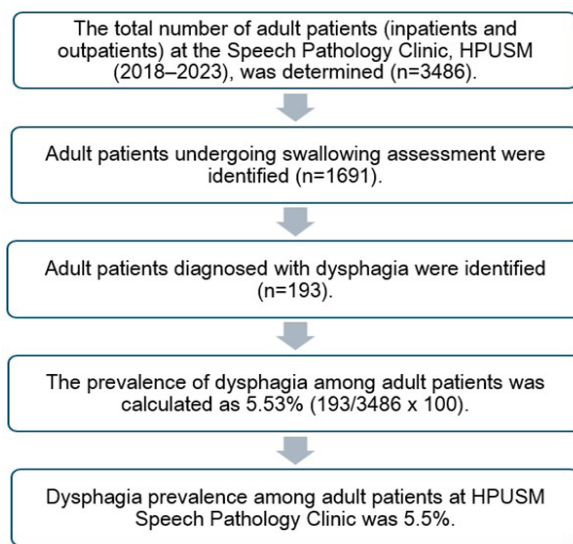
FIGURE 3: The prevalence of dysphagia among patients at the Speech Pathology Clinic, HPUSM

TABLE 1: Socio-demographic features of adult patients with dysphagia

Variables		Frequency	Percentage (%)	Mean (SD)
Age	18-40	19	15.2	
	41-60	41	32.8	1.37 (0.74)
	≥ 61	65	52.0	
Gender	Male	72	57.6	
	Female	53	42.4	0.58 (0.50)
Ethnicity	Malay	115	92.0	
	Others	10	8.0	0.92 (0.27)
Employment Status	Employed	57	45.6	
	Unemployed	68	54.4	0.46 (0.50)
Marital Status	Single	11	8.8	
	Married	109	87.2	0.99 (0.50)
	Widower	5	4.0	
Referral Sources	Inpatient	96	76.8	
	Outpatient	29	23.2	0.23 (0.42)
Type of Cases	New	14	11.2	
	Follow-up	111	88.8	0.89 (0.32)

1). Age distribution revealed a variation, with the majority (52.0%) being 61 years and above. Gender breakdown showed a slight male predominance (57.6%). The ethnic composition mirrored Malaysia's demographics (92.0% Malay). Over half (54.4%) of the patients were unemployed. Marital status indicated a high proportion of married patients (87.2%). Clinically, the majority (76.8%) of patients were inpatients referred for swallowing assessment, with most cases (88.8%) being follow-up cases, indicating ongoing management for dysphagia. The referral source included inpatient referrals from the ward at HPUSM and outpatient referrals from other hospitals and clinics. This comprehensive demographic and clinical profile provided valuable insights into the adult dysphagia patient population at HPUSM, highlighting the importance of referral pathways in the management and diagnosis of dysphagia.

The Medical Conditions and Histories

Table 2 detailed the medical histories of adult patients diagnosed with dysphagia. A diverse range of underlying conditions was identified. The most prevalent co-occurring condition was digestive diseases or Gastroesophageal Reflux Disease (GERD), affecting 35.2% (n=44) of patients and this was consistent with the present study that found that the most prevalent type of dysphagia was oesophageal dysphagia. Stroke history was present in 20.0% (n=25) of the population, followed by neurological diseases (17.6%, n=22). Cardiothoracic diseases were found in 8.0% (n=10) of patients. Less prevalent co-morbidities included other types of cancer (5.6%, n=7), various other medical conditions (4.8%, n=6), head and neck cancer (3.2%, n=4), respiratory diseases (3.2%, n=4), and laryngeal diseases (2.4%, n=3). This distribution underscored the multifaceted nature of dysphagia, often arising from a complex interplay of underlying medical conditions

Methods for Diagnosing Adult Patients with Dysphagia

A multifaceted diagnostic approach was employed to assess swallowing difficulties in the study population (Figure 4). FEES emerged as the most prevalent method (61.6%), followed by CSE (49.6%) and

