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"Assessment of Malnutrition Care Practices and Knowledge in Lebanese Hospitals: A Cross-sectional Study"

By

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Assessment of Malnutrition Care Practices and Knowledge in Lebanese Hospitals: A Cross-sectional Study

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ABSTRACT

Undernutrition is a debilitating and highly common condition in the acute hospital setting and it is associated with devastating adverse health and economic outcomes. Several guidelines aim to standardize and optimize hospital malnutrition care practices; however such practices are still insufficient in certain areas due to several barriers especially in developing countries like Lebanon. Data on the current situation of malnutrition care practices in Lebanese hospitals is still unavailable. Therefore, this study aims to describe the quality of malnutrition care in Lebanese hospitals and explore barriers and facilitators to these practices in order to ultimately implement potential strategies to achieve optimal practice. The study is of an observational cross-sectional design where data was collected online through validated questionnaires by the Malnutrition Quality Improvement Initiative MQii addressing actual malnutrition practices, malnutrition knowledge and awareness, as well as the hospitals' readiness to implement initiatives pertinent to malnutrition care. In addition, semi-structured interviews were held with eight dietitians to acquire qualitative data mainly on the barriers and facilitators of proper malnutrition care. Fifty-eight out of 95 hospitals completed the practice questionnaire. Results showed that private hospitals scored better than governmental hospitals for the malnutrition practice questionnaire (80.4% of private hospitals scored in the "Good Practice" category versus 37.5% for governmental hospitals: P-value= 0.009) and that the presence of a documented malnutrition care protocol was significantly associated with this practice score (P-value = 0.045). Moreover, for malnutrition knowledge and awareness score, the mean average was 8.56 ± 3.22 out of 17 and it was significantly associated with the hospital academic affiliation (P-value = 0.016), location (P-value = 0.006), and size (P-value = 0.036). In addition, the most common barriers identified from the interviews were related to human and financial resources and potential facilitators were mostly related to inter-professional communication and protocol standardization. In conclusion, practice gaps and areas of development were identified in this study in order to serve as a first step for hospitals eager to apply a quality improvement initiative for their malnutrition management systems.

Keywords: Malnutrition Care Practice, Malnutrition Knowledge, Malnutrition Screening, Facilitators, Barriers.

Table of Contents

List of Tables

List of Figures/Charts

List of Abbreviation

ACEND Accreditation Council for Education in Nutrition and Dietetics

AND Academy of Nutrition and Dietetics

ASPEN American Society of Parenteral and Enteral Nutrition

BMI Body Mass Index

CDR Commission on Dietetic Registration

EMR Electronic Medical Record

ESPEN European Society for Clinical Nutrition and Metabolism

FFMI Fat Free Mass Index

GLIM Global Leadership Initiative on Malnutrition

ICD International Classification of Disease

ICU Intensive Care Unit

MNA Mini Nutrition Assessment

MoPH Ministry of Public Health

MQii Malnutrition Quality Improvement Initiative

MST Malnutrition Screening tool

MUAC Mid-upper arm circumference

MUST Malnutrition Universal Screening Tool

NDTR Nutrition and Dietetics Technicians, Registered

NRS Nutritional Risk Screening

ONS Oral Nutrition Supplements

RDN Registered Dietitian Nutritionist

SGA Subjective Global Assessment

Chapter One

Introduction and Background

1.1 Introduction to Malnutrition

Malnutrition is a broad term that can be used to describe the two sides of nutrition imbalance ranging from over-nutrition to under-nutrition (World Health Organization, 2016). The American Society for Parenteral and Enteral Nutrition defines malnutrition as an acute, subacute, or chronic state of nutrition in which varying degrees of over-nutrition and under-nutrition have led to changes in body composition and diminished function (White et al, 2012). Over-nutrition is the form of malnutrition caused by an excessive intake of energy and nutrients intake leading to excessive fat accumulation and metabolic impairments which in turn increases the risk of several chronic conditions including obesity, type 2 diabetes mellitus, cardiovascular diseases, and certain types of cancers (Mathur & Pillai, 2019 and Hruby et al, 2016).

On the other hand, under-nutrition is a clinical condition mainly characterized by unintentional weight loss, loss of subcutaneous fat, loss of muscle mass as well as muscle function, and an imbalanced intake of energy, protein and other nutrients (Tobert et al, 2018). The International Classification of Disease ICD-11 sheds more importance on nutritional diseases compared to ICD-10; it includes codes for reporting Kwashiorkor, Marasmus, and unspecified undernutrition (WHO, 2016). According to

ESPEN, more than 1 billion of the world's population suffers from undernutrition due to disease, poverty, hunger, war, and natural catastrophe (Cederholm et al, 2017). For the purposes of the study, in the following work, we will focus on malnutrition in the hospital setting.

1.2 Prevalence of Hospital Malnutrition

Malnutrition (undernutrition) is highly prevalent in the hospital setting in which 20% to 50% of all hospitalized patients are found to be malnourished or at risk of malnutrition (Barker et al, 2011). Studies assessing hospital malnutrition prevalence show varied results due to several factors, including patients' age and medical status, the nutrition parameters, and the screening tools used. Hospital malnutrition is particularly prevalent among elderly patients and patients with specific illnesses known to affect nutritional status; an Albanian prospective cohort study has shown that the prevalence of malnutrition risk upon Intensive Care Unit ICU admission of patients aged 65 years and older was 71%. Malnutrition risk prevalence was highest among elderly ICU patients, especially among severely ill patients with malignancy admitted to the ICU ward. The study also showed that ICU elderly patients had higher risk of complications and nosocomial infections, longer ICU and hospital stay, and increased mortality (Shpata et al, 2015).

In developed countries, up to one third of patients are malnourished upon admission, and if left untreated, two thirds of patients will develop malnutrition (Hamilton & Boyce, 2013). For example, the European Society for Clinical Nutrition and Metabolism Symposium reported that malnutrition is widely common in European hospitals; ranging from 10% to 85% with an average prevalence of 35%. In the United

Kingdom, studies have shown hospital malnutrition rates to be 20% - 40% upon hospital admission (Patel et al, 2014). In North America, 40% to 50% of hospitalized patients are at risk of malnutrition. Similarly, in Brazil, studies have shown that up to 50% of children and adolescents can develop malnutrition during hospitalization (Hamilton & Boyce, 2013). Moreover, in a cross-sectional study by the Dutch dietetic organization assessing the nutritional status of 7600 patients, 25% of patients admitted to different medical wards were either moderately or severely malnourished (Patel et al, 2014).

Similarly, in the Middle East and North Africa Region, malnutrition prevalence also differs from one country to another. In Turkey, a 2014 study on 769 patients showed that according to Nutritional Risk Screening 2002, hospital malnutrition rates reached 39.4%. In a 2008 large-scale study on 5051 patients in nine European countries (Austria, the Czech Republic, Germany, Hungary, Poland, Romania, Slovakia, Spain and Switzerland) and three Middle Eastern countries (Egypt, Lebanon, and Libya), malnutrition prevalence was 33% (Sorensen et al, 2008). Until last year in 2019, data on malnutrition risk in Lebanese hospitals was not updated. In 2019, et al aimed to estimate the nutritional risk status of 150 Lebanese hospitalized patients from Centre Hospitalier Universitaire Notre Dame de Secours (CHU-NDS) hospital using the Mini Nutritional Assessment MNA tool. Results showed that 34.7% of the screened patients were at risk of malnutrition and 9.3% were malnourished (Choueiry et al, 2019).

1.3 Malnutrition Screening and Diagnosis

Identifying malnourished patients and patients at risk of developing malnutrition is fundamental for a proper nutritional treatment. Hence, malnutrition screening is the first and most important step in the malnutrition care process. The Academy of Nutrition

and Dietetics AND defines nutrition risk screening as the process of identifying patients with characteristics commonly associated with nutritional problems that may require comprehensive and detailed nutrition assessment by a dietitian. Screening should be rapid, simple, easy, and inexpensive; it can be done by any trained personnel; in a hospital setting, usually it is done by a nurse or a nutrition assistant (Barker et al, 2011).

For this purpose, numerous nutrition risk screening tools exist; each is validated and applicable for a certain population and in certain circumstances. The Subjective Global Assessment tool SGA is the most commonly used screening tool worldwide; it was validates in acute, rehab, community, and residential aged care settings, and it consists of a two-step questionnaire which assesses data on recent weight and dietary change, gastrointestinal symptoms, functional capacity changes as well as body fat and muscle stores, and the presence of edema or ascites (Abbott et al, 2016). The Malnutrition Screening tool MST is an easy, three-question tool validated in general medical, surgical and oncology patients and it assesses recent weight and appetite changes (Cuong et al, 2019). The Mini Nutrition Assessment MNA tool is specific for elderly patients ($\geq$65 years) and it is valid in hospitals, nursing homes and the community setting (Abd Aziz et al, 2019). Moreover, Nutritional Risk Screening NRS-2002 assesses recent changes in body weight, Body Mass Index BMI, and food intake in addition to a subjective assessment of disease severity affecting nutritional requirements and metabolic state. Due to this additional subjective grading of disease severity, the NRS-2000 tool has been recommended by ESPEN for use in hospitalized patients (Barker et al, 2011).

New research has shifted focus into the underlying etiology of malnutrition since disease-related malnutrition, that results from diverse number of diseases or their treatment, is not only due to reduced intake or assimilation of energy and nutrients but also to varying degrees of chronic or acute inflammation leading to metabolic alterations and diminished body function (Cederholm et al, 2019). Inflammation is associated with malnutrition through several mechanisms including associated anorexia and decrease in appetite, reduction in energy and nutrient intake, increase in energy requirements, and increase in muscle loss and protein catabolism (Cederholm et al, 2019).

In 2019, a consensus scheme for diagnosing malnutrition in adults in clinical settings recommended that at least one phenotypic criterion and one etiologic criterion should be present in order to diagnose malnutrition (Cederholm et al, 2019). In 2016, a diverse group of several clinical nutrition societies worldwide had dedicated their knowledge and expertise in order to create a global consensus on the diagnostic bases of malnutrition in adults in clinical settings. The committee leading this Global Leadership Initiative on Malnutrition GLIM had concluded that malnutrition diagnosis should be a two-step approach based on both phenotypic and etiologic criteria. These diagnostic criteria were retrieved from existing malnutrition screening and assessment approaches. In general, the committee focused on five critical criteria; three phenotypic criteria including recent non-intentional weight loss, low BMI, and reduced muscle mass and two etiologic criteria: diminished food and nutrient intake or assimilation in addition to inflammation or physiologic disease burden. Therefore, the consensus agrees that a malnutrition diagnosis requires at least one phenotypic criterion and one etiologic criterion. It also recommends treating or managing phenotypic aspects and malnutrition

and using etiologic criteria as a guide to malnutrition intervention plan. GLIM diagnostic consensus aims to standardize malnutrition diagnosis in adults in a clinical setting in efforts to ultimately improve malnutrition care (Cederholm et al, 2019).

1.4 Malnutrition Causes and Consequences

Barker et al, 2011 had investigated factors contributing to malnutrition among hospitalized patients. Personal factors included age, depression and psychological status, inability to chew or swallow foods and beverages, limited mobility, loss of smell and taste sensations, polypharmacy, and finally treatments such as ventilators and drain tubes. Other organizational factors contributing to increased malnutrition risk were failure to recognize malnutrition (lack of proper malnutrition screening and assessment), lack ok malnutrition knowledge among hospital professionals, failure to record patient's food intake, failure to record patient's height and weight, lack of staff assisting with feedings, and most importantly lack of interdisciplinary collaboration among healthcare professionals. These personal and organizational factors can increase the risk for hospitalized patients to develop malnutrition or can worsen existing malnutrition cases (Barker et al, 2011).

Consequences of hospital malnutrition have been well documented in the literature. Malnutrition is associated with devastating outcomes not only on the patient but also on the whole healthcare system. Malnourished patients have shown dysfunctions at the cellular, physiological, and psychological level (Barker et al, 2011).

