Attitudes toward the American nutrition guidelines for the critically ill patients of Chinese intensive care physicians

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Running Title: Nutrition practice in Chinese ICUs

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Abstract
Nutrition therapy is essential for the management of critically ill patients. Some guidelines have been published to standardize and optimize the nutrition therapy. However, there are still many controversies in nutrition practice and there is a gap between guidelines and clinical nutrition therapy for patients in intensive care units (ICUs). This study aimed to assess attitudes and beliefs toward nutrition therapy of Chinese intensive care physicians by using the American guidelines as a surrogate. A questionnaire was sent to 45 adult ICUs in China, in which surveyed physicians were asked to rate their attitudes toward the American guidelines. A total of 162 physicians from 45 ICUs returned the questionnaires. Physicians were categorized into groups according to their professional seniority, hospital levels and whether they were members of Chinese Society for Parenteral and Enteral Nutrition (CSPEN). Overall, 94% of the respondents thought that nutrition therapy for critically ill patients was very important, and 80% mentioned that they used the American guidelines. There was diversity of opinion on the recommendations pertaining to nutrition assessment, supplemental parenteral nutrition and cutoff values for gastric residual volume, negative or neutral attitudes about these recommendations were 43%, 59% and 41%, respectively. Members of CSPEN were more likely to select a greater strength of recommendation than non-members. In conclusion, the overall attitudes of Chinese intensive care physicians toward the American guidelines were positive. Nevertheless, given the great guideline-practice gap, nutrition-focused education is warranted for many intensive care physicians in China.

Key Words: nutrition therapy, clinical practice guidelines, intensive care units, survey, China

INTRODUCTION
Nutrition therapy has increasingly been recognized as an essential element in the management of critically ill patients, and it is associated with reduced infectious complications, decreased
length of hospital stay and mortality. Currently, controversies exist in many aspects such as the best administration route, the optimal initiation time, the appropriate number of calories, and type of nutrients. Under this circumstance, several sets of clinical practice guidelines had been published in the past few years to standardize and optimize clinical nutrition therapy for critically ill patients. Also, a number of studies have investigated the attitudes and practices about nutrition therapy of medical staff in diverse ways and demonstrated that the gap between guidelines and clinical practice was considerable. The guidelines of Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN) (the American guidelines) are widely used among many Chinese intensive care physicians. Although nutrition therapy is generally provided in all Chinese intensive care units (ICUs), there are few empirical data available as to the attitudes and beliefs toward nutrition therapy for critically ill patients amongst Chinese intensive care physicians. Hence, we conducted a study to explore the nutrition therapy pattern of Chinese intensive care physicians by using the American guidelines as a surrogate.

The primary aim of this study was to assess current attitudes and beliefs pertaining to the American guidelines of Chinese intensive care physicians. Our secondary aim was to explore whether the perceptions and practice patterns differ among physicians of different backgrounds, so as to facilitate future education.

METHODS

This study was conducted in 45 adult ICUs in China, the participating ICUs were randomly selected from the directory of the 3rd Chinese National Critical Care Conference held in Hangzhou, and almost all ICUs in China sent representatives to attend that conference. A questionnaire was sent to 45 physicians from these ICUs by email or mail with postage-paid, pre-addressed envelopes. These 45 contact physicians were encouraged to distribute the questionnaire to colleagues. The study was approved by the ethics committee of Sir Run Run Shaw Hospital (SRRSH) with a waiver of consent form (Ethics Approval Number: 20110510). Non-respondents were sent a minimum of one reminder letter or email 2 weeks after the first mailing. The total survey period was from December 2011 to March 2012.

The survey was composed of 2 parts (Appendix 1, supplementary file). In part 1, there were 10 questions including demographics characteristics of the respondents, their beliefs regarding nutrition therapy and clinical practice guidelines, specifically about the American guidelines. Physicians were categorized into groups according to their professional seniority, hospital levels and whether they were members of the Chinese Society for Parenteral and Enteral
Nutrition (CSPEN). Professional seniority was grouped into attending, fellow and resident physicians, respectively. Levels of hospital were categorized into “tertiary hospital (level A)”, “tertiary hospitals (level B)” and “secondary hospitals” according to Chinese hospital classification system\textsuperscript{18}. While in part 2, physicians were asked to give their strength of agreement for 26 pre-selected items of nutrition practice. These 26 questions were excerpted from the American guidelines by intensive care physicians of SRRSH through a pilot test. The grade of the response options included five ranks: “strong agreement”, “agreement”, “don’t know”, “disagreement” or “strong disagreement”, depending on a typical five-level Likert scale.

