

# Knowledge, Perception and Challenges of Implementing Nutrition Screening: A Survey of Healthcare Professionals

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**Funding:** This work was granted by Universiti Putra Malaysia (GP-IPM/2018/9613500)

**Potential competing interests:** No potential competing interests to declare.

## Abstract

**Background:** Preoperative malnutrition is common in hospital settings; however, one major problem is the short practices to screen surgical patients as a part of nutrition care management to address the issue of malnutrition.

**Objectives:** The aim of this study is to assess the knowledge, perceptions, and challenges of Healthcare Professionals (HCPs) to implement NS in pre-operative patients. **Methods:** A cross-sectional survey was undertaken between April and May 2023. **Results:** A total of 103 respondents participated in this survey. Almost 75% of HCPs acknowledged the importance of managing malnutrition in preoperative patients; however, there is a lack of implementation of NS (32.4%) and a need for training for HCPs (74.5%), which relates to fewer patients being referred to a dietitian for better nutrition care. All HCPs have a positive perception (85.4%) of the importance of preoperative NS and concur that challenges faced to execute NS accordingly beforehand are the barrier (52.3%). **Conclusions:** The present study suggests that HCPs are aware of early identification of malnutrition but lack implementation of NS. There is a remarkable need for the establishment of a standardised nutrition care pathway for better nutrition intervention in pre-operative patients.

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**Keywords:** Preoperative patients, Nutrition screening, Knowledge, Perceptions, Challenges, Healthcare professionals.

## Introduction

Malnutrition is a common problem, affecting a high percentage of surgical patients; it is frequently observed in 60-85% of surgical patients undergoing common medical procedures [1]. Malnutrition in the pre-operative period is associated with increased morbidity, mortality, length-of-stay, and healthcare costs [2]. These patients are at particular risk due to inadequate oral intake, cancer cachexia, muscle protein depletion, and gastrointestinal inflammation [3][4][5]. Optimising nutrition pre-operatively has been shown to improve outcomes after surgery [6] and may impact long-term health outcomes [7].

Nutrition screening (NS) has been defined as a process used to identify those who may be at risk of malnutrition or who are malnourished so that a full nutrition assessment is indicated, and appropriate nutrition intervention can be provided [8]. It is the key first step in identifying those who may need additional support and is essential to avoid missing those who are malnourished without displaying overt symptoms [9]. A recent study among medical patients comparing Nutrition Risk Screening 2002 (NRS 2002), Subjective Global Assessment (SGA), Short Nutritional Assessment Questionnaire (SNAQ), Mini Nutritional Assessment (MNA), and MUST showed that all screening and assessment instruments have a higher nutritional risk associated with a higher risk for mortality and adverse clinical outcomes but not with treatment response from nutritional support [10].

A recent review suggested that two-thirds of patients scheduled for gastrointestinal surgery are malnourished during the first day of hospital admission and these patients have a three-fold increase in the risk of developing post-operative complications and a five-fold greater risk of mortality than well-nourished patients [11]. Even with this situation, this review found that only one in five hospitals in Western countries had applied nutritional screening processes and only one in five patients received any type of preoperative nutrition therapy [12]. Therefore, as a basic requirement, a systematic nutritional risk screening had been suggested and should be considered in all surgical patients on hospital admission [13].

NS should take place on initial registration at general practice surgeries and when there is clinical concern [14].

Considering NS is vital for identifying patients' nutritional risk, this assessment was made mandatory and systematically integrated for all patients admitted to Portugal national hospitals in 2019 and resulted in an increased proportion of patients screened for malnutrition risk [15]. It is suggested that screening for malnutrition should be done within the first 24-48 hours of hospital admission or during the first visit in an outpatient setting. This will give the clinical team enough time to perform further nutritional assessment and refer patients to the related team for nutritional intervention as needed [13].

