

## Mini Review

# Fighting Malnutrition in Hospitals: A Middle East and Global Perspective

Ouajjan K<sup>1</sup> and Hwalla N<sup>2\*</sup><sup>1</sup>Institute of Global Health, University of Geneva, Switzerland<sup>2</sup>Department of Nutrition, American University of Beirut, Lebanon**\*Corresponding author:** Hwalla N, Department of Nutrition, Faculty of Agriculture and Food Sciences, American University of Beirut, Beirut, Lebanon**Received:** February 21, 2019; **Accepted:** March 22, 2019; **Published:** March 29, 2019**Abstract**

This review highlights the increasing prevalence of hospital malnutrition worldwide and provides evidence for the need to harness global efforts for its identification and management. The review also summarizes the methods currently used to assess malnutrition in hospitals and calls for validation of diagnostic criteria that can be translated into a defined code of disease, which will contribute to prioritizing nutrition care in clinical settings. The review also highlights the need for training healthcare professionals on the application of Nutrition Focused Physical Examination as optimal methodology in the assessment of malnutrition. The review also recommends that studies should include Social Determinants of Health in their approach to combat malnutrition in hospitals in order to have a deeper insight into the etiology and fostering nutrition care as a fundamental part of Human Right to Health.

**Keywords:** Malnutrition; Hospital malnutrition prevalence; Malnutrition diagnosis; Social determinants

**Abbreviations**

ICD: International Classification of Diseases; NFPE: Nutrition Focused Physical Examination

**Background**

Since the publishing of the landmark article “The Skeleton in the Hospital Closet” in 1974, malnutrition in hospitals has been receiving increasing attention due to its direct effect on management of diseases, speed of recovery, and influence on mortality rate [1-3]. Malnutrition begins with worsening of many physiologic functions of the body, weakening the immune system, and delayed wound healing leading to loss of muscle mass and strength [1,4,5]. The consequences of malnutrition in patients will result in increased morbidity, length of stay, nosocomial infections and hospital readmission [5], in addition to 5-fold higher mortality rate than patients with normal nutrition status [6].

Extensive research has been conducted on hospital malnutrition in the recent years and global awareness has been raised. This research focused on investigating the underlying causes and the magnitude of its economic burden in order to develop more targeted recommendations that will put nutrition care as important component of patient care [2,7,8]. The objectives of this mini-review are to review the recent research, conducted at the global level noting its spread, methods used, determinants, and identifying gaps that need to be addressed.

Advances and future directions in the research on hospital malnutrition

The prevalence of malnutrition in hospitals worldwide is reported to range between 20 to 50% with an average of 41.7% [1]. Furthermore, rates of malnutrition have been shown to rise during hospital stay to an extent of 5% increases in weight loss in >12d hospital stay [9]. A recent systematic review on prevalence of hospital malnutrition in

Latin America reports an estimated rate as high as 60% [10]. However other countries report much lower figures derived from hospital databases. The Universal Health System Consortium database in the United States reports a prevalence of 5% based on International Classification of Diseases ICD-10 coding [11]. In fact, coding for malnutrition in ICD-10 is still misclassified and unspecified, resulting in the inappropriate use of the codes for kwashiorkor and marasmus to characterize malnutrition among hospitalized patients leading to lower diagnosis [12]. Global efforts are being exercised to have a standardized unified diagnosis that can be more clearly documented in the ICD than the existing code structure and that are more consistent with the updated research and understanding of hospital malnutrition [2,13,14].

**Optimal Methodologies for Diagnosing Malnutrition in Hospitalized Patients**

Optimal efforts to diagnose malnutrition in hospitals have resulted in a recent consensus by the Global Leadership on Malnutrition who proposed a new diagnostic criterion with well-defined cut-off points [15]. It includes a set of phenotypic and etiologic criteria that incorporates nutrition-focused physical examination NFPE, handgrip strength and if available bioelectrical impedance [15]. This initiative emphasizes two important anthropometric measurements, that are recently being recommended as best practice in measuring malnutrition and its severity in hospitalized patients [16]. Handgrip strength has been shown to be strongly correlated with sarcopenia and an important marker of malnutrition [17,18]. On the other hand, NFPE is rising to become a fundamental step in nutrition assessment requiring specific competencies from healthcare professionals and most specifically from Registered Dietitians [19].

