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Understanding health care professionals' knowledge and practice regarding malnutrition and dysphagia: insights from Targeted Education to Address Malnutrition and Swallowing disorders (TEAMS) international survey

Ivy Cheng Ph.D. [a,b,c,d,*], Nathalie Rommel Ph.D. [e,f], Stefanie Duchac Ph.D. [g], Julie Regan Ph.D. [h], Renée Speyer Ph.D. [i,j], Rainer Dziewas M.D., Ph.D. [d,k]

[a] *Academic Unit of Human Communication, Learning, and Development, Faculty of Education, University of Hong Kong, Hong Kong*
[b] *Centre for Gastrointestinal Sciences, Faculty of Biology, Medicine and Health, University of Manchester, United Kingdom*
[c] *Institute for Biomagnetism and Biosignal Analysis, University of Münster, Germany*
[d] *Department of Neurology, University Hospital Münster, Germany*
[e] *Deglutology, Experimental Otorhinolaryngology, Department of Neurosciences, University of Leuven, Leuven, Belgium*
[f] *Department of Gastroenterology, Neurogastroenterology and Motility, University Hospitals Leuven, Leuven, Belgium*
[g] *Department of Therapy Sciences, SRH University, Heidelberg, Germany*
[h] *Department of Clinical Speech and Language Studies, Trinity College Dublin, Dublin, Ireland*
[i] *Discipline of Speech and Language Therapy, School of Health Sciences, College of Medicine, Nursing & Health Sciences, University of Galway, Galway, Ireland*
[j] *Curtin School of Allied Health, Faculty of Health Sciences, Curtin University, Perth, Australia*
[k] *Department of Neurology and Neurorehabilitation, Klinikum Osnabrueck, Academic Teaching Hospital of the University of Muenster, Osnabrueck, Germany*

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ABSTRACT

Objective: To understand the current knowledge gaps regarding malnutrition and dysphagia among healthcare professionals worldwide.
Design: An anonymous online cross-sectional survey was developed in English and translated into six languages. It comprised 26 questions divided into three categories: demographics, current clinical practice, and educational needs. Data were collected between July 2023 and January 2024.
Participants: Healthcare professionals and students involved in the care of dysphagia patients worldwide.
Analysis: Descriptive statistics and qualitative analysis.
Results: A total of 877 responses, predominantly from dietitians (44.3%) and speech therapists (29.2%) across 54 countries, were analyzed. Only about one-third of participants reported consistent nutrition screening and the use of validated tools. Nearly half (46%) indicated that less than 60% of malnourished dysphagia patients received interventions. The most common (22%) knowledge source was work experience, whereas clinicians' knowledge was a key challenge in managing malnutrition in dysphagia patients.
Conclusions and Implications: Knowledge among international healthcare professionals on malnutrition and dysphagia may be inadequate, and there may be an underuse of validated tools for nutrition screening. These results call for the need to develop a targeted education program that addresses the current knowledge gap on malnutrition and dysphagia among healthcare professionals.

Introduction

Dysphagia is prevalent among patients with neurological diseases such as stroke (78%) [1], Parkinson's disease (82%) [2], cerebral palsy (50.4%) [3] and amyotrophic lateral sclerosis (100%) [4], head and neck cancer (32%) [5], and among the elderly (33–51%) [6,7]. Dysphagia is a recognized risk factor for malnutrition. Studies have shown that acutely hospitalized patients with dysphagia were 2.3 times more likely to be malnourished [7] and stroke patients with dysphagia were 2.4 times more likely to be malnourished, particularly at the rehabilitation stage [8,9]. Moreover, patients who are on a texture-modified diet may have

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*Corresponding author. Tel: +852 3917 1562.
E-mail address: ikycheng@hku.hk (I. Cheng).

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reduced energy (60% of daily requirement) and protein (78% of daily requirement) intake [10]. Malnutrition can hinder childhood development, increase the risk of life-threatening and infectious complications, prolong hospitalization, increase mortality, and increase healthcare cost [9,11]. Studies have also shown that hospitalized patients who are at risk of malnutrition had higher hospital costs and risks of complications, longer length of stay, and larger home healthcare needs than those without malnutrition risks [12,13].

By 2030, one in six people in the world will be aged 60 years or older [14]. Aging is associated with increased risks of neurological diseases that may cause dysphagia. Moreover, several age-related anatomical, physiological, and neurological changes can lead to a decline in the safety and efficiency of swallowing, increasing the risks of developing dysphagia [15]. With the rapidly aging population worldwide, the prevalence of dysphagia and associated malnutrition risks is expected to increase in the next decade. Therefore, there is a pressing need to prevent malnutrition-related complications among patients with dysphagia.

Awareness of malnutrition risks among patients with dysphagia is the key to quality nutrition care. Studies have shown that timely and appropriate nutritional therapy can prevent malnutrition and improve patients' physical and mental health [16]. However, the levels of knowledge and nutrition care practice vary across disciplines and countries [17–20] and may lead to underrecognition of malnutrition and hence delay the delivery of nutritional care among patients with dysphagia.