Although the importance of nutrition management of perioperative patients is well established, malnutrition is frequently overlooked, and screening is not implemented routinely in clinical settings. This requires HCPs to have an awareness of the importance of NS and the tools used [16]. Understanding the knowledge, challenges, and barriers towards implementing NS among HCPs may help to understand why the current evidence base is not translated into routine clinical practice. The present study aimed to determine HCPs' knowledge of, and their perceived barriers to the routine use of NS in their patients. Additionally, the findings of this study serve as data for the development of a standardised nutrition care pathway and feeding protocols in Hospital Sultan Abdul Aziz Shah (HSAAS), an establishment for better-quality improvement in the dietetics profession as well as a reference for future research. This helps in improving the overall quality of dietetics practitioners in providing and managing the nutrition care for pre-operative patients.

## Methods

### Study design

This was a cross-sectional study.

### Study location

The study was carried out at HSAAS, which is located in Serdang district, Selangor, built next to the Faculty of Medicine and Health Sciences UPM (FMHS) and Hospital Sultan Idris Shah (HSIS). HSAAS is located approximately 29 kilometres away from Malaysia's capital city, Kuala Lumpur. This hospital was established in the year 2021 and its main aim is to provide comprehensive medical care to the surrounding communities, regardless of socioeconomic status. HSAAS also serves as the teaching hospital for the students of the FHMS UPM. HSAAS comprises about 20 medical departments including outpatient services and 18 wards for inpatient departments. This study was conducted at four wards in HSAAS, namely Surgical Ward, Orthopaedic Ward, Ear, Nose and Throat (ENT) Ward, and Obstetrics and Gynaecology (OBN) Ward, as well as five other departments of HSAAS, which are Surgical Department, Orthopaedic Department, Urology Department, ENT Department, and Gynaecology Department. The participants of this study were all Healthcare Professionals in Surgical Ward, Orthopaedic Ward, ENT Ward, OBN Ward, Surgical Department, Orthopaedic Department, Urology Department, ENT Department, and Gynaecology Department of HSAAS.

### Subjects

The participants of this study were all HCPs in Surgical Ward, Orthopaedic Ward, ENT Ward, OBN Ward, Surgical Department, Orthopaedic Department, Urology Department, ENT Department, and Gynaecology Department of HSAAS. All HCPs working in the study location and performing the nutrition screening were eligible to participate in the study. The exclusion criteria were non-HCPs working in the study location.

## Study Instruments

The study is a self-administered questionnaire. The questions are self-developed and adapted from previous similar studies' questionnaires, which were combined into one thorough questionnaire. The questionnaire was divided into 3 parts: A - Sociodemographic, B - Knowledge, Perceptions and Challenges on Malnutrition among Preoperative Patients, C - Knowledge, Perceptions and Challenges on Nutrition Screening Implementation. All the adapted questions were extracted from [17][18][19]. As for Part C of the questionnaire, it contains open-ended questions[15].

Data collected was primary data, whereby all HCPs were given a questionnaire sheet consisting of 4 parts. Their participation is voluntary, as a convenient sampling method was used. Upon completion of the questionnaire, the data collected were then transferred into softcopy documentation and analysed for the findings.

## Study approval

Ethical approval for this study was obtained from the Ethics Committee for Research Involving Human Subjects UPM (JKEUPM) with a reference number of JKEUPM-2023-163. The research approval from HSAAS was obtained from the Clinical Research Unit (CRU), HSAAS. Verbal and written informed consent were sought from all participants prior to assessment.

## Statistical analysis

Statistical analysis was done using the IBM SPSS Statistics version 26. This study involves univariate analysis of descriptive statistics only. The categorical variables from the answers for each question in the questionnaires were in frequencies and percentages.

## Results

A total of 103 HCPs were involved in the survey. The characteristics of the participants are shown in Table 1. The majority of the participants were female (92/103; 89.3%), working as a nurse (73/103; 70.9%), working for less than 10 years in the area of health (68/103; 69.4%). A significant proportion of participants fell within the age range of 31 to 40 years old (52/103; 50.5%).

