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Short Communication

US State Hospital Regulations Rarely Include Malnutrition but Could Provide a Future Policy Framework for Improving Malnutrition Quality of Care

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Abstract

Malnutrition is a problem that is often not identified in hospitals as 8% of hospital patients are diagnosed but malnutrition is estimated to affect 20-50% of patients. Federal programs such as Joint Commission accreditation and the new, optional, global malnutrition composite score from CMS may improve inpatient malnutrition diagnosis, but there may be an opportunity to do more from a regulatory side. It's unknown how many states are considering malnutrition from this standpoint. The study's goal was to collect baseline information on mentions of malnutrition-related terms in state hospital regulations. State hospital regulations were identified in July 2022 using this website https://www.hortyspringer.com/list-links-state-hospital-regulations/ with each regulation double checked each to ensure the most updated guidelines. Hospital regulations from each state plus Washington D. C. (*n* = 51) were searched for number of mentions of nutrition and malnutrition and whether terms were included in a nutrition care section. Nutrition was mentioned in 82% of plans, but only 49% included nutrition in a nutrition care process section. Malnutrition was mentioned infrequently, with only three states (6%) mentioning

malnutrition and only two states (4%) mentioning malnutrition in a nutrition care section. There was only one significant difference in frequency of term mentions by US region (average in Midwest 4.69, in Southeast 24). Incorporating malnutrition and nutrition care processes into state hospital regulations and defining enforcement of regulations may help increase inpatient identification of malnutrition.

Keywords
Malnutrition; older adults; quality of care; hospital; US State hospital regulations

1. Introduction

Malnutrition is defined as an acute, subacute, or chronic state of nutrition, in which a combination of varying degrees of overnutrition or undernutrition with or without inflammatory activity have led to a change in body composition and diminished function [1]. Both underweight and overweight individuals can be malnourished [2] and food insecurity as a social determinant of health can increase risk for malnutrition [3]. Older adults are especially at higher risk of malnutrition because of higher rates of disease-associated, function-associated, social/mental health-associated, and hunger/food insecurity-associated risk factors as compared to the general population [4].

Malnutrition has a significant impact on patients and the health care system, including contributing to decreased quality of life, increasing lengths of hospital stays and re-admission rates, and raising healthcare costs [5]. Best practice guidelines recommend specific steps needed to effectively identify and treat malnutrition in the hospital [1, 6]. These guidelines include routine malnutrition risk screening, nutrition assessment, malnutrition diagnosis, and tailored nutrition intervention to correct or prevent further nutritional decline.

However, though the problem of malnutrition in hospitals seems to be well-known, its routine identification and treatment has continued to lag in the United States (US) [4] since the condition was first identified nearly 50 years ago [7].

In the US, there have been several recent federal policy and research-related advancements which may help improve malnutrition quality of care. One policy advancement: in 2022, the Centers for Medicare & Medicaid Services (CMS) adopted the Global Malnutrition Composite Score measure in the CMS Inpatient Hospital Quality Reporting Program. This is the first nutrition-focused quality measure to be included in any CMS payment program and CMS indicated that hospitals have an opportunity to identify malnutrition during the patient admission process and to address it efficiently and effectively with interventions to optimize outcomes [8]. In 2021, the Agency for Healthcare Research and Quality (AHRQ) published a systematic review of malnutrition in hospitalized adults, and its conclusions included that malnutrition-focused, hospital-initiated interventions likely reduce mortality and may improve quality of life for patients diagnosed with malnutrition [9]. Additionally, the National Institutes of Health Office of Nutrition Research held a workshop in 2022, “Malnutrition in Clinical Settings: Research Gaps and Opportunities,” whose goals included examining research to “understand, measure, and address malnutrition in clinical settings considering access to health care services and special populations to promote health equity” [10]. A report from the workshop is expected to be forthcoming.

Older adults are particularly at risk of malnutrition. Those 85 and older have the highest incidence of malnutrition-related hospital stays at 35 times the rate of 18–39-year-olds and 8.6 times rate of 40-64 year-olds [11]. In addition, both acute and chronic conditions have the potential to result in or aggravate malnutrition and require a tailored approach [12].