Therefore, this study aimed to understand the current practice and knowledge among healthcare professionals worldwide on nutritional care among patients with dysphagia. We sought to identify the knowledge gaps and the educational needs among healthcare professionals.

Methods

The reporting of this survey study followed the Checklist for Reporting Of Survey Studies (CROSS) [21].

Ethics approval

Ethics approval was exempt for this study because the survey data were obtained in a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects, as per US Department of Health and Human Services guidelines (Code of Federal Regulations, 45 CFR 46.104(d)(2), 2018).

Survey development: Targeted Education to Address Malnutrition and Swallowing disorders (TEAMS) survey

The TEAMS survey was developed to evaluate the clinical knowledge and experience on nutritional care for patients with dysphagia among healthcare professionals and students (Appendix 1). The TEAMS survey was developed by a committee consisting of six experts, including healthcare professionals from different disciplines, including speech and language therapists, epidemiologists, and neurologists, all of whom had at least 110 years of experience working in the field of dysphagia. The survey comprised 26 questions, which included multiple-choice questions (with single or multiple options), open-ended questions, and a question that required ranking of priorities. The survey could be divided into three sections: (1) demographic information, (2) current clinical knowledge and practice, and (3) educational needs.

In the first part of the survey, participants were asked to provide information regarding their age, country of their primary work or study setting, educational background, profession, and dysphagia-related working experience. The second part investigated the participants' experience in working with patients with dysphagia and/or malnutrition. This part was only completed by participants who are practicing in the field. They were asked about the characteristics of their clinical caseload and practice in screening and diagnosing patients with dysphagia. Furthermore, they were asked to estimate the prevalence of malnutrition among their dysphagia caseload and current clinical practice in assessment and management of nutritional status in patients with dysphagia. The last part of the survey aimed to identify educational needs from the participants' perspectives. They were asked to rate the importance of several suggested topics and suggest additional topics that they perceived to be essential for their further learning.

Survey translation, distribution, and participant recruitment

An anonymous online TEAMS survey was developed in English using an online survey platform, Qualtrics (Provo, Utah, USA). Pretesting of the survey was conducted among 12 experts with at least 10 years of experience working in the field of dysphagia (board of directors of the European Society for Swallowing Disorders [ESSD]). The survey was revised based on the feedback from pretesting. The English survey was then translated into six different languages, including German, Italian, Dutch, French, Greek, and Spanish. The translation was first performed using an online artificial intelligence translation tool (DeepL SE, Cologne, Germany). The translated surveys were then checked and verified by native speakers of the respective languages.

The inclusion criteria for participating in the survey were healthcare professionals and students involved in the care for patients with dysphagia, whether in research, education, or clinical practice. Individuals who would not be involved in the field of dysphagia were excluded from the study. Participants were recruited using a convenience sampling method, such as snowball sampling, through the ESSD newsletters, ESSD social media platforms, ESSD Annual Congress, professional networks, and industries from the nutrition sector. The survey was distributed globally through social media posts, poster advertisements, and emails between July 2023 and January 2024. Predetermination of sample size required for the study was not possible given the limited data on the number of healthcare professionals around the world.

Participants provided informed consent by proceeding with the survey. No personal identifiable information or internet protocol addresses were collected throughout the study.

Data analysis

Raw data were exported from Qualtrics to Microsoft Excel (Version 2410, Washington, USA). The data were cleaned and recoded where necessary using Microsoft Excel. Participants' responses in open-ended text boxes were coded into an existing response option, if applicable, or as a new response option. Data were analyzed using descriptive statistics (e.g., frequency and percentage distributions), and answers to open-ended questions were analyzed qualitatively using thematic analysis.

Results

A total of 1087 individuals responded to the online survey. Ten participants did not consent to proceed with the survey. Moreover, 12.5% (n = 136) of the participants did not continue the survey after

consenting to participation. In addition, 4.2% (n = 64) of the participants were excluded from the study because they did not fulfil the eligibility criteria. The response rate was defined as the number of completed responses of the final analysis (n = 877) divided by the total number of eligible participants (n = 1023), leading to a response rate of 85.7%.

Demographic characteristics

A total of 90.7% of the participants were healthcare professionals practicing in the field of dysphagia, whereas 9.2% were students who would be involved in the care of patients with dysphagia.

The demographic information of the participants is summarized in Table 1. Participants were based in 54 countries from six continents. Approximately two-thirds (62.5%) of the responses were from countries in Europe (e.g., France, Germany and Spain), while a quarter (26.1%) of participants came from Asia (e.g., India, United Arab Emirates and Pakistan) and the remaining (11.4%) participants came from countries in the other continents (e.g. Mexico, Chile and Kenya). Most participants were based in India (22.4%), followed by France (14.7%) and Germany (9.1%).