**Table 1.** Characteristics of the participants (n=103)

Sociodemographic Factors	Number of participants (n)	Proportion of participants (%)	
Age, year	<30	47	45.6
	31 - 40	52	50.5
	41 - 50	3	2.9
	51 - 60	1	1.0
Sex	Male	11	10.7
	Female	92	89.3
Profession	Specialist	2	1.9
	Medical Officer	2	1.9
	Medical Assistant	5	4.9
	Nurse	73	70.9
	Nurse Assistant	7	6.8
	Dietitian	7	6.8
	Pharmacist	4	2.9
	Other	3	3.9
Years of Working	< 10	68	69.4
	10 - 20	27	27.6
	> 20	3	3.1

Most of the participants claimed that they are not trained in using the NS tool for the management of pre-operative patients in HSAAS (62/103; 60.2%). However, a majority of the participants are aware of the malnutrition guidelines in the hospital (76/103; 73.8%), which indicated that they have the knowledge of the importance of managing malnutrition issues in surgical patients. Half of the HCPs did not screen patients using the NS tool prior to any surgical procedures (43/103; 42.2%) as they are unsure (56/103; 54.4%) whether patients are regularly monitored in the proper nutrition care manner. Interestingly, most HCPs acknowledged (88/103; 85.4%) that all surgical patients need to be screened for malnutrition before any surgical procedures. Although half of the participants are aware of the usage of the NS tool for inpatients (51/103; 49.5%), additional assistance is required. Most HCPs agreed on the availability of training for the NS tool (76/103; 74.5%) and the application of the NS tool, i.e., what NS tool to use and when to use (75/103; 73.8%). Almost all HCPs agreed on the need for additional assistance to place a referral to a dietitian in managing malnutrition in surgical patients (96/103; 93.2%).

**Table 2.** Knowledge and perceptions on malnutrition in pre-operative patients (n=103)

Questions	Answers	Number of participants (n)	Proportion of participants (%)
Trained on NS tool	No	62	60.2
	Yes	27	26.2
	Unsure	14	13.6
Aware on Malnutrition Guidelines	No	12	11.7
	Yes	76	73.8
	Unsure	15	14.6
Screen patients using NS tool	No	43	42.2
	Yes	33	32.4
	Unsure	26	25.5
Patients regularly monitored by NS tool	No	18	17.5
	Yes	29	28.2
	Unsure	56	54.4
All surgical patients to be screened for malnutrition before surgical procedure	No	8	7.8
	Yes	88	85.4
	Unsure	7	6.8
Aware of usage of NS tool for inpatients	No	22	21.4
	Yes	51	49.5
	Unsure	30	6.8
Training on NS tool available	No	26	25.5
	Yes	76	74.5
What NS tool to use and when to use	No	27	26.2
	Yes	75	73.8
Referral to Dietitian	No	7	6.8
	Yes	96	93.2

Table 3 summarises the descriptive results of the NS implementation part on the questionnaire. In this part, the five-point Likert scale was used to assess ranges from “1 = strongly disagree” to “5 = strongly agree”. The majority of participants indicated agreement with all of the questions pertaining to knowledge of the NS implementation; however, the responses varied for the challenges faced in applying the NS tool prior to any surgical procedures. These high percentage values indicate that the participants had a high level of knowledge and positive perceptions.

**Table 3.** Knowledge and perceptions on NS tool implementation (n=103)

Questions	Answers	Number of participants (n)	Proportion of participants (%)
Nutrition screening is not important to every patient's postoperative recovery	Strongly Disagree	36	35.0
	Disagree	7	6.8
	Neutral	21	20.4
	Agree	19	18.4
	Strongly Agree	20	19.4
Malnutrition among surgical patients is a high priority at the hospital	Strongly Disagree	5	4.9
	Disagree	6	5.9
	Neutral	19	18.6
	Agree	28	27.5
	Strongly Agree	44	43.1
Implementing NS tool in surgical patients will enhance their post-surgical recovery	Strongly Disagree	0	0
	Disagree	2	2.0
	Neutral	18	17.6
	Agree	37	36.3
	Strongly Agree	45	44.1
I know when a patient is at risk of malnutrition or is malnourished	Strongly Disagree	4	3.9
	Disagree	8	7.8
	Neutral	42	41.2
	Agree	24	23.5
	Strongly Agree	24	23.5
I need more training to better support the nutrition needs of my patients	Strongly Disagree	3	2.9
	Disagree	2	2.0
	Neutral	15	14.7
	Agree	43	42.2
	Strongly Agree	39	38.2