Advocates have called for such steps to help improve the quality of malnutrition care for older adults. They have also made recommendations for policy actions at the state level [4]. The 2022 *Biden-Harris Administration National Strategy on Hunger, Nutrition, and Health* also recognized the need for state-level actions in commenting that the federal government cannot make transformative changes alone and accelerating work on hunger, nutrition, and health will require actions by states and other partners [13]. Through legislation, some states have established malnutrition prevention commissions and taken other actions focused on quantifying and addressing older adult malnutrition [14]. In addition, several states have passed laws requiring or encouraging hospitals to offer healthier foods [15]. However, to date there have been no state bills passed specific to quality malnutrition care in hospitals.

In the absence of state legislation, state regulations play an even more critical role in shaping the quality of care that patients receive, including the provision of adequate nutrition care in the hospital. Indeed, US hospitals are regulated at every level of government--federal, state, and local--with many details determined at the state level, like licensure of medical professionals as well as the processes through which hospitals follow federal mandates such as those set forth in the federal Medicare Conditions of Participation (CoP) regulations. The CoP regulations do not specifically address malnutrition, but require hospitals to have “procedures that ensure that the nutritional needs of inpatients are met in accordance with recognized dietary practices” [16].

Explicitly incorporating malnutrition into state hospital regulations could help increase inpatient identification and treatment of malnutrition and serve as a future framework for improving malnutrition quality of care. However, it is important to first determine whether and how malnutrition is currently part of state hospital regulations, including as part of nutrition regulations. Thus, this research sought to provide baseline information on the inclusion of nutrition and malnutrition in existing state hospital regulations.

2. Materials and Methods

2.1 Study Sample

The study sample was comprised of all publicly available US state hospital regulations. In July 2022, 51 current hospital regulations (50 states and Washington D.C.) were reviewed, using links identified through a legally compiled list of state hospital regulations [17] dates (as available) for each state’s regulations were recorded and individual web searches via google search engine were conducted to identify any more current versions of the state’s hospital regulations. Hospital regulations from each state and Washington D. C. (n = 51) were then searched, using a standard document search function, for number of mentions of “nutrition” and “malnutrition” and whether the terms were included in a specific nutrition care section within the regulations.

2.2 Measurement and Statistical Analysis

This baseline information study sought to quantify frequency of mentions in state hospital regulations of the terms nutrition and malnutrition. The goal was to quantify both the overall number of mentions as well as the specific number of mentions in a nutrition care process section (if such a section was included as part of the state regulations). The nutrition care process is defined as a systematic approach to providing high quality nutrition care and consists of four distinct, interrelated steps: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring/evaluation [18]. Mentions in a nutrition care process section was evaluated to identify instances where term mentions were related to nutrition care versus instances where the terms were related to food service.

The percentage of state hospital regulations mentioning at least one of the defined terms was calculated. Means, standard deviations, and quartiles were estimated for each of the defined terms. To determine any potential regional variations in mentions in state regulations, states were grouped by US region: Midwest, Northeast, Northwest, Southeast, and Southwest; the average mentions in each region were calculated, and an analysis of variance with post hoc Tukey Test was completed to assess significance. To determine any potential variations in mentions in state regulations among states with a greater number or percentage of older adults, state older adult population (aged 65 years and older) size and percentage were identified from 2020 U.S. Census data [19]. Differences between groups were tested using generalized linear models to calculate the F statistic and all significant differences reported were significant at the $p < 0.05$ significance level using graphpad.com.

3. Results

3.1 Nutrition and Malnutrition Mentions

Nutrition was mentioned in 82% of state regulations (mean 12 +/- 16), but only 49% included nutrition in a specific nutrition care process section (mean 2 +/- 3) (Figure 1 and Table 1). Malnutrition was only mentioned five times across all state regulations, with three states (6%) mentioning malnutrition generally and only two states (4%) mentioning malnutrition in a specific nutrition care section (Figure 1). Nevada and Colorado mentioned malnutrition in relation to the nutrition care process and Pennsylvania mentioned malnutrition in the context of death notification.

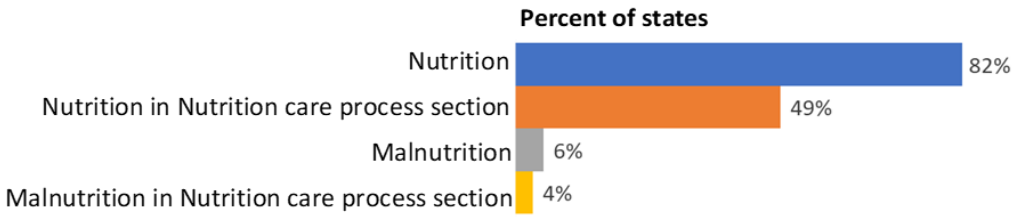

Figure 1 Percentage of 51 state/Washington D.C. state hospital regulations with at least one mention of nutrition and malnutrition terms.