Statistical analysis was performed using SPSS for Windows (Version 16.0, SPSS Inc., Chicago, Ill). Descriptive statistics were used to describe physicians and their response options. Independent samples Student’s t-test or one way analysis of variance was used to compare general attitudes toward the American guidelines. Fisher's exact test was used to compare differences toward specific nutrition recommendation. Profile analysis was conducted to compare general attitudes toward 26 recommendations among physicians in different groups. Profile analysis is a version of multivariate analysis of variance applied when several dependent variables are measured on the same scale (or on scales with the same properties). Profile plot and three hypotheses known as parallelism, level and flatness were accomplished using the repeated measures module under General Linear Model in SPSS\textsuperscript{19-21}. Statistical significance was defined as $p < 0.05$.

RESULTS
A total of 245 questionnaires were distributed and 162 physicians (66.1%) from 45 adult ICUs responded. Baseline characteristics of the respondents were shown in Table 1. As expected, the majority of the respondents (93.8%) agreed that nutrition therapy for critically ill patients was “very important” (Appendix 2, supplementary file). All respondents stated that they were currently using guidelines for nutrition therapy, and 70 (43.2%) referred to more than one set of clinical practice guidelines. Of which, 80.2% used the American guidelines, the next most commonly used guidelines were the Chinese Society of Intensive Care Medicine nutrition guidelines published in 2006 (37.0%) , followed by the European Society for Clinical Nutrition and Metabolism guidelines (European guidelines) (29.6%), and the Canadian Critical Care Nutrition Clinical Practice Guidelines (1.2%) .

Approximate 80% of physicians were either “very familiar” or “somewhat familiar” with the American guidelines, with the members of CSPEN being more familiar than the non-
members (86.0% vs. 75.6%, $p = 0.010$). Eighty (49.4%) physicians stated that they believed the American guidelines represented “best practice” for nutrition therapy for critically ill patients, while 42 (25.9%) physicians thought it was not the “best practice”, the members of CSPEN were more likely to be positive in this context than the non-members (67.4% vs. 42.9%, $p < 0.001$). When asked whether the American guidelines would improve the outcomes for critically ill patients, more than 80% of the respondents stated “yes”, with the members of CSPEN (93.0% vs. 79.0%, $p = 0.025$) being more optimistic than the non-members.

The strength of agreement provided by physicians for each specific nutrition recommendation was conducted by profile analysis outlined in appendix 2 (supplementary file). Overall, physicians endorsed the nutrition practices by responding “strong agreement” or “agreement”. Profile analyses were performed with physician categorization as the grouping variables and Likert scores (Response scale to each item: “strong agreement”=1, “agreement”=2, “don’t know”=3, “disagreement”=4 or “strong disagreement”=5) as dependent variables. For members and non-members, profiles were non-parallel (parallelism test $F (25, 136) = 2.080$, $p=0.004$), nor coincident (level test, $F (1, 160) = 29.852$, $p<0.001$), nor flat (flatness test, $F (25, 137) = 43.412$, $p<0.001$), indicating that a significant difference was found between members and non-members, thus members were more likely to select a greater strength of recommendation than non-members (Figure 1). For physicians of different hospital levels, profiles were parallel (parallelism test, $F (25, 136) = 1.139$, $p=0.309$), but neither coincident (level test, $F (1, 160) = 4.380$, $p=0.038$) nor flat (flatness test, $F (25, 137) = 43.412$, $p<0.001$), indicating that general attitudes toward clinical practice guidelines were similar between physicians of different hospital levels (Figure 2). However, differences existed in the choices of specific recommendation, profile analysis of data from physicians of different professional seniority received similar conclusions (parallelism test, $F (25, 136) = 1.533$, $p=0.064$; level test, $F (1, 159) = 4.792$, $p=0.010$; flatness test, $F (25, 137) = 43.412$, $p<0.001$) (Figure 3).

**DISCUSSION**

In this study, we conducted a nationwide survey to explore discordance in the nutrition-related perceptions and practice patterns of Chinese intensive care physicians by using the American guidelines as a surrogate. Overall, attitudes toward these guidelines were positive. The majority of physicians thought nutrition therapy was very important and the use of guidelines would improve clinical outcomes. There was discordance between the utility and the familiarity of the American guidelines, 80.2% of the respondents stated they used the
guidelines, but the proportion of “very familiar” was 19.1%, this disparity may be explained by the fact that systemic learning has been organized in only a few ICUs although the American guidelines and other guidelines such as the European guidelines were also widely used among Chinese intensive care physicians.