The challenges faced by the HCPs in order for them to apply the NS tool are analysed according to multiple-choice answers and open-ended questions as shown in Table 4. About half of the participants did not implement the NS tool to screen patients on the respective week when the data was collected (67/103; 65%) compared to the most patients being done (12/103; 11.7%). However, it is noted that most HCPs (61/103; 59.2%) agreed that NS should be done before any surgery takes place even though there are quite a number saying none (24/103; 22.3%). While the answers varied for the challenges faced during implementing the NS tool for pre-operative patients in HSAAS, two of the major reasons were unsure to refer (29/103; 28.2%) and not perceived Doctor's order to refer patients (29/103; 28.2%).

**Table 4.** Challenges on NS tool implementation (n=103)

Questions	Answers	Number of participants (n)	Proportions of participants (%)
Patients implemented NS tool this week	0	67	65.0
	1	5	4.9
	2	4	3.9
	3	10	9.7
	4	5	4.9
	>4	12	11.7
When implement NS tool	None	24	22.3
	Before surgery	61	59.2
	After surgery	18	17.5
Challenges to implement NS tool	Unsure	29	28.2
	No answer	20	20.3
	Time constraint	4	3.8
	Patient refuse to refer	3	2.9
	Patient's BMI still normal	12	11.6
	Unsure referrals to Dietitian	6	5.8
	Not perceived Doctor order	29	28.2

## Discussion

The current study assessed HCPs' knowledge, perceptions and challenges towards malnutrition and implementation of NS in pre-operative patients. The majority of HCPs are aware of malnutrition and the importance of NS in the clinical setting. This aligns with the study in New Brunswick, Canada, which indicated that the majority of dietitians and nurses were informed that NS is important (98.5% and 94.7%, respectively) [20]. Additionally, HCPs claimed to have challenges in addressing the malnutrition status of the patients. Obviously, general practitioners (GPs) reported inadequate knowledge, skills, training, time and resources to manage and treat malnutrition [21]. In a study, it was ascertained that only 60.4% of GPs can appropriately select patients to screen, while 19.5% reported a lack of NS knowledge [22]. GPs' knowledge deficit on malnutrition and malnutrition screening was obvious in the primary care and hospital settings, as screening was often done by nurses before referring to dietitians [23].

Study in a public hospital in Malaysia revealed that approximately 22.0% of surgical patients were found to be at risk of developing malnutrition. Only 14.9% of them have been referred for nutrition intervention [24]. Early prevention and intervention strategies are important since the usage of the NS tool is valid and reliable, and the most important factor is the action taken as a result of the screening, to improve the nutritional status of individuals undergoing surgery to improve postoperative recovery [25]. Therefore, it is worth noting that patients undergoing any surgical procedures are generally nutrition-depleted and prone to develop postoperative complications if they are not screened. Only a few of them routinely



screened the patients using the NS tool before any surgical procedures. Our findings are in accordance with a recent European multicentric study that reported an overall routine NS rate of 52% in the participating countries [26]. A remarkably high screening rate of 93% was reported from the United Kingdom, whereas only 33% of the partner hospitals in Germany and Austria performed NS [27]. In addition, routine NS was performed by only 20% of the responding hospitals, whereas another 50% performed a selective assessment of patients with a potential nutritional risk. Up to 30% of centres rarely or never assessed patients' nutritional status preoperatively, which has to be considered as an important shortcoming in modern GI surgery [4][28][29][30]. Furthermore, 48% evaluated their patients' nutritional status only at admission or even postoperatively, which is too late for an effective nutritional intervention [27].