Most participants (32.8%) were aged between 26 and 35 years (Table 1). The next most represented age group was 36 to 45 years (27.7%), followed by 46 to 55 years (20.2%). Over half of the participants had a master's degree or equivalent (55.8%), while 29.0% had a bachelor's degree or equivalent, and 12.2% had a doctorate degree or equivalent.

A majority of the participants were dietitians (44.3%) and speech and language therapists (29.2%) (Table 1). Almost half (48.8%) of the participants' primary work setting was hospitals, while 12.8% worked at private practice. The number of years of work experience and, in particular, years working with patients with dysphagia, varied greatly between participants. More than half (60.5%) had less than 10 years of work experience and approximately 40% (38.7%) had less than 5 years of experience in the field of dysphagia. These data were consistent with the age groups participating in this study, of which 45.0% were younger than 35 years.

Current clinical practice

Table 2 presents the results related to current clinical practice. Regarding the patient population, almost all participants (94.8%) worked with adults, whereas one-third (33.5%) worked with children. Over half (67.9%) of the participants performed dysphagia screening in their primary work setting. In relation to the percentage of patients with dysphagia in their monthly caseload, most participants (59.5%) reported that they had a caseload of 40% or less. Among the caseload of patients with dysphagia, the most commonly reported causes were stroke (18.7%), neurodegenerative diseases (15.9%), and dementia (13.4%). Participants reported that they received referrals for assessment or treatment of dysphagia from medical doctors (38.0%), followed by speech and language therapists (12.5%) and nurses (12.4%). The reported time from referral to dysphagia diagnosis varied across settings and was based on urgency of individual cases. Nonetheless, half (57.4%) of the participants reported that the diagnosis could be made within one week.

Estimated prevalence of malnutrition, nutrition screening, and assessment among patients with dysphagia. When asked to estimate the prevalence of malnutrition among patients with dysphagia, a large variability among participants was observed (range 0% to 100%). More than 15% (16.9%) of participants estimated the prevalence of malnutrition at 20% or lower, while almost a quarter (23.8%) of participants reported prevalence rates of 70% and higher, and the remaining (59.4%) participants indicated prevalence estimates ranging between 20% and 70%.

Regarding the healthcare professionals involved in screening or assessment of nutritional status, nearly half (47.0%) of the participants reported that dietitians were always involved in their work settings, followed by medical doctors (32.5%) and nurses (25.7%). A quarter (25.8%) of participants reported that these healthcare professionals were never involved in their work settings. The distribution of personnel involved is shown in Fig. 1.

On the frequency of nutritional status screening and assessment, approximately one-third of participants reported that they always perform the screening or assessment upon receiving

Table 1
Demographic background of participants (N = 877)

Participant distribution by continent*	Percentage
Europe	62.5
Asia	26.1
North America	4.5
South America	5.7
Africa	1.1
Oceania	0.1
Age (yr)	
<18	0.1
18–25	12.1
26–35	32.8
36–45	27.7
46–55	20.2
56–65	6.3
66+	0.8
Education background	
Bachelor's degree or equivalent	29.0
Master's degree or equivalent	55.8
Doctorate degree or equivalent	12.2
Students	2.9
Profession	
Dietitian	44.3
Speech and language therapist	29.2
Medical doctor	7.4
Researcher	3.5
Nurse	3.4
Physiotherapist	1.4
Occupational therapist	0.2
Dentist	0.2
Other	10.4
Primary work setting	
Hospital	48.8
Private practice	12.8
Rehabilitation facility	9.7
Nursing or elderly home	8.9
Palliative care	6.8
Community care	6.0
Research institute/education	3.2
School	0.3
Other	3.6
Years of experience	
≤5	38.7
6–10	21.8
11–15	14.2
16–20	10.4
21–25	7.0
>25	7.8

*Countries in Europe include Austria, Cyprus, Denmark, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, Turkey, United Kingdom of Great Britain, and Northern Ireland. Countries in Asia include Afghanistan, Armenia, India, Iran, Israel, Lebanon, Malaysia, Oman, Pakistan, Philippines, Saudi Arabia, Sri Lanka, and United Arab Emirates. Countries in North America include Antigua and Barbuda, Canada, Dominican Republic, Guatemala, Honduras, Mexico, and United States of America. Countries in South America include Brazil, Argentina, Chile, Colombia, Ecuador, Paraguay, and Peru. Country in Oceania include New Zealand.