Combining these two optimal measurements with the newly developed diagnostic tools will require further validation studies but constitutes an important step towards standardization and translation

into the accurate ICD code. Accomplishing this goal will enhance the legitimacy and credibility of nutritional practices in hospitals in addition to higher direct hospital reimbursement [11,20].

The reimbursement has been also legitimized by many cost-effectiveness studies affirming that malnutrition is a major driver of increased costs of health care carrying a considerable economic burden, estimated in Europe to be an additional 10% of the national health expenditures [21-23]. The national British report stated that the cost per malnourished subject is 3-4 times greater than that for a non-malnourished subject, and the incremental cost 2-3 times greater than for a non-malnourished subject [24].

## Challenges Identified in the Field

Challenges facing hospital malnutrition can first be identified as gaps in prevalence data especially in developing countries. Although prevalence studies are being done in several countries worldwide, data on global prevalence of hospital malnutrition has not been reported yet. Initiatives to study the prevalence of malnutrition hospitals have been modest in the Middle East [25]. An international multicenter study, has reported a rate of 49% of risk of malnutrition across different specialties in the Middle East region [26]. Turkey has recently published a prevalence rate of 39% in hospitalized patients, of which only half 50% received nutrition support in a multicenter study in Turkey [27]. A major reason for this discrepancy in treatment is mainly due to failure of identification of malnutrition during the hospital stay [28]. Another survey conducted in hospitals in Lebanon has revealed that only one out of 41 hospitals conducts a systematic nutrition screening upon admission [29] and one recent study conducted in one hospital in Lebanon showed a prevalence of malnutrition of 24.8%, of which 50% did not receive proper nutrition intervention [30]. This emphasized the importance of developing policies that implement mandatory screening systems in all health care systems as first step in the efficient management of hospital malnutrition.

## Social Determinants of Malnutrition

Another necessary step in management of hospital malnutrition is to have a deeper insight on the etiology of malnutrition by tackling social determinants. The health status of the person, including its nutritional status, is often affected by its social status. In 2005, the World Health Organization (WHO) Commission on Social Determinants of Health (CSDH) was established because it was clearly demonstrated throughout the years that Social Determinants of Health (SDH) influence the health of populations by having an impact on access, provision, and ability to benefit from health services including nutrition care [31]. However, studies on the impact of social determinants of health and nutritional status have been scarce and focused only on the growth of children [32,33]. A study examining the data from the Healthcare Cost and Utilization Project (HCUP) in the United States has demonstrated a link between the patients' income levels and their nutritional status upon admission to the hospital with more patients with a malnutrition diagnosis falling below the 50th percentile of income [34]. Studies on prevalence of malnutrition should include in their surveys social and economic parameters such as race, urbanization level, household income, level of education in addition to health coverage and source of payment.

All these parameters have been proven to be an integral part of the Social Determinants of Health and facilitate intervention activities [31,34-36]. This insight on hospital malnutrition will be a step towards classifying it under the approach of Human Rights to Health and ensuring that all people have equal access to nutrition care [37,38].

## Conclusion and Recommendations

Global research efforts are being intensified on hospital malnutrition, especially in relation to recognition and diagnosis, in order to validate a defined code in the ICD in order to provide better healthcare for the patients and to structure the reimbursement of nutrition care. The review identified the NFPE as optimal methodology in the assessment of hospital malnutrition and as an important step towards the goal of unifying diagnosis. Training of healthcare professionals on implementing NFPE will provide the tools for measuring prevalence of hospital malnutrition, will narrow the knowledge gaps on hospital malnutrition, and consequently allow for the recommendation of evidence-based intervention strategies to curtail the prevalence of hospital malnutrition in the Middle East and globally.