According to Shafiee et al. (2016), of both two hospitals where their study was conducted, only a small number of HCPs have employed screening tools like the Malnutrition Universal Screening Tool (MUST) and Subjective Global Assessment (SGA) to identify whether or not patients are at high risk of malnutrition [31]. Previous findings declared that less than one in six patients who are at risk of undernutrition were adequately monitored, which could be due to a lack of training, resources, and time [32]. It is crucial to empower regular monitoring of the patients' nutritional status to ensure patients' optimal preoperative condition in an attempt to reduce postoperative complications associated with malnutrition [33]. These findings explained why the majority of HCPs in this study would also like to receive more assistance regarding implementing the NS in patients. Incorporating NS as part of the nutrition education for HCPs is important to introduce and train HCPs in enhancing the implementation of screening malnourished patients using NS prior to prescribing nutrition intervention properly and in monitoring patients effectively [31].

Another important and commonly reported challenge faced is due to a lack of training in nutrition skills. Based on the study in Italy, about 46% of surgeons and residents claimed to not have the knowledge of the nutrition therapy multidisciplinary team [34]. This is in line with the current study, as 28.2% claimed that the main reason for not implementing NS tool is not perceived orders from general practitioners to conduct a thorough NS. This relates to a study carried out, as 60.4% of general practitioners choose their patients wisely for NS, and 39.6% of them claimed to have no understanding about NS [22].

On top of that, a major number of the HCPs believe in the importance of nutrition screening for all surgical patients, though only 47.0% of HCPs are able to ascertain when patients are at risk of malnutrition or malnourished. It has been stated that the preoperative nutritional care of surgical patients includes screening for malnutrition with a 100% consensus stating that the nutritional status of patients should be assessed before and after the operation, and patients who are not meeting their energy adequacy orally should be provided with ONS perioperatively [35]. Therefore, to improve their competency in providing better nutrition care to patients preoperatively, 80.4% feel that training is necessary. This is in line with the suggestions from various previous studies that nutritional care practice can be further improved by developing the HCPs' knowledge and skills through education and training [36][37][38][39][40][41]. If this were implemented, HCPs might report more confidence in their ability to screen patients, therefore being better able to identify those most in need of dietetic intervention.

## Strengths and Limitations

These new findings add remarkable information on the positive clinical and nutrition care outcome of implementing the NS in managing malnutrition issues in surgical patients prior to any surgical procedures, specifically in the Malaysian context. Hence, this study can serve as a foundation for future research and development of feeding protocols in HSAAS as this marks the establishment of proper nutrition care management and intervention in the field of nutrition and surgery.

Nevertheless, it is important to acknowledge certain limitations in this study. The limitations of this study were relatively small and conducted in only one institution, which potentially affects the generalizability of the findings.

## Conclusion

The knowledge about the importance of managing malnutrition in pre-operative patients in HCPs was adequate. However, there is a lack of implementation of NS tool, which relates to the smaller number of patients being referred to a dietitian for better nutrition care. All HCPs have a positive perception of the importance of preoperative nutrition screening. Basically, HCPs are not sure how to execute the NS tool among the pre-operative patients and there is a need for training for HCPs. Establishing a standardised nutrition care pathway and feeding protocol in HSAAS presents an opportunity to improve the challenges and barriers in the pre-operative patients.

## Acknowledgements

The authors wish to express their sincere gratitude to all enthusiastic study participants who extended their cooperation during the study.

## Conflicts of Interest

None to declare from all authors.

## Funding

This work was granted by Universiti Putra Malaysia (GP-IPM/2018/9613500)

## References

- <sup>1</sup> *World Health Organization. Malnutrition. www.who.int. [https://www.who.int/health-topics/malnutrition#tab=tab\\_1](https://www.who.int/health-topics/malnutrition#tab=tab_1). Accessed August 15, 2023.*
- <sup>2</sup> *Weimann, A., Braga, M., Carli, F., Higashiguchi, T., Hubner, M., Klek, S., et al. (2021). ESPEN practical guideline:*