On a cellular level, a state of undernutrition weakens the immunes system, often interrupting the body's ability to fight infections and exposing it to a higher risk of

nosocomial infections. It also delays wound healing and increases the risk of developing pressure ulcers (Badosa et al, 2017). On the physiological level, malnutrition alters body composition causing losses in muscle and subcutaneous fat mass, accumulation of body fluids, and atrophy in visceral organs therefore weakening muscle strength, particularly and most importantly respiratory muscle and cardiac muscle functions (Taylor, 2018). Moreover, on the psychological level, malnutrition is associated with decreased quality of life. Malnourished patients are more likely to experience poor quality of life and interventions to improve the patient's nutritional status lead to improvements of quality of life indicators as well as including both physical and mental indicators (Rasheed & Woods, 2013).

In addition to the cellular, physical, and psychological adverse effects on the patient, hospital malnutrition is strongly associated with increased length of hospital stay, greater risk of morbidity and mortality, and higher hospital cost (Barker et al, 2011). In a 2015 study in Albania, length of intensive care unit stay, ventilation duration, total complications, infectious complications, and mortality risk were examined in relation to malnutrition risk in older adults. Results showed that malnutrition risk was an independent risk factor of poor clinical outcome for elderly ICU patients for infections, complications, mortality, and ICU length of stay. Malnourished patients were 4.37 times at higher risk of acquiring an ICU infection, 6.73 times at higher risk of developing complications, and 2.68 times at higher risk of mortality (Shpata et al, 2015).

In another study in 2017 in Mexico, 55 hospitalized patients diagnosed with malnutrition were randomly allocated into either nutrition intervention group or to control group. Participants in the intervention group received an individualized nutrition

care plan and dietary advice whereas participants in the control group received standard

nutrition management. Post intervention, the average hospital stay was two days shorter

in the intervention group compared to the control group. Therefore, this randomized

control study suggests that nutritional intervention in hospitalized malnourished patients

decrease hospital length stay (Cano-Torres et al, 2017). In a similar study in Australia,

length of stay of malnourished patients was 5 days greater than that of well-nourished

patients (Middleton et al, 2001).

As a result of all the aforementioned consequences of malnutrition, hospital

malnutrition imposes a huge burden on the healthcare system. With the increase in

morbidities, mortalities, complications, infections, and length of hospital stay comes the

increase in nursing and medical care, use of medications, surgical interventions, hospital

readmission, and subsequently healthcare cost (Tagliaferri et al, 2018). Disease-related

malnutrition is considered today as one of the most concerning public health problems

worldwide inflicting huge economic costs of healthcare systems.

In Switzerland and Germany, hospital cost for malnourished patients is three

times higher than that for well-nourished patients. In 2018, an analysis of the United

States' hospital discharge estimated that the average cost for a well-nourished patient

was $12,900 whereas that for a malnourished patient was $22,200. It was also estimated

that the overall economic burden of the morbidity, mortality, and direct medical cost

associated with hospital malnutrition reached $157 billion in the United States

(Mccauley et al, 2019). Likewise, in the United Kingdom, approximately 3.7 billion €

are spent annually on the healthcare services for hospitalized patients diagnosed with

disease-related malnutrition (Khalatbari-Soltani & Marques-Vidal, 2015). Moreover, in

Ireland, the annual total public health and social care costs of malnutrition were estimated at 1.4 billion which is equivalent to 10% of the UK national health care budget (Mccauley et al, 2019). Fortunately, initiatives to improve nutrition screening and intervention have been showing significant reductions in hospital bills. For example, the prescription of preoperative supplementation of nutritional drinks had anticipated savings of 1000 euros per patient (Souza et al, 2015).

Similarly, numerous studies have been proving the substantial benefits of malnutrition interventions on key clinical outcomes in a hospital setting. These studies have shown that nutritional interventions can significantly reduce complication, length of hospital stay, rates or hospital readmission, hospital cost, and mortality and morbidity rates. In a recent Cochrane systematic review of 24 studies including 6225 patients ≥65 years of age who were at risk for malnutrition, patients who received Oral Nutrition Supplements ONS developed less complications (pressure sores, deep vein thrombosis, and respiratory and urinary infections) compared with patients who did not receive any ONS (relative risk [RR], 0.86; 95% confidence interval [CI], 0.75–0.99). Indeed, fewer complications, shorter length of stay, and less readmission will be translated into lower medical bills (Tappenden et al, 2013).

1.5 Literature Review on Malnutrition Care Practices

All the aforementioned consequences and complications of malnutrition can be attenuated or managed through comprehensive and careful nutritional management. Primarily, screening patients for malnutrition upon hospital admissions is considered as the first and most important step of the malnutrition care process for it allows early interventions to prevent or treat any degree of malnutrition at an early stage (Malone &

Hamilton 2013). The Academy of Nutrition and Dietetics AND and the American Society of Parenteral and Enteral Nutrition ASPEN recommend early identification and documentation of malnutrition in hospitals. Ideally, once a hospitalized patient is identified to be at risk of developing malnutrition or to be malnourished, consulting a dietitian is necessary to initiate a proper malnutrition management plan (Malone & Hamilton 2013). Guidelines and protocols for malnutrition care are numerous and diverse varying from one hospital to another since there is no one standardized approach to screen, diagnose and treat malnutrition (Malone & Hamilton 2013). Hospitals may vary regarding malnutrition practices mainly in terms of screening tools, diagnostic criteria, treatment protocol, and healthcare team collaboration.

In an attempt to standardize malnutrition diagnosis in hospitals, ESPEN had published consensus-based criteria to define malnutrition: a BMI of less than 18.5 kg/m^2 or an unintentional weight loss of >10% within any time frame or >5% over the past three months with BMI is <20 kg/m^2 when the patient is <70 years old or BMI <22 kg/m^2 when the patient is 70 or more years old or a Fat Free Mass Index FFMI of <15 in women and <17 in men (Tagliaferri et al, 2018). However, variability among different hospitals can still be seen in other aspects of the malnutrition care process such as malnutrition screening. Malnutrition screening tools are many and they include Malnutrition Universal Screening Tool MUST, Nutrition Risk Screening NRS, and Mini Nutrition Assessment MNA (Barker et al, 2011).

Many studies had aimed to correlate the quality of the malnutrition care approach in a specific hospital setting to the prevalence of malnourished patients in the same setting. Such studies used indicators such as the presence of a multidisciplinary

nutritional support team, the use of validated malnutrition screening tools, the availability of malnutrition diagnosis and treatment protocol, and the documentation of all related record. Barriers to proper malnutrition care practices were also of interest in an attempt to tackle practice gaps.

A 2013 article was published by Tappenden et al 2013 as a call for action from the interdisciplinary Alliance to Advance Patient Nutrition aiming to shed light on the critical impact of certain key factors that can remarkably enhance hospital malnutrition rates. The article focused mainly on the presence of a multidisciplinary nutrition care team that works through an inter-disciplinary collaborative approach to set standard policies to monitor and manage malnutrition at the hospital. They also highlighted the importance of establishing strong communication strategy among hospital clinicians that will allow adequate understanding of the importance of nutritional care and the proper role of each profession in this process. They explained the primary importance of these key factors through their major influence on all other aspects of the malnutrition management system including screening, intervening, and follow-up. Also, they clarified that the nutrition care team and the established protocol would be the bases of all possible facilitators and improvements to malnutrition care.

In 1995, the Joint Commission has mandated that all patients should be screened and assessed for malnutrition upon hospital admission. However, this mandate was no fully put into practice in all hospitals in the United States, showed a cross-sectional study in the U.S. in 2014. The study by Patel et al, 2014 aimed to investigate hospital staff perspective on currents status of malnutrition screening and assessment in U.S. hospitals. A web-based survey was sent to hospital professionals, including dietitians,

nurses, pharmacists and physicians who were members of the American Society of Parenteral and Enteral Nutrition ASPEN, the Academy of Medical-Surgical Nurses, and the Society of Hospital Medicine in order to assess the current nutrition screening and assessment practices as well as associated gaps in malnutrition knowledge. Majority of respondents confirmed that the Joint Committee's mandate was often applied regarding nutrition screening and assessment. Most hospitals were compliant to the accreditation standards and they confirmed performing nutritional assessment by a dietitian whenever malnutrition risk was identified upon screening patients by nurses; however no specific screening or assessment tool or coding system was identified (Patel et al, 2014).

In 1999, the council of Europe assessed the quality of hospital malnutrition care practices in 12 European countries through a questionnaire and confirmed that nutritional screening and assessment upon hospital admission were not routinely performed in most of the hospitals and nutrition intervention was not always applied to malnourished patients or at-risk patients. The use of nutrition support for undernourished or at risk patients was often only applied for severely ill patients. Only 10% of the hospitals reported the availability of a nutritional support team. This review by the council of Europe had opened insights to several European countries to proceed with a more specific and detailed investigation of the quality of malnutrition care offered at their hospital wards (Vanderwee et al, 2010).

One of these countries was Belgium where a national cross-sectional study by Vanderwee et al addressed malnutrition care practices in all Belgian general and teaching hospitals for older adults in particular. The study also associated these practices with the prevalence on malnutrition in the same wards. Malnutrition prevalence rate was

31.9% and it was correlated with suboptimal malnutrition practices such as screening and assessment methods, tools, and protocols. Fifty six percent of the wards reported the lack of malnutrition screening at admission, 70% did not have a standardized malnutrition screening tool, 30% did not routinely measure patients' weights and 70% did not calculate their BMI. In addition, 86.4% of the wards reported the lack of a standardized malnutrition protocol. Multilevel analysis showed that malnutrition practices explained 9.1% of malnutrition risk (Vanderwee et al, 2010).

More recently in 2016, the Commission on Dietetic Registration CDR, Accreditation Council for Education in Nutrition and Dietetics ACEND, and the Academy of Nutrition and Dietetics AND had published the results of the 2015 audit of dietetics practice. This audit was created in attempt to assess the quality of dietetic practices among Registered Dietitian Nutritionists RDNs and nutrition and dietetics technicians, registered NDTR in the United States in a comprehensive and objective way. The audit has been replicated every five years since 2005 with a primary objective of providing objective quantitative measure on the overall nutrition and dietetics activities including managing food and other material resources, nutrition screening and nutrition-focused physical examination, nutrition assessment, monitoring, and evaluation, nutritional interventions, meals preparation and diet plans, and maintaining food safety and sanitation of facility, and monitoring quality of food menus. Audit data is collected through a web-survey developed and validated by audit committee. In 2015, a basic knowledge examination was added to the 2010 survey to identify gaps in nutritionists' and dietitians' general knowledge. The overall response rate was 53% for RDNs and 49% for NDTRs which was interpreted by the CDR committee as

representative of the current practice. The 2015 audit results showed better involvement of participants in research compared to the 2005 and 2010 audits, better human and financial management, and better nutritional education provision. In summary, the audit committee concluded that dietetic practice was mostly aligned with the recommended clinical nutritional care (Griswold et al, 2016).

In addition, after the increase in malnutrition prevalence in Australia, the Pressure Ulcer Prevention Unit at Queensland Health Hospitals decided to implement a quality improvement study to investigate dietetic practices regarding malnutrition identification, prevention, and treatment in 14 Queensland Health facilities. Surveys were sent to 780 clinicians in total and response rate was 48%. Study results revealed that six facilities (42%) adopted systematic malnutrition screening upon hospital admissions by a nurse, seven facilities (50%) also included dysphagia screening upon admission, nursing staff took major responsibility of nutritional management in most of the facilities, and there was a lack of role clarity among hospital professionals concerning nutritional management responsibilities. Results also showed substantial gaps in monitoring patients' food intake and another substantial gap in nutritional knowledge in 21% of clinicians. Furthermore, only five facilities had up-to-date nutritional policies and none of the 14 facilities had a nutrition committee represented by a dietetic stakeholder. Finally, the Pressure Ulcer Prevention study concluded with a list of recommendations to improve the quality of nutritional services offered at the Queensland Health Hospitals (Tonder et al, 2018).