TABLE 2: The medical histories of patients with dysphagia

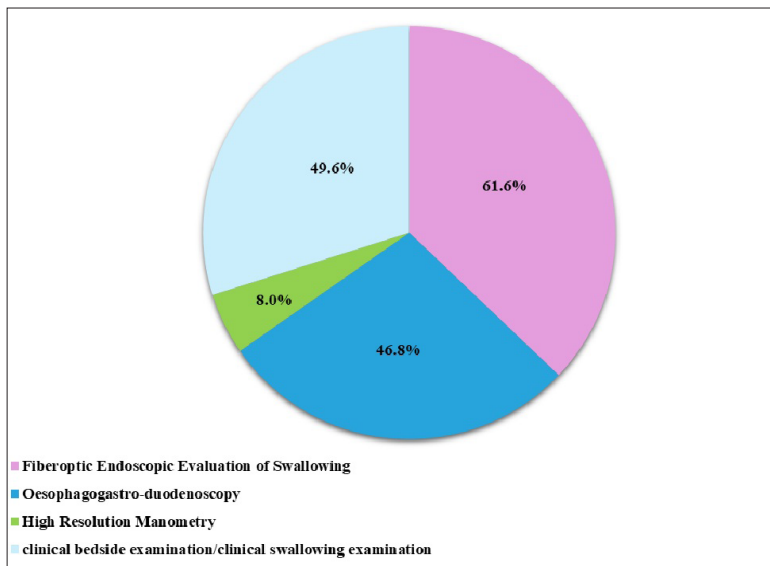| Medical histories	Frequency (n)	Percentage (%)
Digestive diseases /Gastrointestinal Reflux Disease	44	35.2
Stroke	25	20.0
Neurological Disease	22	17.6
Cardiothoracic Diseases	10	8.0
Other types of cancer	7	5.6
Others	6	4.8
Head and Neck cancer	4	3.2
Respiration Disease	4	3.2
Laryngeal Diseases	3	2.4

FIGURE 4: Methods for diagnosing adult patients with dysphagia

OGDS (46.8%). While BSE/CSE is valuable initial screening tools, it is important to note their limitations in definitively diagnosing dysphagia, particularly silent aspiration; because of that, at HPUSM, therapists initially use bedside swallowing tests to screen patients for dysphagia in the ward, and is followed by FEES to finalise the diagnosis and treatment plan. This integrated diagnostic strategy, utilising multiple methods, enhances the accuracy and effectiveness of dysphagia management while addressing the limitations of any single diagnostic approach. Of the 125 patients assessed, approximately 62 were evaluated using only one diagnostic modality, while around 63 patients were assessed using two or more modalities, with 44 patients undergoing two diagnostic methods and 19 patients undergoing all three. This variation in diagnostic techniques employed reflected the complexity of swallowing disorders and highlighted the

need for a comprehensive evaluation to accurately determine the underlying cause and appropriate treatment.

Types of Dysphagia

Analysis of dysphagia types (Figure 5) revealed oesophageal dysphagia as the most prevalent category (40.8%). Oropharyngeal dysphagia followed at 28.8%, and pharyngeal dysphagia was the least common (16.8%). This distinction between dysphagia types holds significant clinical value, as targeted treatment approaches vary depending on the specific anatomical location of the swallowing impairment.