*Clinical nutrition in surgery. Clinical Nutrition, 40, 4745-4761.*

3. <sup>^</sup>Arends, J., Bachmann, P., Baracos, V., Barthelemy, N., Bertz, H., Bozzetti, F., et al. (2017). ESPEN guidelines on nutrition in cancer patients. *Clinical Nutrition, 36*(1), 11-48.
4. <sup>a, b</sup>Bozzetti, F., Gianotti, L., Braga, M., Carlo, V. D., & Mariani, L. (2007). Postoperative complications in gastrointestinal cancer patients: The joint role of the nutritional status and the nutritional support. *Clinical Nutrition, 26*, 698-709.
5. <sup>^</sup>Correia, M. I., Hegazi, R. A., Diaz-Pizarro, G. J. I., Gomez-Morales, G., Fuentes Gutierrez, C., Goldin, M. F., et al. (2016). Addressing disease-related malnutrition in healthcare: a Latin American perspective. *Journal of Parenteral and Enteral Nutrition, 40*, 319-325.
6. <sup>^</sup>Vaid, S., Bell, T., Grim, R., & Ahuja, V. (2012). Predicting risk of death in general surgery patients on the basis of preoperative variables using American college of surgeons national surgical quality improvement program data. *The Permanente Journal, 16*(4), 10e17.
7. <sup>^</sup>Horowitz, M., Neeman, E., Sharon, E., & Ben-Eliyahu, S. (2015). Exploiting the critical perioperative period to improve long-term cancer outcomes. *Nature Reviews Clinical Oncology, 12*(4), 213-226.
8. <sup>^</sup>American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors and Clinical Practice Committee. (2010). Definition of terms, style and conventions used in A.S.P.E.N. Board of Directors-approved documents. American Society for Parenteral and Enteral Nutrition. <http://www.nutritioncare.org/Library.aspx>. Accessed 24th August 2022.
9. <sup>^</sup>Matthews, L. S., Wootton, S. A., Davies, S. J., & Levett, D. Z. H. (2021). Screening assessment and management of perioperative malnutrition: a survey of UK practice. *Perioperative Medicine, 10*, 30.
10. <sup>^</sup>Stalder, L., Kaegi-Braun, N., Gressies, C., Gregoriano, C., Tribolet, P., Lobo, D. N., et al. (2022). Prospective validation of five malnutrition screening and assessment instruments among medical inpatients: Secondary analysis of a randomized clinical trial. *Clinical Nutrition, 41*(6), 1307-1315.
11. <sup>^</sup>Wischmeyer, P. E., Carli, F., Evans, D. C., Guilbert, S., Kozar, R., Pryor, A., et al. (2018). Perioperative Quality Initiative (POQI) 2 Workgroup. American Society for enhanced Recovery and perioperative quality Initiative Joint Consensus Statement on Nutrition Screening and therapy within a surgical Enhanced Recovery pathway. *Anesthesia and Analgesia, 126*(6), 1883-1895. <https://doi.org/10.1213/ANE.0000000000002743>
12. <sup>^</sup>Williams, J. D., & Wischmeyer, P. E. (2017). Assessment of perioperative nutrition practices and attitudes—A national survey of colorectal and GI surgical oncology programs. *The American Journal of Surgery, 213*(6), 1010-1018.
13. <sup>a, b</sup>Kondrup, J., Allison, S. P., Elia, M., & Vellas, B. (2003). ESPEN guidelines for nutrition screening. *Clinical Nutrition, 22*(4), 415-421.
14. <sup>^</sup>National Institute for Health and Care Excellence. (n.d.). Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition (CG32). <https://www.nice.org.uk/Guidance/Cg32>. Accessed 24th August 2022.
15. <sup>a, b</sup>Taipa-Mendes, A., Amaral, T., & Gregório, M. (2021). Undernutrition risk and nutritional screening implementation in hospitals: Barriers and time trends (2019-2020). *Clinical Nutrition ESPEN, 45*, 192-199. <https://doi.org/10.1016/j.clnesp.2021.08.029>
16. <sup>^</sup>Keaver, L., Connolly, P., & Richmond, J. (2021). Providing nutrition advice in the oncology setting: A survey of current