Table 1 Descriptive statistics for number of mentions of nutrition, malnutrition in state hospital regulations.

Terms searched	mean	standard deviation	**25th quartile**	**Median**	75th quartile
Nutrition (total, does not include malnutrition)					
Number (#) overall mentions	12	16	2	7	17
Number (#) mentions in Nutrition Care Process Section	2	3	0	0	3
Malnutrition					
Number (#) overall mentions	0	0.2	0	0	0
Number (#) mentions in Nutrition Care Process Section	0	0.2	0	0	0

Figure 2 depicts the term nutrition by quartile of total nutrition mentions and shows with stars the US states that had mentions of malnutrition.

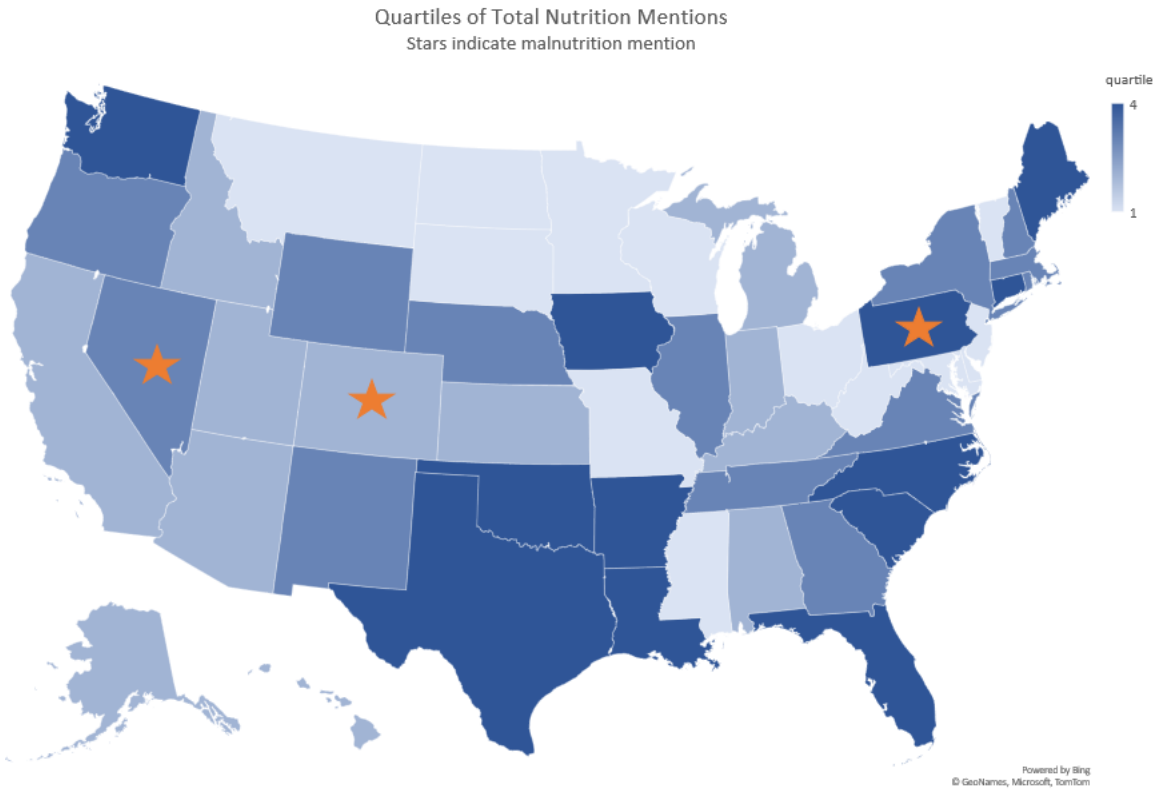

Figure 2 US States by quartile of nutrition mentions in state hospital regulations and also indication of malnutrition mention.

3.2 Nutrition and Malnutrition Mentions by US Region

There was a significant difference between overall nutrition mentions in state hospital regulations and US region between the Midwest and Southeast (data not shown, supplemental Table 1, Midwest mean 4.69, Southeast mean 24, Tukey HSD p = 0.029). However, there were no significant differences in frequency of nutrition mentions in a nutrition care process section in state

hospital regulations by US region (data not shown, Table S1). The number of malnutrition mentions in state hospital regulations were too low to evaluate by region.