The Characteristics of Dysphagia

Patients with dysphagia exhibited a variety of symptoms (Table 3). Coughing during swallowing emerged as the most frequent symptom, reported by 56.0%
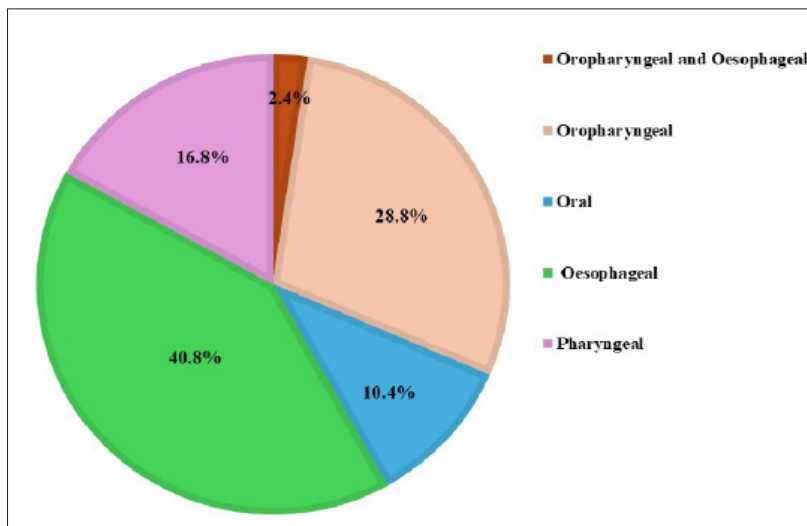
FIGURE 5: Types of dysphagia

of patients. This was followed by weight loss (41.6%), poor appetite (36.8%) and vomiting (36.8%). Significantly, clinical signs of aspiration were present in 34.4% of patients, highlighting the potential for associated complications such as aspiration pneumonia. Vocal fold problems were also noted in 15.20% of patients. These included functional issues like hoarseness, reduced vocal resonance and laryngeal oedema, as well as structural problems such as vocal cord (VC) palsy (e.g., right VC palsy, left VC palsy), nodules in the anterior third of the VC, redness of the VC, large phonation gap and laryngitis. These findings underscored the diverse presenting characteristics of dysphagia and the importance of comprehensive evaluation to identify and manage potential complications effectively.

Feeding Methods

Dysphagia's impact on patients extends beyond just swallowing difficulties, encompassing more than just challenges with swallowing and necessitating interventions to address nutritional concerns. Table 4 provided an in-depth analysis of the feeding methods employed by adult patients in this study; a significant proportion (77.0%) required adjustments to their nutritional management, highlighting the broader implications of the condition. Over half (54.0%) received nutritional support through nasogastric tubes, while liquid-consistency diets were prescribed for 50.0% of patients. These findings highlighted the substantial influence of dysphagia on nutritional intake.

The Association between the Socio-demographic Data and Types of Dysphagia among Adults

Logistic regression analysis identified key factors associated with dysphagia (Table 5). Patients aged 61 years and above were significantly more likely to experience dysphagia compared to those

TABLE 3: The characteristics of dysphagia among adult patients

Dysphagia Characteristics	Frequency (n)	Percentage (%)
Limited tongue mobility	34	27.2
Anterior leakage	8	6.4
Reducing bolus manipulation	10	8.0
Oral residue	8	6.4
Absent gag reflex	23	18.4
Saliva problems	31	24.8
Reduce hyolaryngeal excursion	20	16.0
Change in voice quality	20	16.0
Cough	70	56.0
Vallecular residue	20	16.0
Pyriform sinus residue	25	20.0
Penetration	19	15.2
Aspiration	43	34.4
Regurgitation	7	5.6
Heartburn	2	1.6
Chest pain	17	13.6
Gastroesophageal reflux disease (GERD)	15	12.0
Poor appetite	46	36.8
Stuck sensation	28	22.4
Vomiting	46	36.8
Frequent throat clearance	9	7.2
Weight loss	52	41.6
Poor hygiene	33	26.4
Vocal folds problems	19	15.2

TABLE 4: Feeding methods among adult patients with dysphagia

Type of Feeding	Frequency (n)	Percentage (%)
Oral feeding without diet modification	19	15
Oral feeding with diet modification	96	77
Soft diet	46	37
Semi-solid diet	8	6
Blended diet	3	2
Solid food	2	2
Other oral intake	37	30
Liquid consistency	62	50
Tube feeding		
Nasogastric (Ryle's) Tube	68	54
Percutaneous endoscopic gastrostomy tube (PEG)	2	2

TABLE 5: Association between Socio-demographic data and types of dysphagia among adults