- practice, awareness of guidelines and training needs of Irish healthcare professionals in three hospitals. *European Journal of Cancer Care*, 31, e13405.
17. <sup>^</sup>Laur, C., Marcus, H., Ray, S., & Keller, H. (2016). Quality nutrition care: measuring hospital staff's knowledge, attitudes, and practices. *Healthcare*, 4(4), 79.
  18. <sup>^</sup>Alemu, B. K., & Biru, T. T. (2019). Health Care Professionals' Knowledge, Attitude, and Practice towards Adverse Drug Reaction Reporting and Associated Factors at Selected Public Hospitals in Northeast Ethiopia: A Cross-Sectional Study. *BioMed Research International*, 30, 1-11. <https://doi.org/10.1155/2019/8690546>
  19. <sup>^</sup>Kementerian Kesehatan Malaysia. [https://www.moh.gov.my/moh/resources/Penerbitan/Laporan/Umum/Buku\\_Technical\\_ReportAllied\\_Health\\_Professionals\\_in\\_MOHA\\_Consultation\\_Report\\_By\\_WHO\\_2020\\_10032021.pdf](https://www.moh.gov.my/moh/resources/Penerbitan/Laporan/Umum/Buku_Technical_ReportAllied_Health_Professionals_in_MOHA_Consultation_Report_By_WHO_2020_10032021.pdf). Accessed 24th August 2022.
  20. <sup>^</sup>Villalon, L., Laporte, M., & Carrier, N. (2011). Nutrition screening for seniors in health care facilities: A survey of health professionals. *Canadian Journal of Dietetic Practice and Research*, 72, 162-169.
  21. <sup>^</sup>Browne, S., Kelly, L., Geraghty, A. A., Reynolds, C. M., McBean, L., McCallum, K., et al. (2021). Healthcare professionals' perceptions of malnutrition management and oral nutritional supplement prescribing in the community: A qualitative study. *Clinical Nutrition ESPEN*, 44, 415-423.
  22. <sup>a, b</sup>Castro, P. D., Reynolds, C. M., Kennelly, S., Clyne, B., Bury, G., Hanlon, D., et al. (2020). General practitioners' views on malnutrition management and oral nutritional supplementation prescription in the community: a qualitative study. *Clinical Nutrition ESPEN*, 36, 116-127.
  23. <sup>^</sup>Mawardi, F., Lestari, A. S., Kusnanto, H., Sasongko, E. P., & Hilmanto, D. (2021). Malnutrition in older adults: how interprofessional teams see it? A systematic review of the qualitative research. *Family Practice*, 38(1), 43-48.
  24. <sup>^</sup>Siti Nursyafiqah, S., Zalina, A. B., Barakatun Nisak, M. Y., & Aishah Zafirah, A. A. (2023). Length of hospital stay and its associated factors among surgical patients in Hospital Serdang. *Malaysian Journal of Medicine and Health Sciences*, 19(5), 51-58.
  25. <sup>^</sup>Phillips, M. B., Foley, A. L., Barnard, R., Isenring, E. A., & Miller, M. D. (2010). Nutritional screening in community-dwelling older adults: a systematic literature review. *Asia Pacific Journal of Clinical Nutrition*, 19(3), 440-449.
  26. <sup>^</sup>Schindler, K., Pernicka, E., Laviano, A., Howard, P., Schutz, T., Bauer, P., et al. (2010). How nutritional risk is assessed and managed in European hospitals: a survey of 21 007 patients findings from the 2007-2008 cross-sectional nutritionDay survey. *Clinical Nutrition*, 29, 552-559.
  27. <sup>a, b</sup>Grass, F., Cerantola, Y., Schafer, M., Muller, S., Dermartines, N., & Hubner, M. (2011). Perioperative nutrition is still a surgical orphan: results of a Swiss-Austrian survey. *European Journal of Clinical Nutrition*, 56, 642-647.
  28. <sup>^</sup>ASPEN Board of Directors and the Clinical Guidelines Task Force. (2002). Guidelines for the use of parenteral and enteral nutrition in adult and pediatric patients. *JPEN Journal of Parenteral and Enteral Nutrition*, 26, 1SA-138SA.
  29. <sup>^</sup>Weimann, A., Braga, M., Harsanyi, L., Laviano, A., Ljungqvist, O., Soeters, P., et al. (2006). ESPEN guidelines on enteral nutrition: surgery including organ transplantation. *Clinical Nutrition*, 25, 224-244.
  30. <sup>^</sup>Sorensen, J., Kondrup, J., Prokopowicz, J., Schiesser, M., Krahenbuhl, L., Meier, R., et al. (2008). EuroOOPS: an international, multicentre study to implement nutritional risk screening and evaluate clinical outcome. *Clinical Nutrition*, 27, 340-349.