3.3 Nutrition and Malnutrition Mentions by Older Adult Population

To test whether US states with a large proportion of older persons might give more attention to nutrition in state hospital regulations, the number of mentions for overall nutrition mentions and nutrition in a nutrition care process section were compared among states using linear regression. No significant association was found between number of older adults or percent of state population of older adults and total nutrition mentions or nutrition mentions in a nutrition care process section (data not shown, Table S2). The number of malnutrition mentions in state hospital regulations were too low to evaluate by region.

4. Discussion

As a baseline information study, this research identified that overall, very few US state hospital regulations mention malnutrition and less than half of state hospital regulations specifically mention nutrition in a nutrition care process section. Although there was a significant difference between overall nutrition mentions in state hospital regulations and US region between the Midwest and Southeast, in general nutrition mentions in state hospital regulations did not appear to correlate with US region or the size or proportion of a state's older adult population.

The rationale for lack of inclusion of malnutrition in state hospital regulations is unknown. Of the three states mentioning malnutrition in state hospital regulations, only two (Nevada and Colorado) mentioned malnutrition in relation to the nutrition care process. Both states also issued Malnutrition Awareness Week^{R} proclamations in 2022, but so did 29 other states according to A. Blackmer from the American Society for Parenteral and Enteral Nutrition (personal communication, March 31, 2023). In addition, the three states that have the highest documented malnutrition death rates among older adults (New Mexico, South Carolina, and Utah) did not have any malnutrition mentions at all [20]. It may have been assumed that federal regulations and Joint Commission requirements are adequate. However, such an assumption is not accurate. As previously mentioned, the federal CoP regulations do not specifically address malnutrition [13]. The Joint Commission is an independent, not-for-profit accreditation body who sets standards in healthcare and accredits over 22,000 healthcare organizations. The Joint Commission accreditation is voluntary but passing an accreditation survey (about once every 36 months) indicates a hospital meets the federal regulations necessary to receive payment from Medicare and Medicaid programs [8, 21]. Although The Joint Commission requires that hospitals screen for risk of malnutrition as part of the general admission process, hospital practices vary [21]. Further, state-level regulations can offer advantages over one-size-fits all federal regulations. Also, while states do routinely inspect hospitals for compliance with regulations, having specific requirements such as inclusion of malnutrition in a specific nutrition care process section could help set a clearer path of operations for the hospitals to follow in-between inspections.

The finding that states rarely mention malnutrition in state hospital regulations presents an opportunity for change that could serve as a future framework for improving malnutrition quality of care. There are several reasons why leveraging of this opportunity is important. First, older adults have a heightened risk for malnutrition that occurs with age [22], and while malnutrition is

diagnosed in about 8% of hospital stays [11], this is much lower than the estimated 20-50% of hospital patients believed to be malnourished [23]. Older adults represent the largest proportion of hospitalized patients [24]. Even though in the baseline study, nutrition mentions in state hospital regulations did not appear to correlate with the size or proportion of a state's older adult populations, as the older adult population continues to represent a greater a percentage of total US population and individual state populations, there will likely be increasingly more hospital patients who are malnourished.

A second reason to consider including malnutrition in state hospital regulations is to help save healthcare costs. As previously mentioned, malnutrition leads to increased hospital readmissions, medical complications, and costs [5]. Goates et al have estimated the direct medical costs attributable to disease-associated malnutrition at the state level, ranging from an annual cost of $36 per capita in Utah to $ 65 per capita in Washington DC, with older adults bearing a disproportionate share of this cost [25]. Nutrition-focused quality improvement programs can help improve hospital malnutrition care process and have been associated with total cost savings of over $ 4.8 million from reduced 30-day readmissions and hospital stays [26].

A third reason is to build on CMS's recent adoption of the Global Malnutrition Composite Score as a quality measure in its Inpatient Hospital Quality Reporting Program [4]. In adopting the composite measure, CMS recognized the significance of malnutrition quality care in impacting hospital health care outcomes. Similarly, Connecticut identified malnutrition's impact on quality care when it passed House Bill 7338 in 2019, which requires their Department of Public Health, "as part of its quality-of-care program for licensed health care facilities, to develop recommendations on collecting and analyzing patient malnutrition data to improve quality of care" [27].