Variables	Crude OR (95% CI)	p-value (< .05)
Age		
18-40	1.0	
41-60	1.138 (.275, 4.702)	.859
61	6.016 (2.189, 16.531)	.001
Gender		
Male	.535 (.218, 1.310)	.171
Female	1.0	
Ethnicity		
Malay	1.084 (.201, 5.833)	.926
Others	1.0	
Employment status		
Employed	1.081 (.438, 2.669)	.866
Unemployed	1.0	
Marital status		
Single	1.0	
Married	1.762 (.104, 29.829)	.695
Widower	.947 (.115, 7.823)	. 959
Referral sources		
Inpatient	.111(.029, .419)	.001
Outpatient	1.0	
Type of Case		
New case	1.0	
Follow-up case	2.278(.492, 10.549)	.292

aged 18-40 years (OR = 6.016, 95% CI: 2.189, 16.531, p = 0.001). This finding aligned with the observed age distribution of our dysphagia population, particularly concerning oropharyngeal dysphagia, which was more prevalent among older adults. Interestingly, the analysis revealed that referral sources were significantly associated with types of dysphagia (OR = 0.111, 95% CI: 0.029, 0.419, p = 0.001). Specifically, inpatients had higher odds of oesophagal dysphagia compared to outpatients, potentially reflecting the higher prevalence of GERD in this group. However, the analysis found no significant association between the presence of different types of dysphagia and variables such as ethnicity, employment status or marital status. These results, detailed in the accompanying table, underscored the complexity of dysphagia's etiology and highlighted the importance of age and referral sources in its diagnosis and management.

DISCUSSION

This retrospective study, conducted over five years at the HPUSM, provides important insights into the clinical presentations of dysphagia in adult patients. The research findings show a dysphagia prevalence of 5.5% among adult patients, which is consistent with previous studies. Cho et al. (2015) found a similar prevalence of 3.0% among patients with dysphagia symptoms at least weekly, regardless of gender. Similarly, Patel et

al. (2018) found consistent prevalence rates among adult in the United States inpatients aged 45 years and above. Both the Cho et al. (2015) and Patel et al. (2018) studies are similar to the current study in that they also employed retrospective data collection from medical records. Moreover, the study populations are comparable to Cho et al. (2015) study that included 3,669 adult patients, while Patel et al. (2018) covered a similar population size over the same five-year period. The comparatively low prevalence observed in the current study could be attributed to the comprehensive assessment protocol, which included both instrumental and non-instrumental diagnostic techniques. This multi-faceted approach to dysphagia evaluation likely contributed to a more precise identification of cases, potentially moderating the overestimation of prevalence rates observed in studies that used less comprehensive assessment techniques.

The HPUSM study's prevalence rates may not accurately represent the broader Malaysian population due to its focus on Malay participants and specialised speech clinics. Higher prevalence rates in online surveys and telephone surveys may not accurately capture all cases due to self-reporting biases. Adkins et al. (2020) conducted an online survey in the United States, revealing a higher prevalence of 16.1% of respondents experiencing dysphagia, implying that approximately one in six adults struggle with swallowing. Similarly, Kertscher et al. (2015) found that 12.1% of participants in a telephone survey in the Netherlands reported swallowing difficulties, indicating an increased incidence of oropharyngeal dysphagia with age.

Dysphagia in Malaysia presents a significant public health concern, characterised by widespread prevalence yet marked by underdiagnosis and suboptimal treatment. Mustaffa Kamal et al. (2013) noted that speech and language pathology services are notably underutilised in managing this condition. This underutilisation stems from various factors, such as a lack of awareness among patients and healthcare providers about the benefits of speech and language pathology for dysphagia management, limited access to specialised care, or even cultural and socioeconomic barriers that prevent patients from seeking help (Mustaffa Kamal et al. 2013). This issue is highlighted by a study conducted at HPUSM revealed that medical officers rarely refer patients to speech-language pathologists for dysphagia therapy (Xinyi et al. 2018). Various factors influence the prevalence and management of dysphagia in Malaysia, though the full extent of their impact requires further research. Global studies have shown that the aging population naturally leads to a higher incidence of age-related conditions that predispose individuals to dysphagia, such as stroke, Parkinson's disease and dementia (Estupiñán Artiles et al. 2022). The specific dynamics in Malaysia need a more comprehensive investigation. The diverse textures and strong flavours typical of traditional Malaysian cuisine, while culturally significant, may pose challenges for individuals with dysphagia, particularly those requiring texture-modified diets, but their precise influence needs to be scientifically evaluated. Therefore, addressing these dietary habits within dysphagia management frameworks is essential. Enhancing awareness,