31. <sup>a, b</sup>Shafiee, M., Belghaisi-Naseri, M., Seifi, N., Arabi, S. M., & Norouzy, A. (2016). An audit to evaluate the knowledge and attitude of Iranian medical specialists towards Oral Nutritional Supplements. *Journal of Nutrition and Food Security*, 2(3), 40-45.
32. <sup>^</sup>Khalatbari-Soltani, S., & Marques-Vidal, P. (2015). The economic cost of hospital malnutrition in Europe; a narrative review. *Clinical Nutrition ESPEN*, 10, e89-e94.
33. <sup>^</sup>Latiff, N. S. M. A., Ahmad, N., & Islahudin. (2016). Complications Associated with Malnutrition in Elective Surgical Patients in a Malaysian Setting. *Tropical Journal of Pharmaceutical Research*, 15(6), 1321. <https://doi.org/10.4314/tjpr.v15i6.27>.
34. <sup>^</sup>Paulo, D. A., Oliveira, B. M. R. D., Wang, D. W. M., Guimarães, M. P., Cukier, C., & Lopes Filho, G. D. J. (2013). Surgeons' knowledge and attitude regarding concepts of nutritional therapy. *Revista do Colégio Brasileiro de Cirurgiões*, 40, 409-419. <https://doi.org/10.1590/S0100-69912013000500011>
35. <sup>^</sup>Weimann, A., Braga, M., Carli, F., Higashiguchi, T., Hübner, M., & Klek, S., et al. (2017). ESPEN guideline: clinical nutrition in surgery. *Clinical Nutrition*, 36(3), 623-650.
36. <sup>^</sup>Hestevik, C. H., Molin, M., Debesay, J., Bergland, A., & Bye, A. (2019). Healthcare professionals' experiences of providing individualized nutritional care for older people in hospital and home care: a qualitative study. *BMC Geriatrics*, 19, 317. <https://doi.org/10.1186/s12877-019-1339-0>
37. <sup>^</sup>Eide, H. D., Halvorsen, K., & Almendingen, K. (2015). Barriers to nutritional care for the undernourished hospitalised elderly: perspectives of nurses. *Journal of Clinical Nursing*, 24(5-6), 696-706. <https://doi.org/10.1111/jocn.12562>
38. <sup>^</sup>O Connell, M. B., Jensen, P. S., Andersen, S. L., Fernbrant, C., Nørholm, V., & Petersen, H. V. (2018). Stuck in tradition: A qualitative study on barriers for implementation of evidence-based nutritional care perceived by nursing staff. *Journal of Clinical Nursing*, 27(3-4), 705-714. <https://doi.org/10.1111/jocn.14020>
39. <sup>^</sup>Watkinson-Powell, A., Barnes, S., Lovatt, M., Wasielewska, A., & Drummond, B. (2014). Food provision for older people receiving home care from the perspectives of home-care workers. *Health & Social Care in the Community*, 22(5), 553-560. <https://doi.org/10.1111/hsc.12117>
40. <sup>^</sup>Beattie, E., O'Reilly, M., Strange, E., Franklin, S., & Isenring, E. (2014). How much do residential aged care staff members know about the nutritional needs of residents? *International Journal of Older People Nursing*, 9(1), 54-64. <https://doi.org/10.1111/opn.12016>
41. <sup>^</sup>Bonetti, L., Bagnasco, A., Aleo, G., & Sasso, L. (2013). 'The transit of the food trolley'- malnutrition in older people and nurses' perception of the problem. *Scandinavian Journal of Caring Sciences*, 27(2), 440-448. <https://doi.org/10.1111/j.1471-6712.2012.01043.x>