## References

1. Norman K, Pichard C, Lochs H, Pirlich M. Prognostic impact of disease-related malnutrition. *Clin Nutr.* 2008; 27: 5-15.
2. Steiber A, Hegazi R, Herrera M, Zamor ML, Chimanya K, Pekcan AG, et al. Spotlight on Global Malnutrition: A Continuing Challenge in the 21<sup>st</sup> Century. *J Acad Nutr Diet.* 2015; 115: 1335-1341.
3. Butterworth CE. The skeleton in the hospital closet. 1974. *Nutrition.* 1994; 10: 435-441.
4. Kirkland LL, Kashiwagi DT, Brantley S, Scheurer D, Varkey P. Nutrition in the hospitalized patient. *J Hosp Med.* 2013; 8: 52-58.
5. Schneider SM, Veyres P, Pivot X, Soummer AM, Jambou P, Filippi J, et al. Malnutrition is an independent factor associated with nosocomial infections. *Br J Nutr.* 2004; 92: 105-111.
6. Corkins MR, Guenter P, DiMaria-Ghalili RA, Jensen GL, Malone A, Miller S, Patel V, et al. A.S.P.E.N. data brief 2014: use of enteral and parenteral nutrition in hospitalized patients with a diagnosis of malnutrition: United States, 2010. *Nutr Clin Pract.* 2014; 29: 698-700.
7. Barker LA, Gout BS, Crowe TC. Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. *Int J Environ Res Public Health.* 2011; 8: 514-527.
8. Correia MI, Hegazi RA, Higashiguchi T, Michel JP, Reddy BR, Tappenden KA, et al. Evidence-based recommendations for addressing malnutrition in health care: an updated strategy from the feed ME. *Global Study Group. J Am Med Dir Assoc.* 2014; 15: 544-550.
9. Pichard C, Kyle UG, Morabia A, Perrier A, Vermeulen B, Unger P. Nutritional assessment: lean body mass depletion at hospital admission is associated with an increased length of stay. *Am J Clin Nutr.* 2004; 79: 613-618.
10. Correia M, Perman MI, Waitzberg DL. Hospital malnutrition in Latin America: A systematic review. *Clin Nutr.* 2017; 36: 958-967.
11. Mordarski BA, Hand RK, Wolff J, Steiber AL. Increased Knowledge, Self-Reported Comfort, and Malnutrition Diagnosis and Reimbursement as a Result of the Nutrition-Focused Physical Exam Hands-On Training Workshop. *J Acad Nutr Diet.* 2017; 117: 1822-1828.
12. Tobert CM, Mott SL, Nepple KG. Malnutrition Diagnosis during Adult Inpatient Hospitalizations: Analysis of a Multi-Institutional Collaborative Database of Academic Medical Centers. *J Acad Nutr Diet.* 2018; 118: 125-131.
13. White JV, Guenter P, Jensen G, Malone A, Schofield M; Academy Malnutrition Work Group. Consensus statement: Academy of Nutrition and Dietetics