providing targeted training to healthcare professionals, a multidisciplinary approach in diagnosing and managing dysphagia, ensuring the availability of culturally appropriate and specialising treatment options are critical steps toward improving patient outcomes in Malaysia.

In this study, demographic analysis revealed dysphagia is more common among older adults, particularly those aged 61 and above. This finding aligns with previous research, such as the study by Estupiñán Artiles et al. (2022), which attributes age-related changes in swallowing patterns as the primary cause of dysphagia in older adults. Specifically, physiological changes such as reduced secondary oesophageal peristalsis, increased intrabolus pressure, and resistance to bolus flow are significant contributors to swallowing difficulties in older adults. The findings are consistent with a study conducted in a Danish acute care setting found that 43.1% of patients aged 65 or older exhibited signs of dysphagia (Olesen et al. 2021), and with Kwon et al. (2016), who noted a significant increase in both annual incidence and prevalence of dysphagia among those over 70 years old. In Malaysia, Asrori and Ying (2022) found that decreased muscle strength significantly influences the risk of dysphagia in older adults. This is particularly relevant to the present study, as the majority of the patients with dysphagia in the sample study were elderly, supporting the notion that advancing age is a critical risk factor for dysphagia. While dysphagia is predominantly observed in the elderly, it is important to note that it can also affect younger populations due to various underlying conditions, as highlighted by

Leslie and Smithard (2021). The study also found that males had a higher prevalence of dysphagia (57.6%) than females (42.4%). This finding corroborates the results of Ferraz et al. (2020), who observed a 37.27% risk of dysphagia in healthy elderly individuals, with males being the most affected. Similarly, Armas-Navarro et al. (2023) reported that the majority of critically ill patients with dysphagia were males. Furthermore, Khader et. al (2018) found 20.1% of healthy elderly individuals had swallowing difficulties, with 61.5% of those aged 61-70 being male. However, findings contrast with some previous studies. For instance, Leslie and Smithard (2021), Yamagishi et al. (2008) and Mateos-Nozal et al. (2020) reported a higher prevalence of dysphagia in females. Mateos-Nozal et al. (2020) specifically noted that dysphagia in older female patients frequently leads to poor health conditions and placement in nursing homes. Yamagishi et al. (2008) found an increased prevalence of gastroesophageal reflux disease symptoms, including dysphagia, among females aged 60-89 in Japan. This finding adds another degree of intricacy to the demographic profile of dysphagia. It is important to highlight that differences in study populations, methodological approaches, and cultural contexts may explain why gender-related vary between studies.

The demographic profile of the participants in this study primarily consists of Malays, who represent 92% of the study population. This high percentage is reflective of the ethnic composition of Kelantan, where Malays make up 95.7% of the population, followed by 3.4% Chinese, 0.3% Indian and 0.6% from other ethnicities (Choo et al. 1988; Department

of Statistics 2022). The findings from this study, conducted at a hospital in Kelantan, align with the state's demographic trends, where the Malay population is the majority (Linn & Wahab 2015). While Husmeela et al. (2021) reported different prevalences among ethnic groups, with Indians having the highest proportion (60.0%). However, the high representation of Malays in our study is likely due to the region's ethnic makeup, which suggests that our findings are representative of the local population. Further research is needed to explore whether there are unique cultural, dietary or genetic factors contributing to dysphagia in this ethnic group.

