



Contents lists available at ScienceDirect

e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism

journal homepage: <http://www.elsevier.com/locate/clnu>

Original Article

Nurses estimating body weight and height to screen for malnutrition in bedridden patients: Good practice?

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ARTICLE INFO

Article history:

Received 25 February 2011

Accepted 25 June 2011

Keywords:

Nursing
Practice nursing
Nutrition
Bedridden
Nursing research

SUMMARY

Background & aims: Body height and weight are required to screen for malnutrition. In practice, body weight and height are at times estimated based on nurses' own judgements. How accurate are nurses' estimations of body weight and height?

Methods: Body weight and height of a volunteer simulating a bedridden patient was to be estimated by qualified nurses.

Results: One-tailed *T*-tests on the difference scores of the estimated and measured variables yielded significant results for weight and height, but not for body mass index suggesting significant differences between estimated and real parameters of weight and height. Multiple regression analyses showed no significant effect of nurses' body weight or height on the difference score, nor did the nurses' body mass index, age, gender and years of job experience yielded any significant results on any of the difference scores. **Conclusions:** Nurses' estimations for weight and height are not accurate. One in four nurse participants classified the patient into a wrong category of body mass index. Deviations in estimated versus measured body weight and height are not influenced by nurses' own body weight and height nor by their age, gender or years of job experience. These results are discussed in the line of existing research.

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1. Introduction

Disease-related malnutrition is a common problem in hospitalized patients with prevalence rates up to 60% and massive overall cost to society.¹ It has a negative impact on the outcome, leads to prolonged recovery, increases the need for high-dependency nursing care and increases morbidity and mortality.^{2–7}

More attention to nutritional care should positively affect the prevalence of malnutrition in healthcare, as well as the consequences and costs, hence identification and treatment of malnutrition is important. Therefore, the first step in an evidence-based

approach of malnutrition is screening and assessment. Since Registered Nurses (RN's) have close and continuous contact with patients, they are in an ideal position to screen or assess for malnutrition.⁸ The measurement of body weight and height to calculate body mass index (BMI) is a major part of various nutritional screening and assessment tools.⁹ Therefore, body weight and height should be assessed accurately as a routine procedure at hospital admission for all patients.^{10,11}

Medical anamnesis in combination with a clinical examination is the traditional start not only of the 'nursing process' but also of any form of clinical assessment. Although simple in essence, body weight and height require the immediacy of accurate, calibrated tools as well as a competent and watchful observer. These measurements are easily adopted with healthy volunteers but may be somewhat more laborious with sick, disabled or elderly patients. Research demonstrated that bed confinement or difficulties in maintaining erect and standing position, lack of appropriate material, lack of knowledge and lack of time are the most prominent factors limiting the systematic measurement of body weight and height in hospitalized patients.^{12–14} Consequently, this might explain why adult patients' height and weight records at admission

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to clinical and surgical units are at times based on information provided by the patient, a relative or even the subjective estimation of the nursing staff. Moreover, due to mobility problems or when patients are too sick, unconscious or bedridden, nurses might depend on their subjective estimations of body height and weight instead of obtaining an actual objective measurement.¹⁵

The results of a national survey, including 60 hospitals and 12,332 patients, showed that body height was actually measured in 5,209 patients or 42.2% of the total study sample.¹⁶ Moreover, what this study demonstrated was that body height was estimated in 1091 or 8.8% of this patient population. These data suggest that in 1 out of 10 cases, body height was estimated by the nursing staff and not actually measured.