Moreover, the issue of malnutrition care malpractices may be of critical concern in certain areas or in certain institutions such as public-sector hospitals. In South Africa,

Tonder et al aimed to assess the prevalence of malnutrition among adult hospitalized patients and to evaluate nutrition-related quality indicators in three South African public-sector hospitals in 2018. Using Mid-upper arm circumference MUAC, BMI, and malnutrition universal screening tool MUST, malnutrition prevalence was shown to reach 45% based on MUAC assessment and 48% of adult patients were at high risk and 24% were at medium risk according to MUST. No routine nutritional screening was conducted in any of the wards to identify patients at nutritional risk. The majority of nurses reported inadequate training or knowledge to calculate patients' BMI or percentage weight loss, or to perform nutritional screening (Tonder et al, 2018).

As for the nutrition-related quality indicators, no routine nutritional screening was applied in any of the hospitals to identify malnourished patients or patients at risk of malnutrition. Moreover, most of hospital professionals reported insufficient malnutrition knowledge and were untrained and unable to calculate patients' BMI or percentage weight loss, or to perform nutritional screening. The authors interpreted malnutrition risk as very high in these public hospitals and explained the revealed nutritional quality indicators as the main contributors to high malnutrition rated and risk (Tonder et al, 2018).

1.6 Study Aims

To our knowledge, such findings on the quality of malnutrition practice in the Middle East are not available due to the scarcity of evidence-based data and research. In Lebanon, in particular, data on the dietetic practice regarding malnutrition and on the ability of dietitians to manage and implement a protocol that can effectively and accurately address the problem of malnutrition among hospitalized patients is scarce.

Therefore, this study aims to assess the current status of malnutrition practices related to malnutrition in hospitals across Lebanon through online questionnaires and semi-structured focus groups with the hospitals' dietitians as well as to evaluate dietitians' related knowledge on malnutrition and to determine potential facilitators and barriers to proper malnutrition care through a mixed-method design. Answering this scientific gap would be the basis of future areas of development in malnutrition care management. Finally, providing insights on the current situation of malnutrition care in Lebanese hospitals would be the first step to persuade stakeholders to improve quality of care mainly through awareness and education. Implementing a proper malnutrition screening and intervention protocol would remarkably decrease the rates of malnutrition among hospitalized Lebanese patients which would be translated into shorter hospital stay, lower treatment costs, and most importantly decreased mortality and morbidity rates.

The purpose of this study is to assess the quality of care practices related to malnutrition in Lebanese hospitals and to explore potential facilitators and barriers to proper malnutrition care. The primary outcome of the study is status of malnutrition practices in hospitals across Lebanon. Other secondary outcomes include the knowledge and awareness of dietetic professionals in Lebanon regarding malnutrition, hospitals' willingness to implement a malnutrition-focused quality improvement initiative, and key facilitators and barriers to adequate malnutrition care practices in Lebanon. We hypothesize that numerous complex barriers in Lebanon render malnutrition care practices in Lebanese hospitals suboptimal.

1.7 Study Objectives

The primary objective of the study is to assess the status of malnutrition practices in hospitals across Lebanon. Moreover, secondary objectives include assessing knowledge and awareness level of dietetic professionals working in Lebanese hospitals regarding hospital malnutrition care, assessing the hospitals' readiness to implement a malnutrition-focused quality improvement initiative, and finally exploring facilitators and barriers to adequate malnutrition care practices in Lebanese hospitals.

Chapter Two

Methodology

2.1 Study Design

The study is a nation-wide study of an observational cross-sectional mixed-method design in which quantitative and qualitative data will be used to describe actual malnutrition care practices in Lebanese hospitals. Quantitative data was used to describe key indicators of malnutrition practices such as the presence of a malnutrition team and protocol, the use of validated screening tools and diagnostic criteria, and the effectiveness of nutritional interventions and to compare these indicators among hospitals according to hospital types (private or public) or affiliation (academic or non-academic). Furthermore, qualitative data was used to explore the etiologies that might explain findings revealed from quantitative data and to explore major barriers and facilitators to optimal malnutrition care as well as potential areas for development.

2.2 Inclusion and Exclusion Criteria

The study aimed to include all Lebanese hospitals registered at the Ministry of Public Health MoPH. Only hospitals that have at least one full-time clinical dietitian were included in the sample; whereas hospitals that do not have clinical dietitians or that recruit a part-time dietitian were excluded from the study. Having a full-time dietitian at the hospital was a must for the feasibility of contacting a representative hospital staff

from the dietetic department who is familiar with the topic and all malnutrition practices and procedures at the hospital.

2.3 Data collection

Data was collected through two methods: online questionnaires and semi-structured in-depth interviews. Online questionnaire were used to collect quantitative descriptive data on the status of malnutrition care practices and its main indicators, malnutrition knowledge among Lebanese dietitians, and hospitals' willingness to improve nutritional care. Moreover, online sessions were held with dietitians from hospitals across all districts of Lebanon where they were asked to share what they believe is hindering the achievement of optimal malnutrition care practices and what is/ or might be able to facilitate it.

The questionnaires used in this study were developed by the Malnutrition Quality Improvement Initiative MQii, a project of the Academy of Nutrition and Dietetics, Avalere Health and other stakeholders who provided guidance and expertise. The questionnaires were adapted to fit the Lebanese hospitals settings.

2.3.1 Malnutrition Care Assessment Questionnaire (Appendix 1)

The Malnutrition Care Assessment Questionnaire was used to assess the current state of malnutrition practices in hospitals and to what extent they are currently supporting best practices for malnutrition care. According to MQii, this tool helps highlight gaps in malnutrition care practices and provides insights on key areas for improvement in a hospital setting. The questionnaire was organized in accordance with malnutrition care process starting with screening, nutritional assessment, diagnosis,

intervention, monitoring and evaluation, and finally discharge planning in attempt to cover all aspects of malnutrition care. It is important to highlight that answers to this questionnaires questions should be based on actual hospital care practices and not on optimal or recommended care practices to reflect the real current status of malnutrition care in hospitals. The Malnutrition Care Assessment Questionnaire was sent only to the head dietitians of the participating hospitals via emails along with the corresponding informed consent.

This practice questionnaire should take approximately five to ten minutes to complete and it included 29 yes/no questions and 1 multiple choice question to assess current malnutrition practices in addition to five demographics questions of hospital type, academic affiliation, location, and size. One key question was about the presence of a documented protocol for malnutrition care at the hospital. Other questions asked whether all admitted patients were screened for malnutrition within 24 hours of hospital admission, whether the screening tool used was validated, or whether Nutrition-Focused Physical Exam NPFE is part of nutrition assessment. Inter-professional communication, communication process, patient/care giver involvement, and discharge planning were also assessed in this tool.

Results from this questionnaire were converted into a composite score of 30 (1 point for each question) and then categorized into unsatisfactory (0-10), satisfactory (10-20), and good (20-30).

2.3.2 Malnutrition Knowledge and Awareness Questionnaire (Appendix 2-a)

The Malnutrition Knowledge and Awareness Questionnaire aims to assess basic knowledge on malnutrition prevalence and care concepts in hospital staff members. This tool was sent to all full-time clinical dietitians currently working in participating hospitals via emails along with the corresponding informed consent.

The test should take approximately five to ten minutes to complete and it included 17 multiple-choice questions with only one correct answer for each. Questions cover different aspect of malnutrition care practices; screening, diagnosis, and treatment.

MQii also provides an answer key (Appendix 2-b) for the Malnutrition Knowledge and Awareness Test. Test knowledge was assessed by a score of 17 point maximum; one point for each question.

2.3.3 Readiness to change Questionnaire (Appendix 3)

The Readiness to Change Questionnaire aims to determine the extent to which hospitals are ready to pursue malnutrition-focused quality improvement initiative. Answering this questionnaire helps to predict the ease or difficulty any hospital might encounter upon planning a quality improvement initiative. This tool targets hospital administrators and project managers aiming to implement malnutrition care quality improvement initiatives. This questionnaire was sent to hospital administrators via emails along with the corresponding informed consent. Hospitals administrators were reached via phone calls to the hospital also.

This readiness questionnaire should take approximately five to ten minutes to complete and it included 17 questions that assess hospitals' ability to support quality improvement efforts.

All questions use the Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). Finally, MQii provides a scoring rubric and a table on results assessment to help interpret results. It also provides some suggestions and recommendations according to the level of readiness. In addition, another composite score was created for this questionnaire by adding up the values for each question (strongly disagree = add one point, disagree = add two points, neutral = add three points, agree = add four points, and strongly agree = add five points) to get a maximum score of 85.

2.3.4 In-depth Interviews

Qualitative data collection was planned to be achieved through focus groups with a convenient sample of dietitians from all over Lebanon facilitated by two facilitators from the study team. Due to the Lebanon revolution and the covid-19 pandemic, the focus groups were decided to be held online via zoom for the ease of assembly and for safety precautions. Each focus group was planned to be attended by 4-6 participants for a 30-40 minutes. The structure and the questions of the focus groups were based on what was found to be both feasible and effective in the literature (Appendix 4). Each session starts after the assembly of all participants by a brief introduction on the study and the main objectives of the meeting. Then, an introductory question on the participants' opinion on the topic of malnutrition care practices and its importance in Lebanon. After that, dietitians were asked to briefly share the malnutrition management policies or

procedures at their hospital commenting on all steps of malnutrition care starting from early screening, moving to dietitians' assessment, care plan development, intervention, follow-up or rescreening, and finally discharge planning. Then, most importantly, open-ended questions were asked regarding what might hinder and what might facilitate the achievement of optimal malnutrition care practices. Participants were allowed to answer freely each on each question and at the end of each session, facilitators made sure that all important topics were covered such as the presence of a nutrition committee or protocol, electronic records and documentation, and administrative support to the dietetic department.

2.4 Procedure

The latest version of the list of all Lebanese hospitals (public and private) registered at the Ministry of Public Health was taken from the ministry website. Hospitals were contacted via phone calls to check if they meet the inclusion criteria of the study; i.e., to check if they have a full-time dietitian. Hospitals that do not have a full-time dietitian were automatically excluded from the sample.

Head dietitians of all participating hospitals were invited to participate in the research study after briefly introducing the project and its main purpose. Head dietitians who decided to participate were asked to share their emails and the emails of all clinical dietitians currently working at the same hospital, if any. Informed consents were sent via emails to all participants along with the corresponding questionnaire. After two weeks of sending the emails, another reminding email was sent to all participants and after four weeks, a second reminder was sent in addition to reminding phone calls to the participating dietitians.

For the focus groups, dietitians were invited through phone calls and confirmation email invitations. 4-6 dietitians were invited to each focus group session. However, as mentioned earlier, due to several circumstances in Lebanon within the last few months including the revolution and the Covid-19 situation, focus groups were changed into online interviews. Unfortunately, these circumstances affected the participation of the dietitians in the focus groups as they were overwhelmed with the increased workload at the hospitals. Other dietitians could not attend as they were either dismissed from the hospital or not working as full-time employees anymore. As a result the first and second focus group sessions were only attended by two participants. For the remaining sessions, participants' time availability could not be matched so we decided to more into one-to-one interviews instead of the focus groups due to low attendance. As such, four one-to-one interviews were held after that with four dietitians separately with the same content and questions as the focus groups. Interviews were also held via zoom except for one session which was done through a phone call. In conclusion, for qualitative data collection, two focus group sessions were attended by two dietitians each and four other sessions were done as one-to-one interviews.

2.5 Data Management

Information obtained through online questionnaires is stored in an electronic database and that obtained through interviews is documented in case record forms. To guarantee the privacy and confidentiality of the collected data, electronic data and record forms are stored in password-protected computer files. Only the principle investigator and co-investigators have access to this data. Furthermore, to de-identify data, names of subjects were not recorded.

2.6 Ethical Consideration

This study was approved by the Institutional Review Board at the Lebanese American University (approval number: LAU.SAS.LM4.30/Oct/2019). None of the study activities was expected to impose human subjects to any risk. Before collecting data, participants were all asked to give their informed consent (Appendix 5, 6, 7, & 8).

2.7 Statistical Analysis

Statistical analysis was performed using SPSS version 22 and statistical significance was accepted at p-values of less than 0.05. Analyzed data was summarized using descriptive statistics. Categorical variables were reported as frequencies and percentages and continuous variables were reported as mean ± standard deviation (SD) or as median and interquartile (IQ) depending on the normality distribution of the values.