This study found that 35.20% of the individuals had GERD, a prevalent disorder associated with swallowing difficulties. The high prevalence of GERD in our population may contribute to the increased rates of oesophageal dysphagia observed in this study, as GERD is known to cause inflammation and damage to the oesophagus, leading to difficulties in swallowing (Jung 2011). This finding is consistent with the global trend of rising GERD incidence, particularly in Asia, where Southeast and Western regions have recorded significantly higher rates (Jung 2011). The connection between GERD and dysphagia is well-documented, with previous studies indicating that approximately 3.5% of reflux patients experience trouble in swallowing. Moreover, conditions like cancer, gastroesophageal disease and oesophagal motility disorders are frequently found in conjunction with dysphagia (Gouda et al. 2015; Tsukamoto et al. 2016).

Stroke is a major risk factor for dysphagia, with a prevalence of 20.00% among dysphagia patients in this study.

Research has shown high rates of dysphagia in stroke patients, often persisting over time (Arreola et al. 2019; Lapa et al. 2022). For example, Lapa et al. (2022) reported a 90.7% prevalence of dysphagia in patients undergoing endovascular treatment, with 69.4% experiencing ongoing dysphagia during follow-ups. Additionally, Arreola et al. (2019) reported a 39.7% prevalence of post-stroke oropharyngeal dysphagia, which increased to 41.7% after three months.

The diagnosis of dysphagia involves a variety of methods, each with its own distinct advantages. FEES is a primary diagnostic procedure for pharyngeal dysphagia, offering real-time visualisation of the swallowing process. FEES has been particularly useful for identifying pharyngeal dysphagia in diverse patient groups, including stroke survivors (Braun et al. 2019; de Oliveira et al. 2019), adults with general dysphagia symptoms (Speyer et al. 2022), elderly individuals (Imaizumi et al. 2020) and multiple sclerosis patients (Printza et al. 2021; Solaro et al. 2020). It's important to note that FEES is highly effective for assessing pharyngeal dysphagia, it does not directly evaluate oesophagal dysphagia. However, when considering all subtypes of dysphagia (oral, pharyngeal, and oropharyngeal), oropharyngeal dysphagia is typically more prevalent than oesophagal dysphagia. This prevalence is consistent with the widespread use of FEES as a diagnostic tool, as it effectively assesses the more common oropharyngeal issues. Bedside swallowing tests (BSTs), such as the bedside swallowing test of dysphagia (BSTD), provide accessible screening tools with high sensitivity and specificity (Hassan & Aboloyoun 2014; Immovilli et al. 2021).

To address oesophagal dysphagia, which FEES unable to assess, advanced diagnostic methods like EGD are crucial in identifying oesophageal pathologies (Varadarajulu et al. 2005) and have high sensitivity in diagnosing GERD and dysphagia (Chan & Balasubramanian 2019; Matsubara et al. 2021). High-resolution manometry (HRM) gives a detailed picture of how the oesophagus contracts and can tell the difference between problems with the structure and problems with the movement (Lazarescu et al. 2020). The combination of these methods, as practiced at HPUSM, enhances the accuracy and effectiveness of dysphagia diagnosis and management.

Understanding dysphagia characteristics in adults is crucial for effective treatment and early intervention, which can improve outcomes and reduce costs. This study at HPUSM's Speech Pathology Clinic found coughing while swallowing to be a prominent characteristic, with a 56.00% prevalence. This aligns with other studies such as Somasundaram et al. (2014) who found that coughing could predict dysphagia with 61% sensitivity and 81% specificity, Hassan & Aboloyoun (2014) stated that coughing and changes in voice were important evaluation criteria and Pezdirec et al. (2019) identified persistent coughing was the most important factor in dysphagia among head and neck cancer patients (84.4%). Another problem was weight loss, which happened to 41.60% of the patients. This matches what other studies (Peladic et al. 2019; Su et al. 2017; Tsukamoto et al. 2016), found that people with dysphagia lose a lot of weight, with 14-41% of them having this problem. This finding is consistent across various patient populations, including Parkinson's disease patients and cancer patients.