Table 2
Current clinical practice

Patients with dysphagia (%)	Percentage of caseload
≤20	33.8
21–40	25.8
41–60	14.3
61–80	12.0
81–100	14.2
Causes of dysphagia	
Stroke	18.7
Neurodegenerative diseases	15.9
Dementia	13.4
Head and neck cancer	12.3
Tracheostomized patients	12.1
Critical care patients	11.1
Cerebral palsy	6.0
Children with neurodevelopmental disorders	4.2
Children with congenital structural disorders	2.3
Neonates	1.7
Other	2.4
Origins of referral	
Medical doctor	38.0
Speech and language therapist	12.5
Nurse	12.4
Dietitian	8.9
Patient/caregivers	8.3
Physiotherapist	3.4
Occupational therapist	2.8
Dentist	1.3
Other	12.5
Time from referral to dysphagia diagnosis	
Within 1 week	57.4
1–4 weeks	25.6
5–12 weeks	4.5
13–18 weeks	1.7
>6 months	1.9
Other	8.9
Estimated prevalence of malnutrition	
0–10%	5.8
11–20%	11.1
21–30%	9.8
31–40%	9.3
41–50%	15.1
51–60%	12.2
61–70%	13.0
71–80%	14.8
81–90%	5.0
90–100%	4.0
Percentage of malnourished patients received intervention for malnutrition	
≤20%	14.4
21–40%	18.7
41–60%	12.9
61–80%	22.5
81–100%	25.1
Unknown	6.5
Types of intervention	
Modification of diet and food fortification	19.7
Provision of dietary advice	18.3
Modification of feeding route	17.8
Liquid or powder oral nutritional supplements and thickening agents	16.3
Prethickened nutritional supplements	14.6
Intervention for underlying cause of malnutrition	12.2
Others	1.0

reports or concerns from patients or caregivers (33.7%), upon medical referral (36.4%), and during initial assessment of dysphagia (35.7%). Approximately 10% of the participants reported that they never performed screening or assessments in the abovementioned scenarios (10.2%, 17.4%, and 10.6%, respectively). Fig. 2 depicts the distribution of frequencies across scenarios.

The most frequently reported tools for screening or assessment of nutritional status were the patient's medical and dietary history, clinical assessment of malnutrition symptoms, and anthropometric measurements (with 49%, 43.1%, and 38.3% rated "always used" respectively). Only about 30% (29.4%) of participants reported that they always use validated screening tools such as Mini Nutritional Assessment (MNA) [22], Malnutrition Universal Screening Tool (MUST) [23] or Nutritional Risk Screening (NRS-2002) [24]. Approximately 15% (15.7%) of participants reported that they always use the Global Leadership Initiative on Malnutrition (GLIM) criteria [25] for diagnosing malnutrition, whereas nearly half (42.3%) stated that they never used these criteria for diagnosis. The reported use frequencies of different screening and assessment tools are represented in Fig. 3.

Regarding reassessment of nutritional status after initial screening or assessment, one-third (37.8%) of participants reported that reassessments were performed every month, while 13.3% reported that they were performed once every 3 months, 3.2% reported that they were performed once every 6 months, and 1.6% reported that they were performed once every year. However, nearly 15 (14.5%) participants reported that they never reassessed the patients after initial screening or assessment.

Management of malnutrition in patients with dysphagia. Approximately one-quarter (25.1%) of participants stated that 80-100% of patients with dysphagia who were diagnosed as malnourished received intervention for malnutrition (Table 2). Approximately half (47.6%) of the participants reported that more than 60% (range: 61–100%) of malnourished patients received intervention, while most of the remaining participants (46%) reported lower percentages. In total, approximately fifteen percent (14.4%) of participants even reported that less than one in five patients would receive the required treatment for malnutrition. Approximately 6% (6.5%) of participants could not provide an estimate on the percentage of malnourished patients who received intervention.

Dietitians were always involved in the intervention for patients with dysphagia and malnutrition in approximately half (52.9%) of participants' work settings, followed by medical doctors (34.6%) and nurses (25.2%). Interestingly, 22% of participants reported that dietitians, medical doctors, and nurses were never involved in the intervention of malnourished patients with dysphagia in their work settings. Fig. 4 shows the distribution of personnel involved in intervention. The reported types of intervention provided to these patients included modification of diet and food fortification (19.7%), provision of dietary advice (18.3%), modification of feeding route (17.8%), liquid or powder oral nutritional supplements and thickening agents (16.3%), pre-thickened nutritional supplements (14.6%) and intervention for underlying cause of malnutrition (12.2%) (Table 2).

The greatest reported challenge in the management of malnutrition in patients with dysphagia included family's or caregiver's adherence (18.4%) or patient's adherence (18.1%) to management recommendations, followed by clinician's knowledge (15.2%), human resources (14.0%), other comorbidities (12.3%), time resources (10.9%), and patient's medical history (8.0%). Other reported challenges included financial resources, knowledge of caregivers, patients, or staff, environmental factors such as culture, lack of referrals, poor communication among healthcare providers, and technical problems.