Bivariate analysis test were used to detect associations and relationships among variables. Two way Chi-square tests / Fisher's exact tests were applied for categorical variables whereas Mann-whitney tests and Kruskal Wallis tests were applied for continuous variables. Moreover, multivariable analysis (logistic regression) was done to build a predictive model for optimal malnutrition practices (dependent variable is categorical). Multiple logistic regression was used since the dependent variable (Practice score category) is nominal and there is more than one independent variable entered to the model.

All focus groups and one-to-one interviews were recorded and then transcribed using two softwares (Temi and Amberscript). All scripts were revised and accordingly edited by two members of the research team to correct for Arabic words or inadequate

audio transcription. Then, transcripts were interpreted and analyzed manually following the Quagol criteria (Qualitative Analysis Guide of Leuven). This comprehensive guide was created to help researchers properly analyze and interpret interview data by identifying themes and subthemes through two phases: (1) preparing data through thoroughly re-listening and re-reading the interviews while taking notes and then (2) actual analysis of the interviews by drawing conceptual interview schemes and then organizing and categorizing them to properly extract main themes and subthemes (Dierckx de Casterlé et al, 2012).

Chapter Three

Results

3.1 Response

A total of 160 hospitals are registered at the Lebanese Ministry of Public Health; 28 are public and 132 are private. Out of the 28 governmental hospitals, 17 did not meet inclusion criteria (did not have a full-time dietitian) and 11 met inclusion criteria (do have a full-time dietitian). The Malnutrition Care Practices Questionnaire was sent to 11 governmental hospitals of which 9 responded with a response rate of 82%.

Similarly, out of 132 private hospitals registered at the MoPH, 45 did not meet inclusion criteria (did not have a full-time dietitian) and 87 met inclusion criteria (do have a full-time dietitian) of which three hospitals refused to participate either due to lack of time or due to administration disapproval. Therefore, the Malnutrition Care Practices Questionnaire was sent to 84 private hospitals of which 49 responded. In other words, response rate for the Malnutrition Care Practices Questionnaire from private hospitals was 58%. Overall, a total of 58 questionnaires were received from 95 public and private hospitals leaving us with a response rate of 61%.

Several hospitals were lost from our sample for several reasons including work overload; many dietitians welcomed the study and were willing to participate but did not as they did not have time. Also, this problem was exacerbated with the Lebanese revolution and then the Covid-19 pandemic as many dietitians were not working

according to their usual schedule anymore or even the hospital was not open. Other hospitals refused to participate because they did not receive approval from the hospital administration.

After data cleaning, out of the 58 questionnaires collected, 56 responses were valid as the remaining 2 were missing most of the questionnaire items. For the Malnutrition Knowledge Questionnaire, 62 questionnaires were received of which 60 were valid and for the Readiness to Change Questionnaire, 30 questionnaires were received of which 29 were valid.

3.2 Characteristics of the Hospitals

Table 1a represents the characteristics of the participating hospitals for the first questionnaire. Nine dietitians (16.1%) out of all the participants who responded to the Malnutrition Care Practices Questionnaire worked at governmental hospitals whereas 47 (83.9%) worked at private hospitals. 27 (48.2%) of the hospitals were affiliated with an academic institution and 29 (51.8%) were non-academic. In addition, hospitals were located across different districts of Lebanon as follows: 16 (28.6%) in Beirut, 13 (23.2%) in North Lebanon, 11 (19.6) in South Lebanon, 9 (16.1%) in Mount Lebanon and 7 (12.5%) in Bekaa. The majority of hospitals were constituted of either 50-100 beds (21 hospitals which is equivalent to 37.5%) or hospitals of 100-200 beds (21 hospitals which is equivalent to 37.5%).

Table 1a

		Frequency	Percent	Valid Percent	Cumulative Percent
Institution	Governmental	9	16.1	16.1	16.1
	Private	47	83.9	83.9	100
Affiliation	Academic	27	48.2	48.2	48.2
	Non-academic	29	51.8	51.8	100
Location	Beirut	16	28.6	28.6	28.6
	Bekaa	7	12.5	12.5	41.1
	Mount Lebanon	9	16.1	16.1	57.1
	North Lebanon	13	23.2	23.2	80.4
	South Lebanon	11	19.6	19.6	100
Number of Beds	10 – 50	6	10.7	10.7	14.3
	50 – 100	21	37.5	37.5	100
	100 – 200	21	37.5	37.5	51.8
	200 – 300	6	10.7	10.7	62.5
	>300	2	3.6	3.6	3.6
Total		56	100	100	

Table 1a, Characteristics of Malnutrition Care Practices Questionnaire Responders

Secondly, Table 1b represents the characteristics of the second questionnaire (Malnutrition Knowledge and Awareness Questionnaire) responders. Out of 60 responders, 7 (11.7%) worked at governmental hospitals whereas 53 (88.3%) worked at private hospitals. 29 (48.3%) of the hospitals were academically affiliated and 31 (51.7%) were not. Hospitals were located across different districts of Lebanon as follows: 16 (26.7) in South Lebanon, 15 (25%) in Mount Lebanon, 13 (21.7%) in Beirut, 10 (16.7%) in North Lebanon and 6 (10%) in Bekaa. The majority of hospitals (21 hospitals which is equivalent to 35%) constituted of 100-200 beds followed by 10-50 and 200-300 (15 hospitals each which is equivalent to 25%).

Table 1b

		Frequency	Percent	Valid Percent	Cumulative Percent
Institution	Governmental	7	11.7	11.7	11.7
	Private	53	88.3	88.3	100
Affiliation	Academic	29	48.3	48.3	100
	Non-academic	31	51.7	51.7	51.7
Location	Bieurt	13	21.7	21.7	21.7
	Mount Lebanon	15	25	25	46.7
	North Lebanon	10	16.7	16.7	63.3
	South Lebanon	16	26.7	26.7	90
	Bekaa	6	10	10	100
Number of Beds	10 – 50	3	5	5	5
	50 – 100	15	25	25	30
	100 – 200	21	35	35	65
	200 – 300	15	25	25	90
	>300	6	10	10	100
Total		60	100	100	

Table 1b, Characteristics of Malnutrition Knowledge and Awareness Questionnaire

Responders

Thirdly, Table 1c represents the characteristics of the third questionnaire (Readiness to Change Questionnaire) responders. Out of 29 responders, 6 (20.7%) worked at governmental hospitals whereas 23 (79.3%) worked at private hospitals. 7 (24.1%) of the hospitals were academically affiliated and 22 (75.9%) were not. Hospitals were located across different districts of Lebanon as follows: 12 (41.4%) in Mount Lebanon, 7 (24.1%) in North Lebanon, 5 (17.2) in South Lebanon, 3 (10.3%) in Beirut and 2 (6.9%) in Bekaa. The majority of hospitals (13 hospitals which is equivalent to 44.8%) constituted of 50-100 beds followed by 10-50 and 100-200 (9 hospitals each which is equivalent to 31%).

Table 1c

		Frequency	Percent	Valid Percent	Cumulative Percent
Institution	Governmental	6	20.7	20.7	20.7
	Private	23	79.3	79.3	100
Affiliation	Academic	7	24.1	24.1	24.1
	Non-academic	22	75.9	75.9	100
Location	Bieurt	3	10.3	10.3	10.3
	Mount Lebanon	12	41.4	41.4	51.7
	North Lebanon	7	24.1	24.1	75.9
	South Lebanon	5	17.2	17.2	93.1
	Bekaa	2	6.9	6.9	100
Number of Beds	10 – 50	3	10.3	10.3	10.3
	50 – 100	13	44.8	44.8	55.2
	100 – 200	9	31	31	86.2
	200 – 300	3	10.3	10.3	96.6
	>300	1	3.4	3.4	100
Total		29	100	100	

Table 1c, Characteristics of Readiness to Change Questionnaire Responders

3.3 Results of the Malnutrition Care Practices Questionnaire

Results from the Malnutrition Care Practices Questionnaire revealed that 71.4% (N=40) hospitals in Lebanon do have a documented protocol for malnutrition care. The mean average of the created score was 20.96 ± 6.16 out of 30 with a median of 22 with a maximum score of 29 and the minimum score recorded was 2. Table 2 shows the results of all the items in the Malnutrition Care Practices Questionnaire.

Table 2

Malnutrition Risk Assessment

	Yes (N,%)	No (N,%)
1. Does a member of your care team (e.g., nurse, dietitian, diet technician, diet aid) perform a malnutrition risk screening for all patients admitted to the hospital?	49 (87.5)	7(12.5)
2. Does a member of your care team (e.g., nurse, dietitian, diet technician, diet aid) perform a malnutrition risk screening for all patients within 24 hours of admission?	38(67.9)	18(32.1)
3. If yes, who is responsible for the malnutrition risk screening?	• Nurse • Dietitian • Diet technician • Diet aid • Physician • Other…	
4. Is the malnutrition risk screening tool in use at your facility a validated screening tool?	44(78.6)	12(21.4)
5. Are "at-risk" results clearly communicated to	49(87.5)	7(12.5)

other providers, or to next-in-line clinicians (e.g., dietitians)?		
6. Is a dietitian/physician approved protocol in place to initiate a malnutrition-risk diet order?	45(80.4)	11(19.6)

Nutrition Assessment

	Yes (N,%)	No (N,%)
1. Does a dietitian conduct a nutrition assessment for all patients who were identified to be at risk for malnutrition?	49(87.5)	7(12.5)
2. Does a dietitian conduct the nutrition assessment within 24-48 hours following determination that the patient is at risk for malnutrition?	47(83.9)	9(16.1)
3. Does a dietitian conduct the nutrition assessment for patients at risk of malnutrition using a validated assessment tool?	40(71.4)	15(26.8.5)
4. Do dietitians use the Nutrition-Focused Physical Exam (NPFE) as part of their nutrition assessment?	15(26.8)	41(73.2)
5. Are the results of the nutrition assessment clearly communicated to the next-in-line clinician	47(83.9)	9(16.1)

	(e.g., physician)?		

Malnutrition Diagnosis

	Yes (N,%)	No (N,%)
1. Are physicians (or other approved clinicians) at your hospital aware of their role in documenting malnutrition diagnoses in the medical record and/or adding malnutrition to the problem list?	32(57.1)	24(42.9)
2. Are providers (e.g., physicians, physician assistants) easily able to make a diagnosis of malnutrition based on dietitian assessment results?	31(55.4)	25(44.6)
3. Do physician orders and diagnoses almost always align with the dietitian's recommendations?	33(58.9)	23(41.1)

Malnutrition Care Plan Development

	Yes (N,%)	No (N,%)
1. Do patients who receive a malnutrition diagnosis receive a specific malnutrition care plan?	48(85.7)	8(14.3)
2. Does the malnutrition care plan include all of the	35(62.5)	21(37.5)

following components: The prescribed treatment/intervention An identification of the practitioner in charge A timeline for follow-up		
3. Is the malnutrition care plan developed immediately following patient diagnosis?	44(78.6)	12(12.4)
4. Is the malnutrition care plan communicated to the patient and/or caregivers?	46(82.1)	10(17.9)
5. Is the malnutrition care plan communicated to the patient care team?	44(78.6)	12(21.4)

Malnutrition Intervention Implementation

	Yes (N,%)	No (N,%)
1. Do patients who are diagnosed as malnourished consistently receive a malnutrition intervention?	50(89.3)	6(10.7)
1. Do recommended or prescribed nutrition interventions/orders get started (as outlined in the care plan) within 24 hours of diagnosis?	35(62.5)	21(37.5)
2. Is there an effective system for practitioners (including physicians, dietitians, nurses, pharmacists, etc.) to clearly communicate about implementation of the	36(64.3)	20(35.7)

nutrition intervention?		
3. Are nutrition interventions effectively administered to patients?	50(89.3)	6(10.7)

Malnutrition Monitoring and Evaluation

	Yes (N,%)	No (N,%)
1. Is there a defined plan established to monitor and evaluate each patient identified as malnourished during their inpatient hospital stay?	34(60.7)	22(39.3)
2. Is there a process in place for discussing the patient's nutritional status with patients and/or caregivers and soliciting feedback from the patient and/or caregiver?	39(69.6)	17(30.4)
3. Is the process of malnutrition care (assessment, diagnosis, intervention, and monitoring & evaluation) documented in the patient's chart?	44(78.6)	12(21.4)
4. Is there a protocol or process in place for re-screening patients at risk of malnutrition who were not found to be malnourished when assessed?	25(44.6)	31(55.4)

Discharge Planning

	Yes (N,%)	No (N,%)
1. Do you incorporate malnutrition instructions into patient discharge planning for patients determined to be at risk or malnourished?	45(80.4)	11(19.6)
2. Is there a designated space for malnutrition information in the discharge planning template?	23(41.1)	33(58.9)
3. Do you provide patients and their caregivers with education on their nutritional status and information/recommendations on maintaining optimal nutrition following discharge?	53(94.6)	3(5.4)

Table 2, Results of the Malnutrition Care Practices Questionnaire

Key questions from this questionnaire showed that 87.5% (N= 49) of the

hospitals apply regular malnutrition risk screening upon patient admission, 78.6%

(N=44) use a validated screening tool, and 71.4% (N= 40) assess the nutritional status by

a dietitian for all patients at risk of malnutrition however only 26.8% (N=15) of the

dietitians use Nutrition-Focused Physical Examination (NPFE) as part of their nutrition

assessment. Moreover, in 78.6% (N=44) of the hospitals, a malnutrition care plan is

immediately developed following a patient diagnosis and in 94.6% (N=53) of the

hospitals, patients and their caregivers are provided with education on their nutritional

status and information/recommendations on maintaining optimal nutrition following

discharge.

