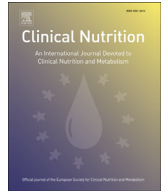




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Original article

Malnutrition in healthcare institutions: A review of the prevalence of under-nutrition in hospitals and care homes since 1994 in England

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SUMMARY

Background & aims: One in four hospital patients in the UK are estimated to be affected by 'hospital malnutrition' (under-nutrition). There is a need for robust epidemiological data relating to the frequency, distribution and determinants of this clinical problem of public health importance. This review aims to undertake a narrative synthesis of data on the descriptive epidemiology of under-nutrition, and to address some of the methodological limitations.

Methods: A methodical review of literature was undertaken, tracking the reported prevalence and incidence of under-nutrition in hospital, in the UK, since 1994.

Results: The 16 articles retrieved and reviewed demonstrate that nutrition in hospital is a long standing problem in UK hospitals and care homes. The existing literature is comprised mainly of cross-sectional surveys describing the prevalence of under-nutrition in hospital which ranges from 11 to 45%. There is considerable heterogeneity in the published literature on hospital malnutrition (under-nutrition) and very few studies either measure or have estimated incidence.

Conclusions: Under-nutrition in hospital continues to be under-addressed, yet a major public health problem in the UK. Defining the descriptive epidemiology of this problem is one of the first steps towards understanding its aetiology or planning and evaluating appropriate prevention or treatment strategies.

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1. Introduction

Malnutrition is defined as 'a state of nutrition in which a deficiency, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (body shape, size, composition), function and clinical outcomes'.¹ It can be classified according to whether there is a positive or negative balance of energy of the nutrient(s) concerned e.g. under-nutrition or over-nutrition/obesity.¹ The number of hospitalised patients presenting with malnutrition, particularly disease related under-nutrition, as addressed with this paper, is unacceptably high, according to surveys conducted across Europe, including the UK, over

the past seventeen years (1994–2011).^{1–16} Increasing understanding of this issue is one step towards its prevention and associated problems including delayed recovery, increased length of hospital stay, worsening of prognosis and an increased risk of serious complications of illness.¹⁷

Since 2006, under-nutrition in patients admitted to UK hospitals and care homes has been collectively termed 'hospital malnutrition' by consensus of member organisations within the Council of Europe (CoE) Alliance on Nutritional Care. Hospital malnutrition can be either community or hospital acquired and associated with a number of interrelated determinants. The CoE Public Health Committee estimated the overall European Union prevalence of institutional malnutrition to be approximately 30%.¹⁵ According to the 2011 Nutrition Screening Week (NSW), conducted by British Association for Parenteral and Enteral Nutrition (BAPEN), it is estimated that 1 in 4 and 1 in 3 UK adults are at medium to high risk of malnutrition respectively when screened using the Malnutrition Universal Screening Tool ('MUST') upon admission to hospital, as well as within 6 months of admission to a care home, respectively.¹⁶

Heterogeneity within surveillance techniques make it difficult to determine if changes have occurred since initial studies (1994)

Abbreviations: CoE, Council of Europe Alliance on Nutritional Care; BAPEN, British Association for Parenteral and Enteral Nutrition; MUST, Malnutrition Universal Screening Tool; NSW, Nutrition Screening Weeks; NNEdPro, Need for Nutrition Education Programme.

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estimated the prevalence of hospital malnutrition to be around 40%.¹ Public health initiatives are reliant on a valid and reliable method of tracking the distribution of hospital malnutrition to evaluate the successes and shortcomings of clinical and public health interventions. In the UK, in 2007, public expenditure on disease-related under-nutrition was estimated at in excess of £13 billion per annum (approximately 80% of which was in England).^{18,19} This is higher than the 2010 projections for the economic costs of obesity which were £3.6 billion per annum (a conservative estimate).²⁰ Due to the complex interplay of factors that impact healthcare costs, it is difficult to calculate the true economic burden of malnutrition (under-nutrition) and indeed it may thus be underestimated.¹⁹

This review was conducted because the evidence of the descriptive epidemiology of under-nutrition in hospital is based on few studies which are heterogeneous in the assessment of the condition. In a climate where the global epidemic of obesity is uppermost on government and National Health Service (NHS) priority lists, hospital under-nutrition may be under-recognised and under-treated.^{18,19} As changes to current structures and commissioning pathways in public health continue, awareness of the seriousness of this problem needs to be raised and steps taken to rectify the problem. This review aims to collate and critically appraise data on the prevalence, incidence, and trends within data collection of under-nutrition in hospital in an attempt to raise awareness of these issues and provide a better insight into the size of the problem.