One can question to what extent these estimations are influenced by nurses' own body shape. In this line, Rasmussen and colleagues¹⁷ investigated the magnitude of self-reported height and weight biases in a sample of adolescents. The data showed that adolescents who were less satisfied with their body size showed larger biases in their self-reported height and weight as compared to subjects who were satisfied with their body size. Brown and Thompson¹⁸ studied primary care nurses' attitudes, beliefs and self-perceptions of body size in relation to their communication towards patients. They found that nurses' own body size influenced the nature of their interventions. In addition, Brown¹⁹ also found that nurses' attitudes towards obese patients were influenced by age, gender, work experience and their own BMI. These studies clearly demonstrate that weight and height are at times estimated based on nurses own judgements rather than actually measured. Furthermore, these studies also suggest that estimations of body measures might be biased. Yet, research confirming the latter is sparse.

Most existing research investigating the accuracy of measurements of body weight and height have been performed in the context of obesity.^{17–22} These results, only to be generated to an obese patient population, demonstrated that a number of variables including nurses' own weight and body mass index influence their attitudes towards obese patients. However, it is unclear whether these variables also influenced the quality of their estimations.

1.1. Relevance to clinical practice

Best practice in malnutrition is based on screening every new patient. Most obligatory tools contain BMI and recent loss of weight. The quality of the screening process, and by enlargement the nutritional care process, is not only based on the choice for the best suitable tool but also on the best way of determining body weight and height.

1.2. Aim

In the present study, we wanted to examine whether estimated values for body weight and height of a non-obese volunteer simulating a bedridden patient, made by nurses are accurate. We hypothesized that data based on observational estimations differ significantly from measured data (golden standard). We also investigated to what extent these estimations might be influenced by the nurses' own body mass index or other parameters such as gender, age and work experience.

2. Method

2.1. Study design

In the present exploratory study, we made a simulation of a non-obese normal fed bedridden patient whose body weight and height were to be estimated by registered nurses. This experiment was set

up at an educational stand during a national nursing congress.²³ The theme of the congress was 'Malnutrition in Health Care'.

2.2. Subjects

Participants ($N = 58$) were randomly selected on the basis of volunteered participation and they were all registered nurses attending the congress. Their mean age was 27.5 years ($SD \pm 4.94$) and 43 (74%) were female.

2.3. Measures

Body weight was measured with a calibrated weigh chair (SECA Model 954 1309103, maximum 200 kg and $d = 0.1$ kg) and height with a stadiometer, attached to the weigh chair (SECA model 221, maximum 230 cm and $d = 0.5$ cm).

2.4. Procedure

We used a non-obese 19 year old male volunteer as a patient. Before the actual start of the experiment, we measured his body weight (65.2 kg) and height (175.5 cm) and calculated his current body mass index (21.91 kg/m^2).

During the entire experiment, the volunteer remained in bed, simulating a bedridden patient. He was good visible, not covered up with bed clothing, was casually dressed and wore no shoes. Registered nurses who visited our educational stand were randomly invited to participate in the experiment. They were told that the experiment aimed to investigate the accuracy of their estimations of the body weight and height of the simulated bedridden patient. After their signed informed consent, they could observe the patient for as long as they wanted and then they reported their estimated value of height and weight.

Then, nurse participants were measured themselves using the same scale and measuring rod that was used before the start of the experiment to measure the volunteer patient. They were all measured in clothes and with their shoes on, similar to the simulated patient. In case of high heels, height was corrected.

2.5. Ethical approval

This study was approved by the scientific board and ethical committee of the organising national nursing association. All participants signed a written informed consent.

2.6. Statistics

Accuracy of the estimations was analysed with one-sample T -tests on the difference scores of the estimated and the measured data. Significance would indicate that estimated scores are actually different from measured data. In order to examine influencing factors, we used multiple regression analyses with nurses own body weight, height and BMI as predictor variables and the difference score between the actual measurement scores of the patient and the nurses' estimated scores as dependent variable.

3. Results

3.1. Sample characteristics

Of all subjects 23 (40%) were employed in hospital care, 24 (41%) in home care and 11 (19%) in care homes. 35 (60%) of these subjects had less than 5 years of work experience ($M = 5.2$; $SD = 3.6$, min 1–max 17) (see Table 1).

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