Some guidelines were often contradictory with practice at individual institutions. First, the American guidelines depreciated the value of traditional nutrition assessment tools (albumin, prealbumin, and anthropometry) in critical care. Overall, only 56.8% of the respondents agreed with the recommendation. For critically ill patients, traditional nutrition assessment tools are of little utility once the patient's nutritional status has been altered by the acute process and its treatment. Second, the guidelines indicated late initiation of supplemental parenteral nutrition (PN). In our study, 41.4% of the respondents agreed with recommendations. The recommended time to start supplemental PN by the American guidelines is greatly different from the European guidelines. There seems to be no consistent answer based on the available literature. However, a recent large study provided valuable data to support later initiation of supplemental PN. Third, the American guidelines recommended a higher cutoff value for gastric residual volume (GRV) of 500ml. Forty-two of the respondents had negative opinions of this recommendation, indicating that their acceptable cutoff was lower than 500 ml. GRV is regarded as an important indicator of monitoring the gastrointestinal intolerance in patients with enteral nutrition (EN), since elevated GRV represents the most common reason for interrupting EN and not reaching target enteral feeding rates. However, recent data demonstrated GRV was not correlated well with the measurements of gastrointestinal intolerance or the incidence of ventilator-associated pneumonia. Nevertheless, physicians who disagreed with guidelines might have a high level of knowledge and be familiar with the evidence, and thus may disagree with the recommendations in the guidelines. Moreover, it is well-recognized that guidelines were based on the best available evidence at the time they were published. Hence, few of them were perfect on the time of publication of this paper. Nevertheless, with the newer evidence, some recommendations would be updated.

Members of CSPEN would be more likely to receive training materials from CSPEN and had more opportunity to participate in conferences about nutrition therapy with peers from other countries. Our survey consistently demonstrated that members were more likely to choose a greater strength of recommendation, and found significant differences between members and non-members, indicating members tended to follow more evidence-based practice in nutrition therapy. It was also probable that the more skilled physicians in the
nutrition therapy would be more prone to answer to the questions. Unexpectedly, junior physicians had a similar familiarity and awareness with guidelines compared with their senior counterparts. It is possible that residents in training may be taught about evidence-based practice while older physicians had less information on this new approach. This was consistent with other studies that fellow physicians tended to be more evidence-based than attending or resident physicians.\textsuperscript{14}

Evidence-based clinical practice guidelines provide a comprehensive way to assist physicians in making treatment decisions, and have been recognized as a useful method of translating evidence into practice.\textsuperscript{26-28} However, evidence-practice gaps are common in clinical practice, with 30\% of hospitalized patients receiving care inconsistent with current best evidence.\textsuperscript{2} Theoretically, physicians’ attitudes and beliefs toward the guidelines was a mirror of their actual clinical practice. Nevertheless, we found that physician’s actual clinical practice patterns did not seem to be influenced by the grade of specific nutrition recommendation, and this was consistent with previous studies that self-reported practice might not represent the actual practice.\textsuperscript{29} Studies have also shown that despite inadequate knowledge, professionals feel confident to make decisions regarding nutrition therapy.\textsuperscript{15, 30} In addition, the level of nutrition recommendations were generally on the low side of the American guidelines. Future studies involving randomized controlled trials research is likely to, increase the evidence base for scientific nutrition therapy.

The lack of a national accredited critical care training programs and the shortage of dietitians are believed to be major obstacles for improving education for nutrition therapy in China.\textsuperscript{17} In contrast to other international surveys,\textsuperscript{11-15} we found that nutrition-related training for Chinese intensive care physicians was incomplete and the degree of knowledge on nutrition for the critically ill patients was insufficient.

Our study had several limitations. First, we could not avoid the selection bias because it was based on an e-mail combined postal questionnaire and distributed in each respondent’s department, and the survey did not involve all potential respondents. Second, our survey did not including other intensive care staff such as dieticians, nurses, and clinical pharmacists; the awareness among these staff about nutrition therapy is also of paramount importance for the overall management of patients in ICU. The third limitation is the excerpt of provisions from the American guidelines was completed in our ICU only, and we believe that a selection bias is probable. In addition, we cannot be certain the reported attitudes of the respondents were a true reflection of their daily nutrition practice.

In summary, the study demonstrated that attitudes among Chinese intensive care physicians
toward the American guidelines were positive, and that the majority used guidelines in clinical practice. However, evidence-practice gaps were common in clinical nutrition practice. The degree of knowledge on nutrition for the critically ill is insufficient, and thus nutrition-focused training is warranted.

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CONFLICT OF INTEREST:
The authors declared no conflict of interest.

REFERENCES


Table 1. Baseline Characteristics of Physicians (n=162)

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Figure 1. Mean Likert scores for members of Chinese Society for Parenteral and Enteral Nutrition (CSPEN) and non-members.
Figure 2. Mean Likert scores for physician from “tertiary hospitals (level A)” and “tertiary hospitals (level B) and secondary hospitals”.
**Figure 3.** Mean Likert scores for attending, fellow and resident physicians.