Educational needs

Regarding the current source of knowledge on dysphagia, 22% reported that they acquire the knowledge through working experience, 17.4% through university or professional training program, 16.8% through academic journal, 14.9% through post-graduate

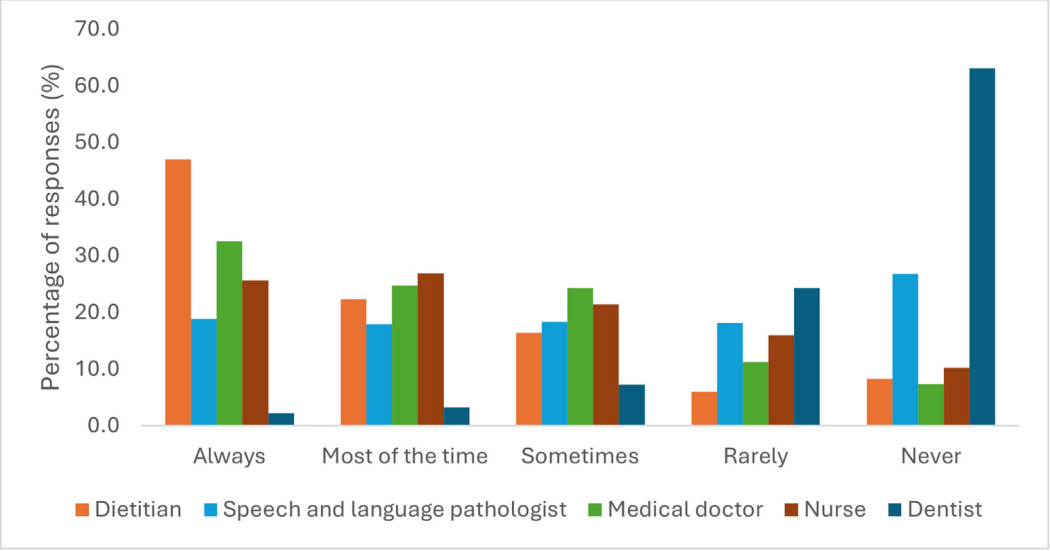

Fig. 1. Healthcare professionals involved in the screening and assessment of nutritional status among patients with dysphagia.

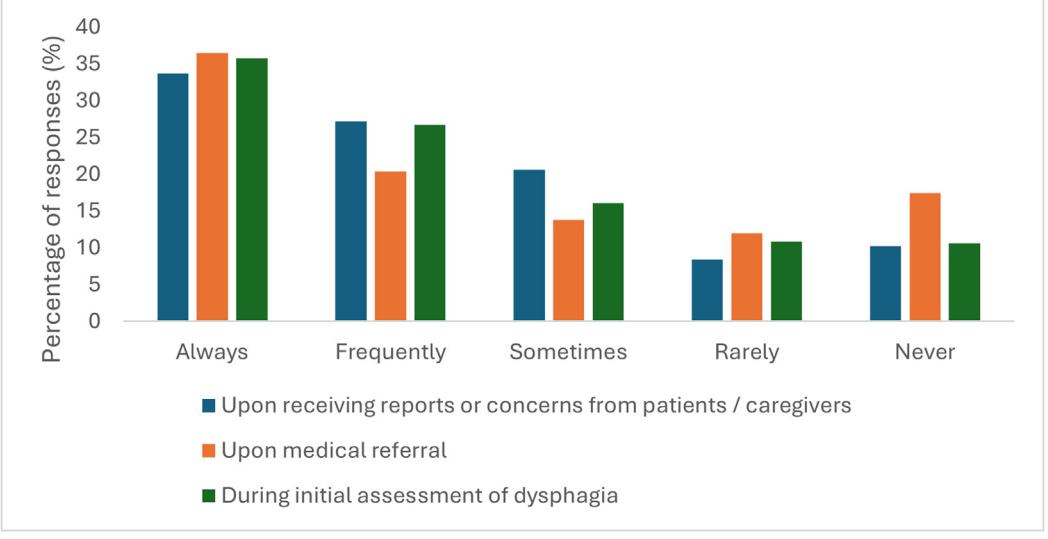

Fig. 2. Frequency of nutrition screening and assessment upon patient's referral, medical referral, and during initial assessment of dysphagia.

training, 14.7% through academic conferences, and 13.1% through in-hospital training. Similar distribution was also reported for the source of knowledge on malnutrition. 22.1% obtained their knowledge through working experience, followed by academic journal (18.4%) and university or professional training (16.6%). The distribution of sources of knowledge is listed in Table 3.

When asked to rate the importance of different educational topics, "understanding signs and symptoms of malnutrition" and "training on assessment tools for nutritional status" were rated as top priorities for future education programs (29.5% and 27.2% rated as the most important, respectively). Fig. 5 shows the distribution of priorities of topics. Other suggested educational topics included practical strategies and resources; ethical, social, and economic aspects of malnutrition and dysphagia; multidisciplinary management; and specific considerations for the pediatric population, the geriatric population, and patients who require palliative care.