A chi-square test of independence (Fisher's Test) was used to compare the

malnutrition care practices categories between public and private hospitals. The Chi

Square test indicated that there is a significant difference between governmental and

private hospitals in terms of malnutrition practices (P-value= 0.009) where 80.4% of

private hospitals scored in the "Good Practice" category while for the governmental

hospitals, 12.5% scored in the "Unsatisfactory" category and 50% scored in the

"Satisfactory" category. Therefore, these results indicate that there is statistically

significant association between the type of the institution and the quality of its

malnutrition practices.

Results showed that unlike the type of institution, hospitals' academic affiliation,

location, or size was not associated with malnutrition practices. When the Fisher's Test

was applied, the association between the affiliation of the institution and the quality of

its malnutrition practices was not statistically significant with a P-value of 0.43 > 0.05.

For the location of the hospital, P-value was 0.8 > 0.05 and for the size of the hospital, it was 0.69 > 0.05 showing no statistically significant difference among hospitals of different sizes and from different districts of Lebanon when it comes to malnutrition care quality. However, only hospitals of a relatively small size scored in the "Unsatisfactory" category: 1 hospital constituting of 10-50 beds and 2 hospitals constituting of 50-100 beds.

Most importantly, results from this questionnaire also proved a statistically significant association with the presence of a documented malnutrition protocol in which 82.1% of hospitals who have a documented protocol scored in the "Good Practices" category while 40% of hospitals who do not scored in the "Satisfactory" category. This difference was significant with a P-value of 0.045.

Moreover, almost all items of the questionnaire had a significant effect on the malnutrition practice quality. For example, 89.5% of the hospitals who reported regular malnutrition screening within 24 hours of hospital admissions scored in the "Good Practices" category whereas only 37.5% of the hospitals who do not regularly screening for malnutrition upon admission scored in the "Good Practices" category (P-value<0.001). Likewise, 81.4% of hospitals who use a validated malnutrition screening tool scored in the "Good Practices" category while only 45.5% of hospitals who do not scored in the "Good Practices" category (P-value = 0.012). Also, the communication of the malnutrition care plan among the healthcare team affected the quality of malnutrition practices at the hospitals where most hospitals (81.8%) that properly communicate within a diverse healthcare team scored in the "Good Practices" category whereas 50% of hospitals whose communication is not well established scores in the "Satisfactory"

category (P-value = 0.006). In the same way, immediately developing a malnutrition care plan for malnourished patients (P-value = 0.006), having a defined monitoring and evaluation plan for malnutrition (P-value = 0.004), documenting the monitoring and evaluation process (P-value = 0.002), rescreening for the nutritional status (P-value = 0.01), and incorporating nutritional education and recommendation into the discharge plan (P-value = 0.003) all have a significant association with the quality of malnutrition practices according to our Malnutrition Care Practices Questionnaire.

Indicators that showed to be significantly associated with optimal malnutrition care practices in the statistical bivariate analysis were taken into further multivariate analysis. Therefore, the type of the hospital and the presence of a documented malnutrition protocol were entered into a logistic regression model. Results of the model goodness of fit test were statistically significant (P-value = 0.03) and the significant of the Hosmer and Lemeshow Test was 0.75 > 0.05 which means that the model is a good fit. Private hospitals and hospitals that reported having a documented protocol were more likely to score in the optimal malnutrition practices score (odds ratio = 0.11 with a 95% confidence interval of 0.02 - 0.61 and P-value = 0.01 and odds ratio = 0.21 with a 95% confidence interval of 0.05 - 0.85 and P-value = 0.02 respectively) (Table 3).

Table 3

Independent Variables	b (95% CI)	Exp (B)	P-value
Institution	2.14 (0.02,0.61)	0.117	0.011*
Malnutrition Protocol	1.52 (0.05, 0.85)	0.217	0.029*

Table 3, Results of Multivariate Analysis for the Malnutrition Care Practices Questionnaire

Dependent Variable: Score.Cat

3.4 Results of the Malnutrition Knowledge and Awareness Questionnaire

For the second questionnaire, the mean average for the correct answers was 8.56 out of 17 with a standard deviation of 3.22, a median of 8, a minimum of 4, and a maximum of 17.

To check for associations and differences in the knowledge score among dietitians working in governmental versus private hospitals or academic versus non-academic hospitals, the Mann-Whitney test was used. Test results showed that for the type of institution, there was no difference between the mean test score for dietitians in governmental and private hospitals (8.85 ± 2.91 SD and 8.52 ± 3.29 SD respectively) in terms of care quality (P-value = 0.64). However, for the academic affiliation, the mean average for the Malnutrition Knowledge and Awareness Questionnaire for dietitians working at academically affiliated hospitals was 9.65 ± 3.66 SD which was significantly higher compared with that of their counterparts in non-academically affiliated hospitals (7.54 ± 2.39 SD) and this difference was statistically significant with a P-value of 0.016.

Furthermore, to study the association between the test score with categorical explanatory variables with more than two categories, Kruskal-Wallis test was used. The first Kruskal-Wallis test conducted to evaluate differences in mean test score among the five different districts of Lebanon showed that the difference was significant with a P-value of 0.008. Likewise, for the number of beds, the differences in mean test score among hospitals of different sizes was significant with a P-value of 0.036.

3.5 Results of the Readiness to Change Questionnaire

For the third questionnaire, the mean average for the created composite score (out of 85) was 65.83 ±11.7 SD with a median of 70, a minimum of 17, and a maximum of 81.

In order to check for associations and differences in the readiness-to-change score among governmental versus private hospitals and academic versus non-academic hospitals, the Mann-Whitney test was used. Test results showed that neither the type of institution nor its affiliation had a significant effect on the readiness-to-change score, (P-values = 0.73 and 0.18 respectively). Similarly, to study the association between this score and categorical explanatory variables with more than two categories, Kruskal-Wallis test was used. The first Kruskal-Wallis test conducted to evaluate differences in the readiness-to-change score among the five different districts of Lebanon showed that the difference was insignificant with a P-value of 0.50. Likewise, for the number of beds, the differences in mean test score among hospitals of different sizes was also insignificant with a P-value of 0.60.

3.6 Results of Interviews

In-depth semi-structured interviews were held with a convenient sample of 8 dietitians from hospitals across all districts of Lebanon. Qualitative data from these interviews were analyzed through a thematic approach. The novelty of the topic, barriers and facilitators were discussed. Multiple themes and subthemes were identified in each area discussed. Figure 1 represents major identified barriers to proper malnutrition care practices while Figure 2 represents the factors that might facilitate the achievement of such practices.
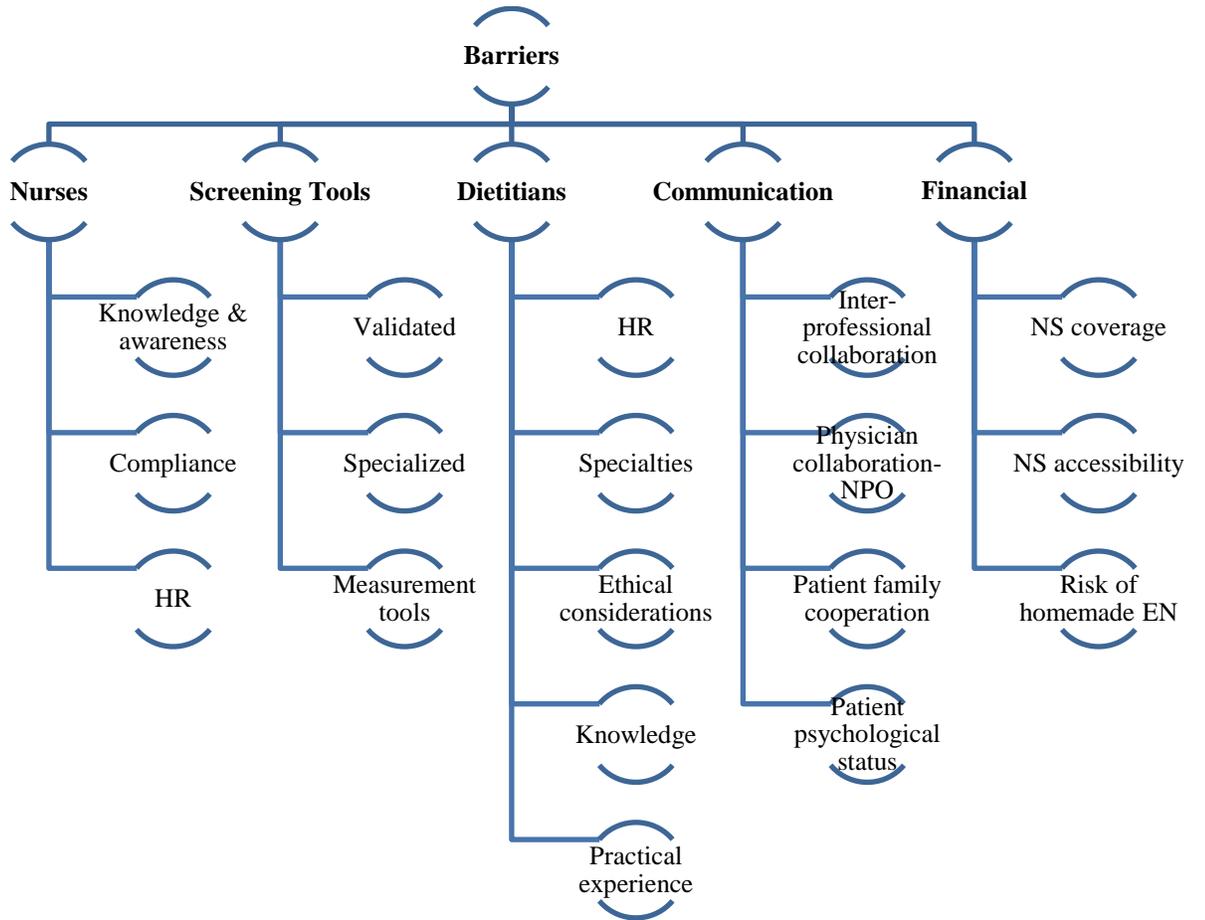
Figure 1