- and American Society for Parenteral and Enteral Nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *JPEN J Parenter Enteral Nutr.* 2012; 36: 275-283.
14. Steindel SJ. International classification of diseases, 10<sup>th</sup> edition, clinical modification and procedure coding system: descriptive overview of the next generation HIPAA code sets. *J Am Med Inform Assoc.* 2010; 17: 274-282.
15. Cederholm T, Jensen GL, Correia MITD, Gonzalez MC, Fukushima R, Higashiguchi T, et al. GLIM criteria for the diagnosis of malnutrition-A consensus report from the global clinical nutrition community. *Clin Nutr.* 2018; 38; 1-9.
16. Jensen GL, Compher C, Sullivan DH, Mullin GE. Recognizing malnutrition in adults: definitions and characteristics, screening, assessment, and team approach. *JPEN J Parenter Enteral Nutr.* 2013; 37: 802-807.
17. Garcia-Pena C, García-Fabela LC, Gutiérrez-Robledo LM, García-González JJ, Arango-Lopera VE, Pérez-Zepeda MU. Handgrip strength predicts functional decline at discharge in hospitalized male elderly: a hospital cohort study. *PLoS One.* 2013; 8: e69849.
18. Bohannon RW, Schaubert KL. Test-retest reliability of grip-strength measures obtained over a 12-week interval from community-dwelling elders. *J Hand Ther.* 2005; 18: 426-428.
19. Mordarski B. Nutrition-Focused Physical Exam Hands-On Training Workshop. *J Acad Nutr Diet.* 2016; 116: 868-869.
20. Cederholm T, Jensen GL. To create a consensus on malnutrition diagnostic criteria: A report from the Global Leadership Initiative on Malnutrition (GLIM) meeting at the ESPEN Congress 2016. *Clin Nutr.* 2017; 36: 7-10.
21. Correia MI, Waitzberg DI. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis. *Clin Nutr.* 2003; 22: 235-239.
22. Khalatbari-Soltani S, Marques-Vidal P. The economic cost of hospital malnutrition in Europe; a narrative review. *Clin Nutr ESPEN.* 2015; 10: e89-e94.
23. Martinez-Reig M, Aranda-Reneo I, Peña-Longobardo LM, Oliva-Moreno J, Barcons-Villardell N, Hoogendijk EO, et al. Use of health resources and healthcare costs associated with nutritional risk: The FRADEA study. *Clin Nutr.* 2017; 37: 1299-1305.
24. Elia M. The cost of malnutrition in England and potential cost savings from nutritional interventions. A report on the cost of disease-related malnutrition in England and a budget impact analysis of implementing the NICE clinical guidelines/quality standard on nutritional support in adults. 2016.
25. Klek S, Krznaric Z, Gundogdu RH, Chourdakis M, Kekstas G, Jakobson T, et al. Prevalence of malnutrition in various political, economic, and geographic settings. *JPEN J Parenter Enteral Nutr.* 2015; 39: 200-210.
26. Sorensen J, Kondrup J, Prokopowicz J, Schiesser M, Krahenbuhl L, Meier R, et al. EuroOOPS: an international, multicentre study to implement nutritional risk screening and evaluate clinical outcome. *Clin Nutr.* 2008; 27: 340-349.
27. Korfali G, Gündoğdu H, Aydintuğ S, Bahar M, Besler T, Moral AR, et al. Nutritional risk of hospitalized patients in Turkey. *Clin Nutr.* 2009; 28: 533-537.
28. O'Flynn J, Peake H, Hickson M, Foster D, Frost G. The prevalence of malnutrition in hospitals can be reduced: results from three consecutive cross-sectional studies. *Clin Nutr.* 2005; 24: 1078-1088.
29. Abi Saleh W, Bou Khalil P, Ouaijan K, Abillama F, Akiki S, Ahmad N, et al. Evaluation of nutrition support practices: Results from a nationwide survey. *Clin Nutr.* 2018; 37: 1976-1979.
30. Ouaijan K, Lakis C, Khoury M, Diab N. Prevalence of malnutrition and the need for an efficient screening system in a hospital in Beirut. *Clinical Nutrition.* 2013; 32: S231-S232.
31. Costa-Font J, Hernandez-Quevedo C. Measuring inequalities in health: what do we know? What do we need to know? *Health Policy.* 2012; 106: 195-206.
32. Fakir AM, Khan MW. Determinants of malnutrition among urban slum children in Bangladesh. *Health Econ Rev.* 2015; 5: 59.
33. Zhang N, Becares L, Chandola T. Patterns and Determinants of Double-Burden of Malnutrition among Rural Children: Evidence from China. *PLoS One.* 2016; 11: e0158119.
34. Corkins MR, Guenter P, DiMaria-Ghalili RA, Jensen GL, Malone A, et al. Malnutrition diagnoses in hospitalized patients: United States, 2010. *JPEN J Parenter Enteral Nutr.* 2014; 38: 186-195.
35. Commission on Social Determinants of Health Final Report. Closing the gap in a generation: Health equity through action on Social Determinants of Health, WHO, Editor. 2008.
36. Kosaka S, Umezaki M. A systematic review of the prevalence and predictors of the double burden of malnutrition within households. *Br J Nutr.* 2017; 117: 1118-1127.
37. Willen SS, Knipper M, Abadia-Barrero C, Davidovitch N. Syndemic vulnerability and the right to health. *Lancet.* 2017; 389: 964-977.
38. Gruskin S, Dickens B. Human rights and ethics in public health. *Am J Public Health.* 2006; 96: 1903-1905.