Discussion

Our study investigated the current knowledge and practice among 877 healthcare professionals and students across 54 countries across six continents. Malnutrition and dysphagia are closely related and require a multidisciplinary model of care. However, our findings showed that the clinical practice and knowledge vary across settings and professions. Only one-third of participants reported that they always performed nutrition screening or assessment upon receiving reports from patients, medical referral, or initial assessment of dysphagia, and validated tools were not consistently used for nutrition screening in patients with dysphagia. Alarmingly, nearly half (46%) of the participants indicated that only under 60% of malnourished patients with dysphagia received intervention for malnutrition. Regarding the knowledge on malnutrition and dysphagia, most of the participants reported that the source of knowledge comes from working experience. In fact,

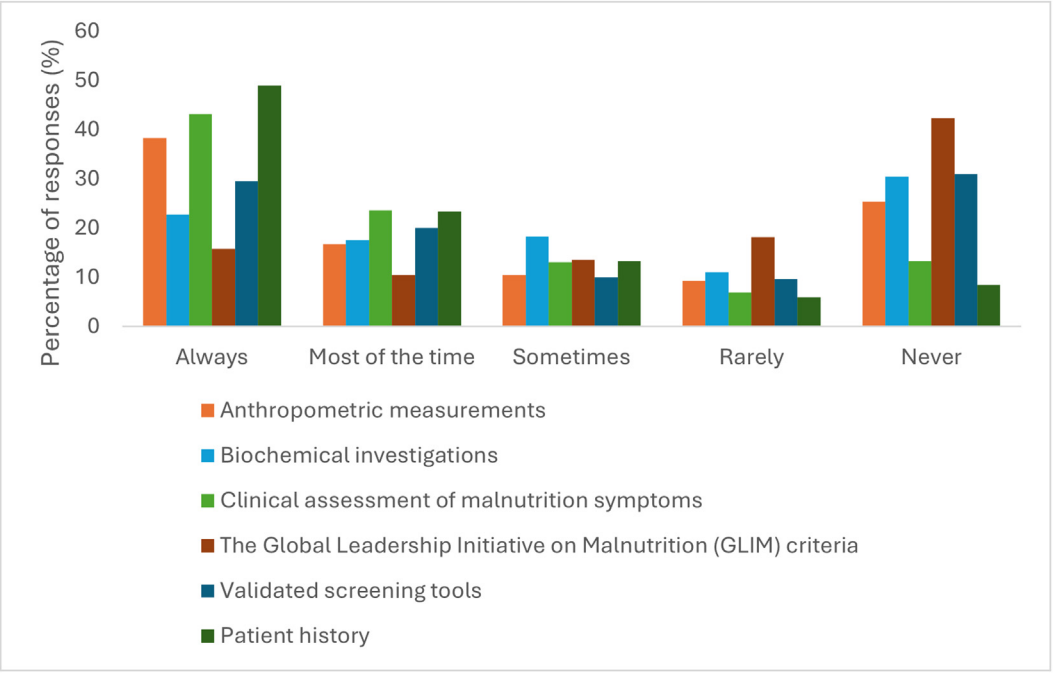

Fig. 3. Frequency of the use of tools for nutrition screening and assessment.

clinicians' knowledge was identified as one of the main challenges in managing malnutrition in patients with dysphagia. The findings demonstrated that there is a need for the development of an education program that addresses the current gap in knowledge on malnutrition and dysphagia among healthcare professionals. The education program should adopt an interprofessional approach to promote a holistic view of patient care and education on the varying complications of dysphagia.

Lack of nutrition screening upon referral and the use of validated screening tools

We found that only about one-third of participants consistently perform nutrition screening upon referrals from physicians or patients, or upon dysphagia diagnosis. This finding is concerning because referrals, whether from other healthcare professionals or from patients themselves, indicate a potential problem that should be addressed as early as possible. Initial nutrition screening upon referral can help identify individuals who may be at nutritional risk and shorten the delay in management. The European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines highlighted that nutrition screening is important for identifying nutritional factors that may affect treatment outcome and treatment planning [26]. Moreover, the guidelines suggested that admitting staff or healthcare teams should perform nutrition screening on all patients upon admission. Therefore, nutrition screening is an essential first step in providing effective nutritional care. While it is plausible that our participants may refer the patients to other disciplines such as dietitians for detailed nutritional assessments, the lack of screening may delay the identification of potential malnutrition risks and subsequent management.

Another surprising finding is that validated screening tools were not consistently used in the participants' work settings. Over 40% of participants reported that the GLIM criteria were never

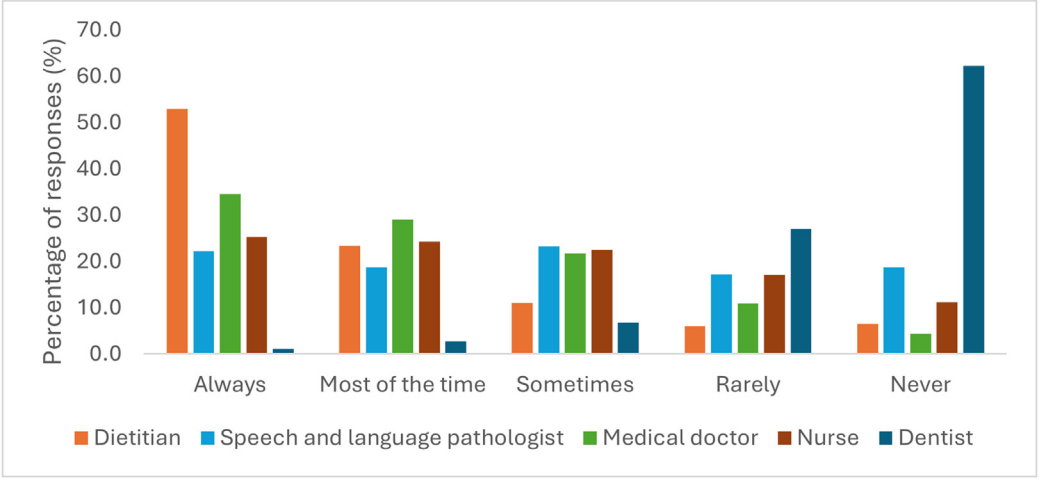

Fig. 4. Healthcare professionals involved in the management of patients with dysphagia and malnutrition.