Figure 1, Barriers to optimal malnutrition practices
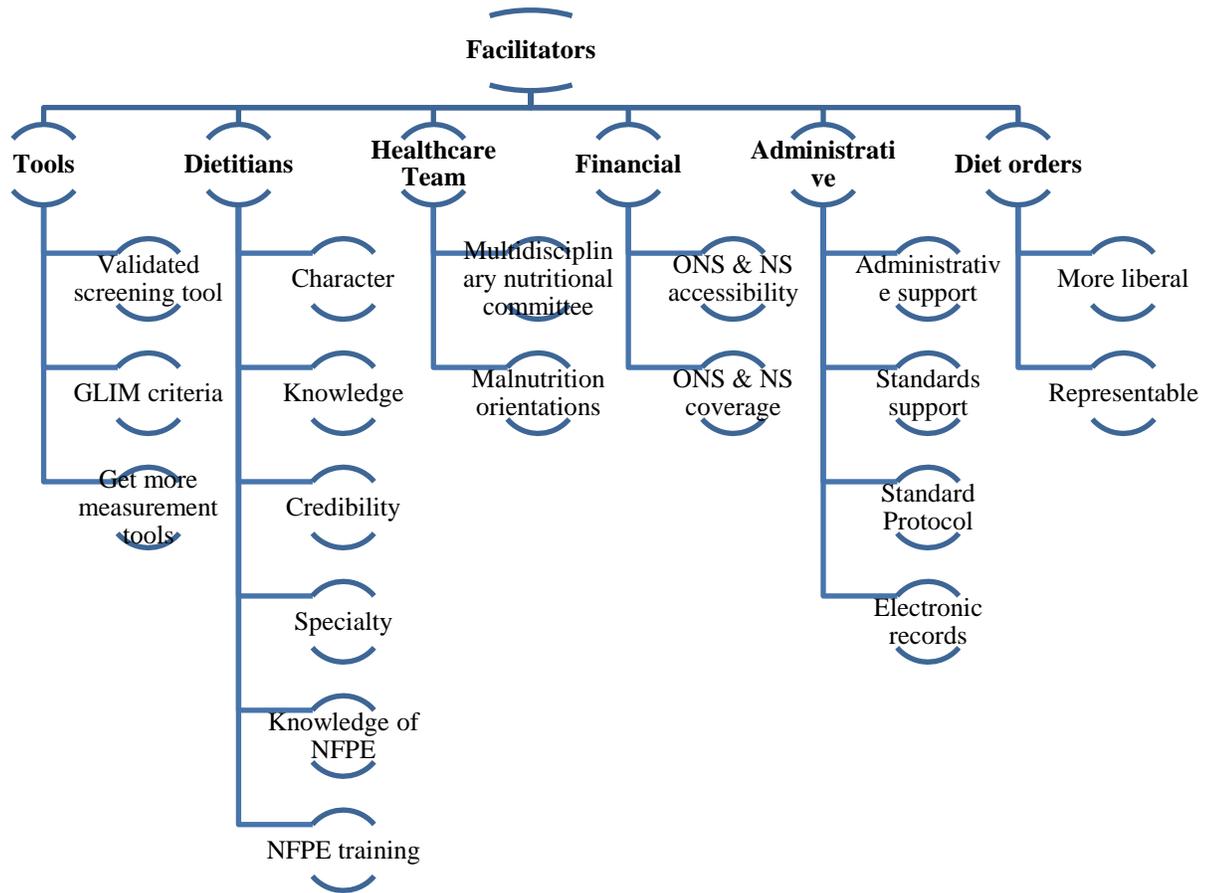
Figure 2

Figure 2, Facilitators towards optimal malnutrition practices

For the novelty of discussion malnutrition topics, most dietitians believed that malnutrition is a very important and interesting topic when in fact it is rarely discussed or studied in a hospital setting in Lebanon leaving us with very scarce data on the actual situation in Lebanon. They also stated that doing such studies would be the first step towards quality improvement initiatives that might improve malnutrition practices.

For the factors that complicate malnutrition care practices, the dietitians believed that many human resources, financial and administrative barriers stand in their way when they deal with malnourished patients. Based on the factors suggested in the interviews, the following themes and subthemes were identified: there is a gap in nurses' initial malnutrition screening due to limitations in nurses' knowledge and awareness on the topic and its importance which is translated into poor compliance with regular screening policies at several hospitals. In addition, the numbers of nursing staff is considered insufficient with respect to the number of patients according to the interviewed dietitians therefore any nutritional care added to the nurse's schedule would be considered an additional workload to their already overbooked schedule. Another factor that is complicating the screening process is the scarcity in measurement tools available in the hospitals and the limitations in the screening tools adopted; in which they might not be validated or they might not be specialized based on the patient's case.

Another important factor was not having enough dietitians recruited at the hospital or not having specialized dietitians for each hospital ward such as dialysis, oncology or pediatrics patients. It was also frequently mentioned that there is a lack of knowledge by the clinical dietitians in practical experience, in research and certain areas like certain surgeries and procedure, medications and nutrient interactions, and nutrition

for the pediatrics population. In addition, malnutrition care practices were not perfectly applied at the hospitals due to improper collaboration and communication among different healthcare providers including mainly physician, nurses, and pharmacists. Sometimes, the patient and his family are considered a barrier according to the dietitians when they do not cooperate regarding the nutritional intervention due to psychological reasons or due to lack of nutritional knowledge. Most importantly, financial barriers were the major obstacle for all the interviewed dietitians knowing that enteral feeding formulas and oral nutritional supplements are not usually financially covered and not easily accessible for the patient.

Moving to the facilitators, most dietitians suggested that securing the appropriate tools for anthropometric measurements at the hospital would facilitate the dietitian's work in addition to financially covering the suitable nutrition support or oral nutrition support feeding while providing them at the hospital. They also believed that the dietitians' character, knowledge, practical experience and credibility is definitely a major facilitator for malnutrition care. They also suggested malnutrition orientations and awareness sessions for hospital staff members in order to increase their awareness on malnutrition and its impact on patients' health outcomes. The adoption of an electronic documentation system was also thought to be helpful in saving time with better accessibility and reliability. Finally, the presence of a multidisciplinary nutritional committee that works solely on improving hospital malnutrition care practices was strongly advocated.

Chapter Four

Discussion

This study showed that Lebanese hospitals are doing well, in general, regarding malnutrition care policies, especially private hospitals that have a documented protocol for malnutrition care. Nutritional knowledge was also satisfactory, in general, for the dietitians working at Lebanese hospitals especially the ones affiliated with an academic institution. However, several gaps; mainly human resources scarcity and financial limitations still hinder the compliance to these malnutrition care protocols. When compared to other countries, Lebanon is doing better in certain features while it lacks in other functions of nutritional care. According to our Malnutrition Care Practice Questionnaire, 67.9% of the hospitals self-reported having a policy to screen for malnutrition within 24 hours of hospital admission when in fact, malnutrition screening for all admitted patients is mandatory according to the Lebanese MoPH accreditation standards published in 2019. These results were similar to an Australian study where malnutrition screening was applied in 67.3% of the hospital while it was lower than the screening rate in British hospital (86%). As showed in the in-depth interviews, although 67.9% of Lebanese hospitals do have a policy for regular screening, in many cases, patients are not actually screened due to two major barriers: nurses understaffing and nurses lack of training on malnutrition screening. This was also a problem for hospitals in South Africa where both doctors and nurses reported inadequate knowledge or training on malnutrition screening and despite having the measurements tool required,

nurses reported incompliance to screening due to understaffing and exhausting work overload (Tonder et al, 2018).

The financial barrier which was reported frequently in our interviews was not a major limitation for Turkish hospitals. In Turkey, the provision of nutrition support was shown to be best where 39.4% of malnourished patients required intervention and 34.4% received malnutrition intervention. Nutrition support teams were reported to be active in some hospitals yet unavailable in others. Moreover, all necessary assessment equipment, dietary mixtures, and other nutritional expenses are covered by the Turkish government (Social Security Institution of Republic of Turkey) and there is complete reimbursement for enteral and parenteral nutrition (Klek et al, 2015).

In a similar national cross-sectional study in Belgium, results also showed worrying nutritional care practices which was attributed to several barriers according to the author including: lack of knowledge, training, and awareness, lack of defined responsibilities, and nurses' attitudes towards nutritional care. Most of the hospitals (55.7%) did not report any routine nutritional screening upon admission and 70% of the hospitals did not use any validated tool or a standardized nutritional screening instrument for screening and assessment. In addition, the majority of the hospitals did not have a nutrition protocol (70%) whereas the majority of Lebanese hospitals in our study reported having a documented protocol for malnutrition care (71.4%) although this is expected to be inaccurate as it was contradicted in the interviews with the dietitians. This contradiction in our results might be due to a bias from the dietitians or due to a misunderstanding of the definition of the malnutrition protocol. Furthermore, according to a recent study in several European countries, quality of malnutrition care practices

was inadequate in certain aspects regarding hospital stakeholders communication and cooperation, malnutrition education, research, and policymaking, absence of a unified screening and diagnostic tools, nutrition screening instruments, nutritional assessment, and the presence of a nutritional protocol. These gaps were also identified in our study in Lebanese hospitals (Visser et al, 2017).

In a study on the current practice of nutrition screening and assessment in hospitalized patients in the United States, a web-based study was sent to hospital-based professionals; mainly dietitians. Participants' response reflected acceptable compliance to The Joint Commission mandate where nurses usually were responsible for nutrition risk screening while dietitians were responsible for nutritional assessment however a validated screening or assessment was not used in most of the cases. For the nutrition care committee, about half (47.7%) of the respondents reported that their hospital had a nutrition care team. Awareness and training on the use of nutrition screening tool in the respondents was variable. For the nurses, 42% reported that they knew how to use the validated screening tool, whereas 49% indicated that they did not. In contrast, for the dietitians, 37% reported that they were aware of the use of the validated screening tool and 20% were not, and the remaining were unsure. Similar to our study results, when asked on the barrier to completing nutritional screening and assessment, the most commonly reported barrier was insufficient personnel along with inadequate resources and unsatisfactory expertise (Patel et al, 2014). Moreover, a 2016 study on 5,896,792 hospitalized patients from 105 US hospitals found that on average, 5% of the patients were malnourished and that the main factors associated with higher malnutrition diagnosis were hospital size and hospital rank. The authors explained high malnutrition

54

rates by inadequate education and lack of malnutrition screening and diagnosis knowledge as well as awareness among health care providers, the use of multiple malnutrition diagnostic tools, and suboptimal dietitians' support (Tobert et al, 2018).

In the same way, in 14 facilities of Queensland Health Hospital in Australia, malnutrition practices were reviewed through an online questionnaire. Only 45% of the facilities had up-to-date policies on nutrition management and no facility had a nutrition care committee with representatives from all professions. Moreover, 21% of participants reported gaps in knowledge in the identification and management of malnutrition. Forty-two percent of the facilities had routine malnutrition screening policy in place but reported significant gaps in compliance, documentation, and referral procedures which was mainly attributed to the lack of role clarity among hospital clinicians in nutrition management (Patel et al, 2014).

Overall, based on results of our study, Lebanese hospitals are doing better than many other countries in terms of malnutrition screening and assessment but we do share numerous barriers to the compliance to nutritional policies with other hospitals around the world.

This study is the first of its kind in Lebanon to assess the current situation of malnutrition practices in a hospital setting and it can be considered as the first step towards setting corrective actions to fulfill the gaps in the practice that were identified in our study. This self-assessment on a national level is considered as a strength for the study especially that it covered all hospitals registered at the Lebanese Ministry of Public Health in all districts of Lebanon including both governmental and private

hospital as well as academic and non-academic institutions. Another strength is the response rate we received for the questionnaires knowing that they were all web-based. Although our study was only cross-sectional, the qualitative data collected helped identify basic correlations and relationships that can explain and support data from the online questionnaires.

In addition, all the surveys used for this study were accurate and strong tools created by the Malnutrition Quality Improvement Initiative which was proved to be reliable and sensitive in several similar studies. The MQii toolkit was created by the Academy of Nutrition and Dietetics along with Avalere Health and other stakeholders to provide healthcare providers with a dual approach to improve malnutrition care practices: (1) a set of four malnutrition-focused electronic clinical quality measures and (2) a toolkit of resources and guidelines focusing on activities that improve the quality of practice. In other words, MQii is an approach that can be adopted by hospitals willing to strengthen their dietetic care regarding malnutrition and it has been showing remarkable success (Mccauley et al, 2019).