Care homes have been included because they are an important aspect of the under-nutrition cycle, as it typically begins to develop in the community (or care home) and is later detected in the hospital. For this reason, it is important to ensure that, once under-nutrition is detected, follow-up is effective to ensure the problem is monitored and does not persist upon discharge from the hospital to the community. Care homes play an important role in this cycle as they are well placed to detect risk and prevent under-nutrition in the elderly. Due to the critical importance of care homes in this cycle of under-nutrition, and inclusion in the BAPEN NSWs, care homes have been included in this synthesis of literature.

Outside of the UK, there are currently a number of initiatives supported by the European Society for Clinical Nutrition and Metabolism (ESPEN) to identify under-nutrition in hospital. ESPEN uses a single instrument across many countries.²¹

2. Methods

2.1. Search strategy and review criteria

A narrative synthesis of literature search was first conducted in autumn 2008 and updated by a second person in autumn 2011 using the NHS library portal linking to MEDLINE, CINAHL, Web of Knowledge and Ovid via the Global health gateway to ensure completeness. Key terms in separate searches included 'hospital malnutrition', 'under-nutrition', 'incidence', 'prevalence', 'diagnosis', 'distribution', 'epidemiology' and 'disease burden' 'care homes' (with appropriate synonyms/MeSH terms) in any field and then narrowed to in the title and/or abstract only, and United Kingdom only.

A checklist of critical appraisal questions was formulated for the purposes of this review, using adapted questions from the Critical Appraisal Skills Programme, NHS Public Health Resources Unit.²² Studies were excluded if they were not conducted in the United Kingdom, and if they were not in English. Data on 16 studies was abstracted and are summarised in Table 1. The BAPEN 2011 report was released in early 2012, thus due to its significant importance to this paper, it was added following completion of the literature search, which is limited to 2011.

Some articles were also identified via reference lists and other sources. The scoping exercise was not limited to published material. One article could not be retrieved in full paper format as it was only published as an abstract from the British Dietetic Association Conference 2008.¹¹ This article was still reviewed as it represents an important contribution to data from care homes. This is part of the population of interest for both this review and national policy formulation but tends to be underrepresented in studies.

2.2. Data synthesis

In 2005, it was recommended that 'MUST' ought to be applied to all adult patients in NHS hospitals and also residents of care homes.²³ For this reason, when possible, 'MUST' data were used to define the prevalence of the risk of hospital malnutrition. A combination of high and medium risk malnutrition score categories were used in this paper. In most cases, malnutrition is focused on 'under-nutrition' unless otherwise specified, or referencing a specific paper. As the studies reviewed did not report 95% Confidence Interval (CI) for these prevalence estimates, the 95% CIs with reported prevalence $\pm 1.96 \times SE$ were estimated using the formula: $sp = \sqrt{\frac{\pi(1-\pi)}{N}}$ where p = proportion and N = sample size.²⁴

3. Results

The key results from the review, including estimated prevalence with 95% CI for hospital under-nutrition are summarized in Table 1. Figure 1 is a review flowchart of how the information was categorized for this review. Eleven of the 16 studies used 'MUST' to define hospital malnutrition. Fourteen of 16 eligible studies are of a cross-sectional design yielding prevalence of hospital malnutrition as the outcome of interest. From the comparative table of studies it appeared that larger studies had smaller CIs, perhaps indicative of more precise estimates for prevalence of hospital under-nutrition. However, methodological differences limited direct comparability.

3.1. Prevalence

Figure 2 and Table 1 provide a comparative profile of point estimates with 95% CI for prevalence of under-nutrition in hospital between 1994 and 2011, where data were collected at a single time point. The point estimates represent unadjusted values which were extracted directly from the included studies.

3.2. Incidence

In 1994, McWhirter et al., estimated incidence to be 5.4%.¹ However, the methods used to determine this estimate and the time period over which this estimation is made, are both unclear. No other study found for this review estimates incidence.

3.3. Trends

Due to limitations in study comparability, it is difficult to establish true time trends. However, Table 1 suggests that similar estimates (between 30 and 40%) for prevalence of under-nutrition in hospital were demonstrated by separate studies in 1994, 2003, 2004, 2007 and 2010. This similarity in values suggests consistently high levels of prevalence between 1994 and 2010.

The BAPEN data, (studies 10, 14, 15, and 16), do not show clear trends in a particular direction. This may be due to changes in sample size and differences in settings (particularly in care homes

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