A fourth reason to consider adding malnutrition in state hospital regulations is to improve health equity. There is an inherent connection between malnutrition, food insecurity, and health equity [28] and CMS specifically adopted the Global Malnutrition Composite Score measure as a health equity measure [4]. A 2021 *Health Equity Scorecard* of state-by-state racial and ethnic disparities found all states' healthcare systems were failing people of color [29].

Finally, another reason to include malnutrition in state hospital regulations is that it could help strengthen the outcomes of other health policy actions states are already taking related to older adult malnutrition in their communities. The federal Administration on Community Living, which administers Older Americans Act community-based nutrition programs, has issued guidance that state aging plans effective on/after October 2022 are now required to address malnutrition in their future nutrition programming [30]. It makes sense to start this process in the hospital. Hospitals can identify malnutrition during patient admission and the initial stay through malnutrition screening and nutrition assessment, then document a malnutrition diagnosis, begin to address malnutrition with a nutrition care plan, and finally find community-based nutrition programs/services for continued nutrition interventions as patients transition out of the hospital. Identifying and intervening for malnutrition in the hospital can also help in determining older adults who will benefit from community-based nutrition programs and services and in effectively connecting older adults to those resources post-discharge [31].

This research on the inclusion of nutrition and malnutrition in existing US state hospital regulations has both strengths and limitations. It is one of the first studies to make such an evaluation and thus provides baseline information which could be helpful to state policymakers as

they revise and develop future hospital regulations. The results of the study could also be used to measure future progress against and for further research on state health and nutrition policy.

Limitations of the study include that it is a baseline screen versus a formative regulation evaluation; the method used to identify mentions was a simple count and could have had errors; and, while attempts were made to find the most current state hospital regulations, there could have been newer regulations released. Very few states mentioned malnutrition, making it difficult to examine factors potentially underlying malnutrition mentions. Further, we were not able to focus on older adult-specific mentions of malnutrition in hospital regulations as older adult malnutrition was not specified in any state hospital regulations. Additionally, as was found in a paper using similar methods to determine malnutrition mentions in State Plans on Aging [32] it can be difficult to untangle when nutrition mentions apply to food service versus clinical nutrition care.

Additionally, states vary in their amount of regulation and the degree of state hospital regulation could have affected our results. Quantification of state hospital regulations or a comparative analysis of mentions of other diseases/medical conditions in state hospital regulations was beyond the scope of our study. We did not find other papers that explored specific disease/medical condition mentions in state hospital regulations. Mercatus Center of George Mason University has conducted an analysis of overall regulation in 49 states [33]. The three states we found with malnutrition mentions (Pennsylvania, Nevada, and Colorado) were among the mid (Pennsylvania and Colorado had <175,000 state regulations) and lower (Nevada had <75,000 state regulations) tiers of amount of state regulation compared to a state like California which had nearly 400,000 state regulations. Thus, it would appear that the overall amount of state regulation is not necessarily linked to the number of malnutrition mentions in state hospital regulations. Finally, although we did not consider differences in state insurance regulations, this was not viewed as a limitation because nutrition and malnutrition care are included under the general coverage/reimbursement of the overall hospital stay and are not separately reimbursed."

5. Conclusions

Malnutrition among hospital patients, particularly older patients, is common and impacts health outcomes but often remains undiagnosed and untreated. Policy actions can help call attention to the issue. US federal policy actions, including CMS adoption of the Global Malnutrition Composite Score measure, are already beginning to do so. Less is known about state policy actions. This baseline information study identified that malnutrition is rarely mentioned in state hospital regulations but presents an opportunity for change. This is important because older adults are at increased risk for malnutrition, malnutrition leads to poorer health outcomes, increased costs, and is a quality issue. Malnutrition is also linked to health equity. States are already taking action to address malnutrition in older adults served by community nutrition programs. Including malnutrition in state hospital regulations can provide a future framework for better leveraging these community nutrition programs and thus improving malnutrition quality of care in US states.

Author Contributions

LB contributed to data collection, data analysis, and manuscript preparation. MW contributed to data analysis and manuscript preparation.

Competing Interests

The authors have declared that no competing interests exist.

Additional Materials

The following additional materials are uploaded for this paper:

1. Table S1: State Hospital Regulation data (excel file)
2. Table S2: Older adult population by state (excel file).

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