For example, in 2018, Silver et al had conducted a pilot study to evaluate the effectiveness of the MQii toolkit of best practice resources for screening, diagnosis, documentation, and timeliness of malnutrition care. Forty-five health care professionals from several units at Vanderbilt University Hospital attended a 3-month intervention with training and education modules from the MQii toolkit. Outcomes measures were assessed through a 30-item Malnutrition knowledge questionnaire; electronic medical record EMR documentation; and timeliness of malnutrition screening, diagnosis, intervention, and discharge planning (Silver et al, 2020). Findings revealed that after the

implementation of MQii, malnutrition knowledge score increased 14%, from 39% to 53% (P=0.009) and registered dietitian nutritionist malnutrition diagnosis was documented in the EMR of all patients whose malnutrition screening indicated high risk of malnutrition. In addition, almost all (95%) of those a- risk patients had a documented malnutrition intervention recorded in the EMR and rate of including malnutrition care plan in the discharge plan increased 4.8%, from 70.0% to 74.8% (P=0.13). The author concluded that the MQii toolkit is an effective and feasible approach to improve the quality of malnutrition care, malnutrition knowledge, and professionals' skills relevant to screening, diagnosis, intervention, and timeliness of malnutrition care which will ultimately be translated into improvements in malnutrition rates in hospitals (Silver et al, 2020). Therefore, the use of the MQii tools in this study is considered a strong point. However, the questionnaires we used from the MQii toolkit are not yet validated nor previously used in similar assessment studies.

Another strength is the inclusion of hospital administration in the study through the readiness to change questionnaire. In 2017, a qualitative study by Laur et al aimed to investigate how staff members from different domains perceived the matter of hospital malnutrition and its impact on patient clinical care and to identify the essential prerequisites to implement a malnutrition quality improvement initiative in a hospital setting. Focus groups and key informants interviews were conducted with several hospital staff including management. Data analysis revealed five main themes: building a reason to change, involving relevant staff in the change, embedding change into current practice, adapting for the climate, and building a collaborative environment among the hospital team. Results also highlighted the importance of the role of

management in the change process and its impact on the effectiveness and sustainability of this change in practice (Laur et al, 2017). This study assures the importance of involving hospital administrators for they play a major role in malnutrition care offered at hospitals and this was the reason behind adding the Readiness to Change Questionnaire.

However, there were some limitations in our study. The design itself had some weaknesses as it was only cross-sectional hence no causality associations can be confirmed by this study. The surveys we online too which omitted response bias as they were self-administered by the dietitians therefore the respondents could answer freely and honestly. Nonetheless, optimism bias was seen in the response where participants may have tended to overestimate their performance regarding malnutrition practices. There might also be an interviewer bias in the data collected through the semi-structured interviews.

Another main limitation to this study was excluding hospitals that do not have a full-time dietitian where we lost a major portion of Lebanese hospitals that might be of greater need for such assessment. Not having a full-time dietitian at the hospital would probably mean that malnutrition care is not well implemented at the hospital and this itself can be considered a major gap at the hospitals. Therefore, hospitals that were excluded could have been approached differently through a more meticulous survey with a medical or hospital representative.

In attempt to overcome the aforementioned limitations, further studies should be administered through audits and checklists to the hospitals in order to avoid any bias

from the dietitian's side. This was actually suggested by several dietitians in the interviews were they thought that regular audits from the Ministry of Public Health or from accreditation boards that would include a checklist for all the essential steps in the malnutrition care practice while observing this actual practice at the hospital. In this way, all Lebanese hospitals would be covered by the audits to make sure that every hospital is well-assessed.

Chapter Five

Conclusion

In conclusion, our study is the first of its kind to evaluate the quality of clinical practices pertinent to hospital malnutrition in Lebanon. However, we still aim to better understand the gaps in the current practice in order to pave our path towards correcting these gaps and ultimately improve the way food and nutrition is provided at Lebanese hospitals. According to the results of our study, the first step to do so would be advocating for financial coverage of ONS and other nutrition support means as well as for hiring more human resources in the hospital setting especially in the dietetic department in order to allow specialized, individualized and precise nutritional care.

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Appendix

Appendix 1

Malnutrition Care Assessment Questionnaire

Instructions: This survey should take approximately 10-15 minutes to complete. The
questions below are organized by different phases of the malnutrition care
continuum. Please respond to each question to the best of your knowledge.
Answering the questions, you should think about what malnutrition care is
actually like in your hospital right now, not how you think it might be in the
future or how you wish it to be.

1. Type of Institution:

    - Governmental Hospital

    - Private Hospital

2. Hospital Affiliation:

    - Academic Hospital

    - Non-academic Hospital

3. Location of institution:

    - Beirut

    - Mount Lebanon

- North Lebanon

- Bekaa

- South Lebanon

4. Number of beds:

  - 10 to 50

  - 50 to 100

  - 100 to 200

  - 200-300

  - >300

5. Does your hospital have a documented protocol for malnutrition care?

  - Yes

  - No

Malnutrition Risk Assessment

	Yes	No
1. Does a member of your care team (e.g., nurse, dietitian, diet technician, diet aid) perform a malnutrition risk screening for all patients admitted to the hospital?		
2. Does a member of your care team (e.g., nurse, dietitian, diet technician, diet aid) perform a malnutrition risk screening for all patients within 24 hours of admission?		
3. If yes, who is responsible for the malnutrition risk screening?	- Nurse - Dietitian - Diet technician - Diet aid - Physician - Other…	
4. Is the malnutrition risk screening tool in use at your facility a validated screening tool?		

	Yes	No
5. Are "at-risk" results clearly communicated to other providers, or to next-in-line clinicians (e.g., dietitians)?		
6. Is a dietitian/physician approved protocol in place to initiate a malnutrition-risk diet order?		

Nutrition Assessment

	Yes	No
1. Does a dietitian conduct a nutrition assessment for all patients who were identified to be at risk for malnutrition?		
2. Does a dietitian conduct the nutrition assessment within 24-48 hours following determination that the patient is at risk for malnutrition?		
3. Does a dietitian conduct the nutrition assessment for patients at risk of malnutrition using a validated assessment tool?		
4. Do dietitians use the Nutrition-Focused Physical Exam (NPFE) as part of their nutrition assessment?		
5. Are the results of the nutrition assessment clearly communicated to the next-in-line clinician (e.g.,		

	physician)?		

Malnutrition Diagnosis

	Yes	No
1. Are physicians (or other approved clinicians) at your hospital aware of their role in documenting malnutrition diagnoses in the medical record and/or adding malnutrition to the problem list?		
2. Are providers (e.g., physicians, physician assistants) easily able to make a diagnosis of malnutrition based on dietitian assessment results?		
3. Do physician orders and diagnoses almost always align with the dietitian's recommendations?		

Malnutrition Care Plan Development

	Yes	No
1. Do patients who receive a malnutrition diagnosis receive a specific malnutrition care plan?		
2. Does the malnutrition care plan include all of the		

	Yes	No
following components: i. The prescribed treatment/intervention ii. An identification of the practitioner in charge iii. A timeline for follow-up		
3. Is the malnutrition care plan developed immediately following patient diagnosis?		
4. Is the malnutrition care plan communicated to the patient and/or caregivers?		
5. Is the malnutrition care plan communicated to the patient care team?		

Malnutrition Intervention Implementation

	Yes	No
2. Do patients who are diagnosed as malnourished consistently receive a malnutrition intervention?		
3. Do recommended or prescribed nutrition interventions/orders get started (as outlined in the care plan) within 24 hours of diagnosis?		

	Yes	No
4. Is there an effective system for practitioners (including physicians, dietitians, nurses, pharmacists, etc.) to clearly communicate about implementation of the nutrition intervention?		
5. Are nutrition interventions effectively administered to patients?		

Malnutrition Monitoring and Evaluation

	Yes	No
1. Is there a defined plan established to monitor and evaluate each patient identified as malnourished during their inpatient hospital stay?		
2. Is there a process in place for discussing the patient's nutritional status with patients and/or caregivers and soliciting feedback from the patient and/or caregiver?		
3. Is the process of malnutrition care (assessment, diagnosis, intervention, and monitoring & evaluation) documented in the patient's chart?		
4. Is there a protocol or process in place for re-screening patients at risk of malnutrition who were not found to be		

	Yes	No
malnourished when assessed?		

Discharge Planning

	Yes	No
1. Do you incorporate malnutrition instructions into patient discharge planning for patients determined to be at risk or malnourished?		
2. Is there a designated space for malnutrition information in the discharge planning template?		
3. Do you provide patients and their caregivers with education on their nutritional status and information/recommendations on maintaining optimal nutrition following discharge?		

Appendix 2-a

Malnutrition Knowledge and Awareness Questionnaire

Instructions: This survey should take approximately 10-15 minutes to complete**.** There are 17 multiple-choice questions included in this test. Please answer to the best of your ability. Please review all provided answers before responding, and then select the answer that you feel is most accurate based on your knowledge of malnutrition.

1. The following clinical findings can be used to make a formal diagnosis of malnutrition except:

    a) Insufficient food intake

    b) Fluid accumulation

    c) Loss of muscle mass

    d) Presence of bed sores

    e) Decrease in grip strength

2. Which of the following is not a recommended type of data to inform whether a patient is diagnosed   as malnourished:

    a) Gastrointestinal symptoms

    b) Serum albumin level

    c) Body mass index

d) Functional capacity

e) Dietary intake

3. How soon following a positive malnutrition screening should a patient receive a nutrition assessment?

    a) Within 12 hours

    b) Within 24 hours

    c) Within 36 hours

    d) Within 48 hours

    e) Within 72 hours

4. Which of the following is not a recommended next step for malnourished patients immediately following the nutrition assessment?

    a) Confirm and record malnutrition diagnosis

    b) Consult patient on care preferences

    c) Establish nutrition care plan

    d) Provide patient education and counseling on condition

    e) Automatically renew existing malnutrition-risk diet order

5. Which of the following commonly result from malnutrition:

    a) Weight loss

b) Falls

c) Hospital-acquired infections

d) Pressure ulcers

e) All of the above

6. Following a nutrition assessment, when should a patient receive a malnutrition
   diagnosis, if appropriate?

   a) Within 12 hours

   b) Within 24 hours

   c) Within 36 hours

   d) Within 48 hours

   e) Within 72 hours

7. Following admission, when should a patient receive a malnutrition screening?

   a) Within 12 hours

   b) Within 24 hours

   c) Within 36 hours

   d) Within 48 hours

   e) Within 72 hours

8. Which of the following are not data that should be collected during a nutrition assessment?

    a) Family nutrition history

    b) Anthropometric measurements

    c) Biochemical data

    d) Physical exam information

    e) Food and nutrition patient history

9. Which of the following is essential to include in a malnutrition care plan?

    a) Patient preferences

    b) Treatment goals

    c) Prescribed treatment or intervention

    d) All of above

10. Which of the following is true regarding a nutrition assessment?

    a) All admitted patients should receive a nutrition assessment

    b) The assessment should utilize a standardized tool

    c) The assessment should be led by a nurse or nurse practitioner

    d) Limited patient/family caregiver involvement should be required

11. Which of the following is not reflective of a recommended best practice for all surgical patients:

    a) Screening for malnutrition upon admission if the patient has not received a malnutrition screening   within seven days prior to admission

    b) Completing malnutrition screening or assessment within 24 hours prior to surgery for patients who   are in NPO (nothing by mouth) status

    c) Discussing plans to implement NPO status with patients prior to surgery

    d) Performing a nutrition assessment for patients directly following surgery

    e) Continuing to rescreen patients every seven days post-surgery, length of stay permitting

12. Which of the following is true regarding discharge planning for a patient treated for malnutrition?

    a) The patient should be given educational materials about continuing their nutrition care after discharge

    b) Recommendations should include timing for follow-up care activities

    c) Nutrition-related discharge instructions may be given independent of discharge instructions for the   primary condition

    d) a and b above

    e) a, b, and c above

13. How soon should the implementation of a malnutrition care plan begin once a patient is diagnosed as malnourished or at risk for malnutrition?