Table 3
Current sources of knowledge

Source of knowledge on dysphagia	Percentage (%)
Working experience	22.0
University/training program	17.4
Academic journals/textbooks	16.8
Postgraduate professional seminars/courses	14.9
Academic conferences	14.7
In-hospital/in-rehabilitation center training	13.1
Others	1.3
Source of knowledge on malnutrition	
Working experience (e.g., from colleagues)	22.1
Academic journals/textbooks	18.4
University/training program	16.6
Academic conferences	14.5
Postgraduate professional seminars/courses	14.2
In-hospital/in-rehabilitation centre training	12.7
Others	1.5

used for the diagnosis of malnutrition in their practice. These findings may be related to the lack of training and knowledge in the use of validated screening tools. In fact, our participants identified "training on assessment tools for nutritional status" as one of the most important educational topics. Validated tools are important for systematic and evidence-based documentation of patients' nutritional status, such that any changes over the course of the disease can be monitored. Findings from validated assessments can also facilitate professional communication across disciplines. The GLIM criteria suggested that initial screening should be performed with validated tools [25]. A recent systematic review and meta-analysis showed that the GLIM criteria had high diagnostic accuracy for malnutrition, and better diagnostic value than subjective global assessment (SGA), making it a viable clinical standard for diagnosing malnutrition [27]. Importantly, the ESPEN guidelines recommended several screening tools with good predictive validity and reliability for nutrition screening in the community (Malnutrition Universal Screening Tool; MUST [23]), hospitals (Nutritional Risk Screening; NRS-2002 [24]) and the elderly (Mini Nutrition Assessment; MNA [22]). Therefore, we recommend prioritizing the use of validated tools in nutrition screening and assessment. Institutions should provide resources and a targeted training program for healthcare professionals on the use of validated tools and establish a protocol for screening and assessment of nutritional status using these tools.

Multidisciplinary model of care

Our study cohort represented a diverse group of healthcare professionals from over 10 disciplines and clinical settings. This is not surprising as management of patients with dysphagia and malnutrition requires a multidisciplinary effort. Dysphagia is a disorder in passing food from the mouth to the stomach, which can disrupt dietary intake and lead to malnutrition. A recently proposed Determinants of Malnutrition in Aged Persons (DoMAP) model suggested that dysphagia is a direct cause of malnutrition in older people, and stroke or Parkinson diseases may indirectly cause malnutrition due to the associated dysphagia [28]. Malnutrition is particularly problematic in patients with dysphagia because it can hinder the recovery of swallowing function. Studies have shown that stroke patients with dysphagia and malnutrition had limited benefits from swallowing rehabilitation compared to those without malnutrition [29].

The close relationship between swallowing and nutrition therefore requires input from specialists in the respective areas. Our results showed that there is a discrepancy between reported estimated prevalence of malnutrition among patients with dysphagia (as high as 100%) and patients who received appropriate intervention for nutrition (under 60%). This gap between identifying patients in need and the delivery of care may be attributed to the inadequacy in knowledge or ineffective communication across disciplines, leading to a delay in delivering care. Although each member of the multidisciplinary team contributes to a different aspect of nutritional care, a comprehensive understanding on the perspectives and roles of different disciplines involved is important. A study with 298 older patients found that early multidisciplinary