Other notable characteristics included poor appetite, which affected 36.80% of patients, while 27.20% reported limited tongue mobility. Bogaardt et al. (2015) highlighted the emotional impact of swallowing problems on elderly patients' quality of life. Lee et al. (2018) and Ruoppolo et al. (2013) highlighted the importance of tongue movement in dysphagia, particularly in neurological disorders. A total of 34.40% of patients exhibited clinical signs of aspiration, whereas 15.20% showed penetration symptoms. Ruoppolo et al. (2013) and Printza et al. (2021) reported similar findings in amyotrophic lateral sclerosis (ALS) patients. These findings highlight the complex nature of dysphagia and the need for individualised assessment and management strategies.

The study also explored feeding methods for adult dysphagia patients. Oral feeding with dietary modifications (77.0%) and nasogastric tube feeding (53.8%) emerged as the most prevalent approaches. These findings align with previous research by Garcia-Peris et al. (2007) who reported that 72.4% of head and neck cancer patients modified their food habits. Similarly, Streicher et al. (2018) documented the widespread use of texture-modified diets among nursing home residents with dysphagia. The utilisation of nasogastric tube feeding in 54% of patients in this study is consistent with observations from Tian et al. (2023). However, Husmeela et al. (2021) reported a wider variety of approaches used in Malaysian head and neck cancer patients, including percutaneous gastrostomy tubes and combined methods. These combined findings emphasise the importance of individualised dysphagia management,

where each patient requires specific interventions tailored to their unique swallowing challenges and nutritional requirements, based on the assessment findings.

Analysis revealed a significant association between age and the type of dysphagia in the study population. This aligns with existing research. Park et al. (2013) associated dysphagia in South Korean nursing homes with patients aged 75 and above, male gender and a history of dementia. Additionally, Zhang et al. (2021b) observed a higher prevalence of dysphagia among older nursing home residents. Similar trends were reported by Wang et al. (2019) who noted increased dysphagia prevalence in those aged 65 and over, and by Gong et al. (2022) who associated dysphagia with older age in Parkinson's disease patients. Ding et al. (2018) further supported this association, found that elderly Parkinson's patients had a 1.078 times greater risk of dysphagia. However, Ferraz et al. (2020) reported that 37.27% of healthy elderly individuals were at risk of dysphagia but found no statistically significant association with sex or age groups. Sura et al. (2012) observed a 20% increase in dysphagia referrals for those over 60 from 2000 to 2009. Taken together, this body of research emphasises the strong connection between older age, referral sources, and the development of dysphagia, highlighting the need for targeted interventions in the elderly population.

The strength of this study is the first to be conducted in Kelantan and Malaysia, involving all adult patients with dysphagia within a broad period (2018-2023) without determining a specific population. Every week, the HPUSM holds a dysphagia clinic where speech-language therapists, ENT doctors, gastrointestinal doctors and dieticians assess and manage patients with dysphagia. The HPUSM has OGDS and manometry to investigate patients with GI disease and can provide accurate diagnoses for patients with oesophageal dysphagia.

The limitation of this study that focuses on speech pathology clinics limits its generalisability, while the exclusion of patients with incomplete records may impact findings. Its retrospective design restricts the assessment of long-term dysphagia progression and outcomes. While the study examined socio-demographic factors predicting dysphagia types, more research is needed on how medical conditions and comorbidities affect dysphagia severity and management. The primarily quantitative approach leaves psychosocial and quality of life implications unexplored, suggesting that qualitative methods could provide deeper insights into patients' experiences. Addressing these limitations in future research could advance understanding of dysphagia, refine clinical practices, and improve the well-being of affected individuals.

CONCLUSION

This study has provided insights into the prevalence and characteristics of dysphagia among adult patients. The findings highlight the importance of comprehensive patient evaluation and the implementation of individualised treatment plans to address swallowing difficulties. It also contributes to bridging knowledge gaps by providing a snapshot of dysphagia prevalence, particularly

within the Malaysian population. Future research efforts should be directed towards investigating the effectiveness of targeted interventions for dysphagia management and evaluating long-term patient outcomes.

ACKNOWLEDGEMENT

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