   a) Within 48 hours following creation of the malnutrition care plan

   b) Within 24 hours following creation of the malnutrition care plan

   c) Immediately following creation of the malnutrition care plan

   d) Within 12 hours following creation of the malnutrition care plan

   e) Prior to end of day following creation of the malnutrition care plan

14. Which of the following is not a validated screening tool?

   a) Nutrition Risk Screening (NRS)

   b) Mini Nutritional Assessment (MNA)

   c) Simplified Nutritional Appetite Questionnaire (SNAQ)

   d) Malnutrition Universal Screening Tool (MUST)

   e) Simple Adult Nutrition Screening Tool (SANST)

15. When should a patient's initial malnutrition-risk diet order (an interim diet order initiated for patients identified as at risk based on malnutrition screening) be reevaluated?

   a) Within 48 hours of receiving the initial diet order

   b) Following a nutrition assessment or reassessment

c) Once first food or oral nutritional supplement is given

d) Prior to discharge

e) b and c above

16. What are the processes associated with nutrition intervention monitoring and

    evaluation as identified by the   Academy of Nutrition and Dietetics?

    a) Monitor patient status, communicate results, assess timing for discharge

    b) Monitor progress, measure outcomes, evaluate changes

    c) Discuss care plan goals with the patient, check the medical record,

       conduct follow-up assessment

    d) Plan, do, study, act

17. How long before hospital discharge should malnutrition discharge planning for a

    given patient begin?

    a) Within 12 hours of discharge

    b) Within 24 hours of discharge

    c) Within 36 hours of discharge

    d) Within 48 hours of discharge

    e) When the patient care plan is developed

Appendix 2-b

Malnutrition Knowledge and Awareness Questionnaire –

Answer Key

1. d

2. b

3. d

4. e

5. e

6. a

7. b

8. a

9. d

10. b

11. d

12. d

13. c

14. e

15. b

16. c

17. b

Appendix 3

Readiness to Change Questionnaire

Instructions: This tool has 17 questions and should take approximately 5-10 minutes to complete. Please respond to each question to the best of your knowledge. Answering the questions, you should think about how nutrition care is actually delivered in your hospital right now, not how you think it might be in the future or how you wish it to be.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. This hospital likes to do new and different things to improve care for patients.					
2. Change in the hospital is managed well and sustained (based on experiences in the past three years).					
3. When physicians are involved in					

changes, the change is easier and more readily adopted across the organization.				
4. This hospital has a Quality Improvement Committee/Team that serves as a resource for quality improvement projects/efforts.				
5. Multi-disciplinary care teams are frequently used and embraced for quality improvement in our hospital culture.				
6. Senior executives in this hospital are visible and strong supporters of quality improvement.				
7. Patients and caregivers or patient advisory councils participate in				

quality improvement efforts in the hospital.				
8. Providers (e.g., physicians, nurses, dietitians) in this hospital understand that they have an important role to play in supporting quality improvement.				
9. Providers have experience reviewing and implementing quality improvement tools or resources.				
10. Senior executives in this hospital understand the negative impacts of malnutrition on patient outcomes and hospital cost of care.				
11. Providers (e.g., physicians, nurses, dietitians) in this hospital understand				

the negative impacts of malnutrition on patient outcomes and hospital cost of care.					
12. Providers understand that they have an important role to play in supporting malnutrition care.					
13. If my facility were to implement a quality improvement initiative for improving malnutrition care, I have staff or a team ready and the time available to take on the task.					
14. Dietitians in this hospital are involved in existing or past quality improvement efforts.					
15. Dietitians in this hospital have a significant role in informing					

malnutrition diagnoses and nutrition interventions/orders.					
16. Dietitians in this hospital are familiar with and use the Academy of Nutrition and Dietetics' recommended Nutrition Care Process model in providing nutrition support.					
17. This hospital has ready access to a dietitian at all times (i.e., sufficient dietitian availability 24/7).					

Appendix 4

Focus groups' Guide: Dietitians' Insights on Malnutrition Care Practices

Objectives

This focus group aims to identify facilitators and barriers to optimal malnutrition care in Lebanese hospitals. The main objectives include:

1.   Assessing current status of malnutrition care

2.   Identifying major barriers to optimal malnutrition care

3.   Identifying major facilitators to optimal malnutrition care

Duration

Three focus groups will be held of 4-6 participants each.

Each focus group will take 30-40 minutes.

Procedure

Focus group facilitators will ask key questions and let each participant answer freely while taking notes. The interview will be recorded via zoom.

The language that will be mainly used is English; however if any participant is uncomfortable using English language, they can use Arabic.

Guide for Semi-structured Focus Group

The structure of the focus group was based on what was found to be both feasible and effective in the literature

1.   General introduction

i.   Basic description of the study, objectives of the interview, and basic definitions of malnutrition care, barriers, and facilitators:

This study aims to assess the current status of dietetic practices related to malnutrition in hospitals across Lebanon through online questionnaires and semi-structured focus groups as well as to evaluate dietitians' related knowledge on malnutrition.

ii.   Importance of improving malnutrition care practices:

In your opinion, is it necessary to assess current hospital malnutrition practices in Lebanon and to implement any interventions to improve the quality of these practices?

2.   Introductory Questions on Malnutrition Practices:

Statement: Academy of Nutrition and Dietetics (AND) and the American Society of Parenteral and Enteral Nutrition (ASPEN) highly recommend malnutrition screening to all patients within 24 hours of hospital admission in order to identify at risk patients and initiate proper nutritional interventions.

i.   How well is your hospital doing in terms of malnutrition care?

3.   Questions on barriers and facilitators:

A barrier is any obstacle that can prevent the achievement of a certain goal or target.

A facilitator is any factor that might help achieve a certain goal or target.

i. What might prevent implementing this recommendation? (Barriers)

ii. What would help implement this recommendation? (Facilitators)

Please elaborate more on your current situation in your hospital.

4. Final Questions on possible solutions:

i. Is there anything else that anyone feels that we should have talked about but we didn't?

Might need to ask questions such as:

ii. When you have made changes to improve care practices in the past, what worked well? What didn't? Why?

iii. If there was one thing you could change about the way food and nutrition care is provided in your hospital, what would it be?

Areas expected to be covered in each focus group:

- Presence of a Nutrition committee

- Screening tools used

- NFPE

- Administrative support

- Electronic records

- Dietitians' qualifications and expertise

- The role of different healthcare providers at the hospital

- The role of hospital administration

- Documentation process

- Communication barriers between hospital staff

Appendix 5

Consent to participate in the Malnutrition Care Assessment Questionnaire

"Assessment of Malnutrition Care and Knowledge in Lebanese Hospitals: A Cross-sectional Study"

I would like to invite you to participate in a research project by completing the following survey. I am a student at the Lebanese American University and I am completing this research project as part of my thesis project. The purpose of this survey aims to assess the status of hospital dietetic practices related to malnutrition screening, assessment, diagnosis and treatment.

There are no known risks, harms or discomforts associated with this study beyond those encountered in normal daily life. The information you provide will be used to enhance and improve the quality of nutritional care provided to hospitalized patients across Lebanon. You will not directly benefit from participation in this study; however it might highlight areas for improvement in your malnutrition management system. Completing the survey will take ten minutes of your time.

By continuing with the survey, you agree with the following statements:

1. I have been given sufficient information about this research project.

2. I understand that my answers will not be released to anyone and my identity will remain anonymous. My name will not be written on the questionnaire nor be kept in any other records.

3. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity. Only researchers will have access to view any data collected during this research however data cannot be linked to me.

4. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.

5. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.

6. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University

7. I understand that if I have any additional questions, I can ask the research team listed below.

8. I have read and understood all statements on this form.

9. I voluntarily agree to take part in this research project by completing the following survey.

If you have any questions, you may contact:

Name (PI)	Phone number	Email address
Dr. Lama Matar		Lama.matar@lau.edu.lb

If you have any questions about your rights as a participant in this study, or you want to talk to someone outside the research, please contact the:

Institutional Review Board Office,

Lebanese American University

3rd Floor, Dorm A, Byblos Campus

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irb@lau.edu.lb

This study has been reviewed and approved by the LAU IRB:

LAU.SAS.LM4.30/Oct/2019

Appendix 6

Consent to participate in the Malnutrition Knowledge and Awareness Questionnaire

"Assessment of Malnutrition Care and Knowledge in Lebanese Hospitals: A Cross-sectional Study"

I would like to invite you to participate in a research project by completing the following survey. I am a student at the Lebanese American University and I am completing this research project as part of my thesis project. The purpose of this survey aims to assess hospital staff members' knowledge of the impact of malnutrition and importance of optimal malnutrition care practices.

There are no known risks, harms or discomforts associated with this study beyond those encountered in normal daily life. The information you provide will be used to enhance and improve the quality of nutritional care provided to hospitalized patients across Lebanon. You will not directly benefit from participation in this study. Completing the survey will take ten minutes of your time.

By continuing with the survey, you agree with the following statements:

1. I have been given sufficient information about this research project.

2. I understand that my answers will not be released to anyone and my identity will remain anonymous. My name will not be written on the questionnaire nor be kept in any other records.

3. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity. Only researchers will have access to view any data collected during this research however data cannot be linked to me.

4. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.

5. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.

6. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University

7. I understand that if I have any additional questions, I can ask the research team listed below.

8. I have read and understood all statements on this form.

9. I voluntarily agree to take part in this research project by completing the following survey.

If you have any questions, you may contact:

Name (PI)	Phone number	Email address
Dr. Lama Matar		Lama.matar@lau.edu.lb

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Appendix 7

Consent to participate in the Readiness to Change Questionnaire

"Assessment of Malnutrition Care and Knowledge in Lebanese Hospitals: A Cross-sectional Study"

I would like to invite you to participate in a research project by completing the following survey. I am a student at the Lebanese American University and I am completing this research project as part of my thesis project. The purpose of this survey aims to assess the extent to which hospitals are ready to pursue a malnutrition-focused quality improvement initiative.

There are no known risks, harms or discomforts associated with this study beyond those encountered in normal daily life. The information you provide will be used to enhance and improve the quality of nutritional care provided to hospitalized patients across Lebanon. You will not directly benefit from participation in this study. Completing the survey will take ten minutes of your time.

By continuing with the survey, you agree with the following statements:

1. I have been given sufficient information about this research project.

2. I understand that my answers will not be released to anyone and my identity will remain anonymous. My name will not be written on the questionnaire nor be kept in any other records.

3. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity. Only researchers will have access to view any data collected during this research however data cannot be linked to me.

4. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.

5. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.

6. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University

7. I understand that if I have any additional questions, I can ask the research team listed below.

8. I have read and understood all statements on this form.

9. I voluntarily agree to take part in this research project by completing the following survey.

If you have any questions, you may contact:

Name (PI)	Phone number	Email address
Dr. Lama Matar		Lama.matar@lau.edu.lb

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Appendix 8

Consent to participate in a Focus Group

"Assessment of Malnutrition Care and Knowledge in Lebanese Hospitals: A Cross-sectional Study"

I would like to invite you to participate in a research project by taking part of a focus group. I am a student at the Lebanese American University and I am completing this research project as part of my thesis project. The purpose of this focus group is to discuss barriers and facilitators for optimal hospital malnutrition care. The focus group will provide an opportunity for you to find out areas for improvement for the current malnutrition practices at your institution.

There are no known risks, harms or discomforts associated with this study beyond those encountered in normal daily life. The information you provide will be used to enhance and improve the quality of nutritional care provided to hospitalized patients across Lebanon. You will not directly benefit from participation in this study; however it might highlight areas for improvement in your malnutrition management system. This focus group should last no longer than 30 minutes.

By continuing with the focus group, you agree with the following statements:

1. I have been given sufficient information about this research project.

2. I understand that my answers will not be released to anyone and my identity will remain confidential within the focus group to the extent possible. My name will not be written nor be kept in any other records.

3. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity. Only researchers will have access to view any data collected during this research however data cannot be linked to me.

4. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.

5. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.

6. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University

7. I understand that if I have any additional questions, I can ask the research team listed below.

8. I have read and understood all statements on this form.

9. I voluntarily agree to take part in this research project by completing the following survey.

If you have any questions, you may contact:

Name (PI)	Phone number	Email address

Dr. Lama Matar		Lama.matar@lau.edu.lb

If you have any questions about your rights as a participant in this study, or you want to talk to someone outside the research, please contact the:

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