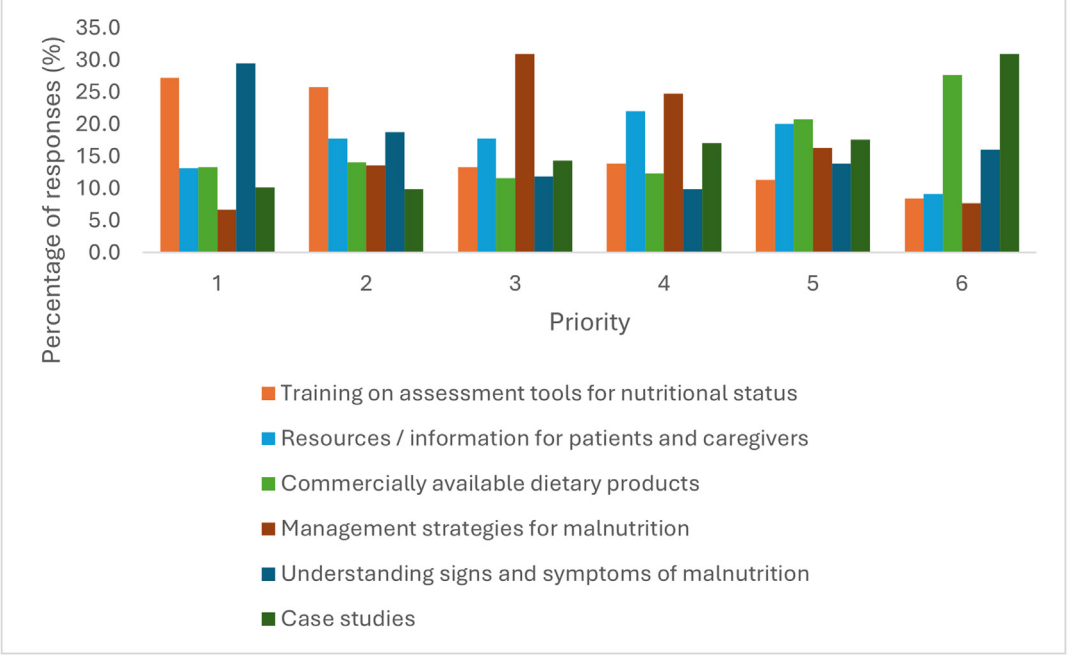

Fig. 5. Priorities of proposed educational topics.

approach, which involved screening for malnutrition, dehydration, and dysphagia on admission and immediate interventions, can reduce malnutrition and related hospital-acquired infections [30]. Importantly, the cost for multidisciplinary approach did not cost much more than standard care. Another randomised controlled trial study also showed that a multidisciplinary team approach was more effective in improving swallowing function, reducing the risks of aspiration pneumonia and malnutrition in older hospitalised people with dysphagia [31]. Taken together, these studies showed that a standardized and streamlined protocol of multidisciplinary management can lead to more effective treatment plans that cater to patient needs, ultimately improving both swallowing function and nutritional status.

Clinician's knowledge as a major challenge and future educational needs

Most participants stated that they gain the knowledge on malnutrition and dysphagia through working experience. This may be attributed to a multidisciplinary management approach, which exposed them to practical skills and knowledge outside of their own discipline. While this is understandable, relying on knowledge gained from working experience may be inefficient, and some healthcare professionals may have difficulties managing patients effectively without adequate knowledge. Previous studies have reported that healthcare professionals may have inadequate knowledge on nutrition [19,20] and management of dysphagia [17,18], which may lead to poor clinical decision-making on management. Consistent with previous findings, our results showed that clinicians' knowledge is one of the main challenges in the management of malnutrition in patients with dysphagia. This finding showed that the knowledge of healthcare professionals can impact on patient outcomes.

Importantly, our findings call for a targeted education program that addresses issues beyond the theoretical knowledge on the physiological and functional aspects of malnutrition and dysphagia. Participants wanted to learn more about the social, ethical, and economic aspects of malnutrition and dysphagia, the practical resources available for healthcare professionals and caregivers, the roles of each multidisciplinary team members in the management of nutrition in patients with dysphagia, and strategies to promote multidisciplinary management. These insightful topics provide a valuable foundation for the development of a sustainable education program on malnutrition and dysphagia for healthcare professionals across the globe.

Limitations

One of the limitations of the study is that the sample size was not predetermined due to our pragmatic approach in collecting responses from across countries and professions. This may affect the ability of the study to reveal findings that are significant and representative of all healthcare professionals worldwide. Of relevance, the participants were predominantly based in European and Asian countries, with most being dietitians and speech and language therapists. This may lead to a skewed opinions towards some parts of world and healthcare professions, limiting the generalizability of results to the global population. Moreover, we did not conduct additional statistical analyses due to the heterogeneity of professions and demographic backgrounds. Future studies using a stratified random sampling approach that controls for professions and countries will provide more comprehensive understanding of the challenges and opportunities in the field. Nonetheless, our results provided an overview of the current knowledge gaps and identified areas of opportunities for improving healthcare practices. Another limitation is that the TEAMS survey was conducted anonymously, with no IP addresses being collected, making it impossible to detect duplicated entries and response inflation. Finally, given the self-reported nature of the survey, response bias may be present.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: This study was funded by the Medical Nutrition Industry (MNI). If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Ivy Cheng: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **Nathalie Rommel:** Conceptualization, Funding acquisition, Methodology, Validation, Writing – review & editing, Supervision. **Stefanie Duchac:** Conceptualization, Funding acquisition, Methodology, Validation, Visualization, Writing – review & editing. **Julie Regan:** Conceptualization, Funding acquisition, Methodology, Validation, Visualization, Writing – review & editing. **Renée Speyer:** Conceptualization, Funding acquisition, Methodology, Validation, Visualization, Writing – review & editing. **Rainer Dziewas:** Conceptualization, Funding acquisition, Methodology, Validation, Writing – review & editing, Supervision.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.nut.2025.112858.

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