Effectiveness of interventions for undernourished older inpatients in the hospital setting

Technical report

Dawn Vanderkroft
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Joanna Briggs Institute Evidence Based Publications

The Joanna Briggs Institute is involved in the development and dissemination of a number of publications that inform health professionals about clinical practice and specifically what constitutes best practice in health care. These serials include the International Journal of Evidence Based Healthcare (formerly JBI Reports) published by Blackwell Publishing and available online at http://www.blackwell-synergy.com. Systematic reviews conducted by Collaborating Centres of the Joanna Briggs Institute are published in the International Journal of Evidence Based Healthcare. These systematic review reports are further abstracted and published by Blackwell Publishing as the series Best Practice Information Sheets for Health Professionals. All Best Practice Information Sheets are derived from systematic reviews of health care research literature either conducted by the Joanna Briggs Institute Collaborating Centres or in some cases by an external source.

Aims and scope of the Technical Report

The conduct of systematic reviews and the development of Best Practice Information Sheets involve rigorous, standardised methods to ensure that all information provided to health professionals is of the highest standard and constitutes best practice. The conduct of a systematic review and development of the corresponding Best Practice issue are two parts of a staged process. All aspects of the conduct of the systematic review and the development of the accompanying Best Practice issue are documented so that these methods may be scrutinised. The processes involved in conducting Joanna Briggs Institute systematic reviews, including review methods are documented within the systematic review report. The format of Best Practice precludes it from including detailed information regarding the abstraction of evidence and development of recommendations embodied in the publication. For this reason JBI Best Practice Technical Reports are provided as a complementary publication to document all aspects of the development of Best Practice Information Sheets. In determining the quality of the Joanna Briggs Institute Best Practice Information Sheets the information provided in the Technical Report and the Systematic Review Report should also be considered.

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Disclaimer

“The procedures described in Best Practice must only be used by people who have appropriate expertise in the field to which the procedure relates. The applicability of any information must be established before relying on it. While care has been taken to ensure that this edition of Best Practice summarises available research and expert consensus, any loss, damage, cost, expense or liability suffered or incurred as a result of reliance on these procedures (whether arising in contract, negligence or otherwise) is, to the extent permitted by law, excluded”.

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Technical report

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Introduction

The aim of Joanna Briggs Institute evidence publications is to provide the best available evidence relating to clinical questions that are important to health professionals and consumers. Although the publications relate to the same clinical question/s and are therefore complementary they serve different purposes and so are of a different scope and format. The Best Practice Information Sheets are targeted to base level health professionals and are restricted to a six-page format, recognising the time constraints on today’s clinicians. This prevents details of the development process being presented in the Best Practice Information Sheets. The Best Practice Information Sheet Technical Report provides this detail to allow scrutiny of the development process. The development of these publications is essentially a stepped process involving first the identification and synthesis of the evidence (Systematic Review) and then the abstraction of the evidence and development of recommendations for practice (Best Practice Information Sheets). In examining the methods and processes that ultimately produce practice recommendations the reader should consider the information available in the both the Systematic Review Report and the Best Practice Information Sheet Technical Report for a given information sheet.

This technical report details the development process for the following Best Practice Information sheet.


Best Practice Information Sheets development methods

All Joanna Briggs Best Practice Information Sheets are developed by staff of the Joanna Briggs Institute in collaboration with staff from one of the Joanna Briggs Collaborating Centres with the assistance of an advisory panel of clinicians and other experts.
Acknowledgements

**Best Practice Information Sheet developers**
Phillip Thomas, Research Fellow, Collaboration Support Unit, Joanna Briggs Institute with Professor Sandra Capra and Dr Clare Collins from the Australian Centre for Evidence Based Nutrition and Dietetics a collaborating centre of the Joanna Briggs Institute.

**Joanna Briggs Institute Collaborating Centre**
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**Identification and synthesis of the evidence**
All Best Practice Information Sheets are derived from systematic reviews of the best available evidence. The review upon which this Best Practice information sheet is based:


All Joanna Briggs Institute systematic reviews are conducted by trained reviewers with the assistance of expert review panels. The review protocols and reports are subjected to a rigorous internal and a blinded external review process.

The executive summary of the systematic review is presented below. (Refer to the full systematic review report for additional information about the review processes followed). The definitive version is available at http://www.blackwell-synergy.com.

**Executive summary**

**Background**
Malnutrition among elderly hospitalised patients is widespread and has been shown to lead to adverse health outcomes. The effectiveness of interventions to minimise undernutrition in elderly inpatients is not well documented.

**Objectives**
To identify the best available practices, in the hospital setting, that minimise undernutrition or the risk of undernutrition, in the acute care patient especially for the older patient. The review will assesses the effectiveness of a range of interventions designed to promote adequate nutritional intake in the acute care setting, with the aim of determining what practices
minimise malnutrition in the elderly inpatients.

Search strategy
English language articles from 1980 onwards were sought using Medline, Premedline, Cinahl, Austrom-Australasian Medical Index and AustHealth, Ebase and Science Citations Index.

Selection criteria
For inclusion the study had to include an intervention aiming to minimise undernutrition in hospitalised elderly patients aged 65 years or older. All study designs were included.

Data collection and analysis
Two independent reviewers assessed the eligibility of each study for inclusion into the review, critically appraised the study quality and extracted data using standardised tools. For each outcome measure results were tabulated by intervention type and discussed in a narrative summary. Results from randomised controlled trials were pooled in meta-analyses where appropriate.

Main results
Twenty-nine studies met the inclusion criteria, with a total of 4021 participants. The focus of 15 interventions was the supplying of oral supplements to the participants, six focused on enteral nutrition therapy, four interventions made changes to the foods provided as part of the hospital diet, one included the services of an additional staff member and three incorporated the implementation of evidence-based guidelines. Ten meta-analyses were conducted from which the main findings were: significant improvements in weight status and arm muscle circumferences with an oral supplement intervention, \( P < 0.05 \).

Reviewers' conclusions
The findings of the review support the use of oral supplements to minimise undernutrition in elderly inpatients. The results also emphasise the need for more high-quality research using appropriate outcome measures in the area of minimisation of undernutrition, particularly interventions that make alterations to the hospital diet and address support for feeding patients at the ward level.

Key words: aged, inpatient, intervention study, malnutrition, meta-analysis, systematic review

Abstraction of the evidence and development of practice recommendations
All Joanna Briggs Institute Best Practice Information Sheets are a standardised format that includes a background to the clinical question, a summary of the evidence from the systematic review, recommendations and/or implications for practice (graded using the Joanna Briggs Institute Feasibility, Appropriateness, Meaningfulness and Effectiveness scale). The recommendations arising from the evidence in the systematic review and embodied in the Best Practice Information Sheets are developed by the Best Practice Information Sheets developers with the assistance of the expert advisory panel. Essentially the implications for practice for Best Practice Information Sheets are where possible evidence based. The developers and the advisory panel consider the evidence and the context in which the evidence may be used and then develop recommendations for practice. Where no evidence is identified in the systematic review the developers and the expert panel develop consensus statements to inform practice. At this point the Best Practice Information Sheet is subjected to an extensive review process external to the developers and advisory panel.

Peer review
All Joanna Briggs Institute evidence publications are subjected to a rigorous peer review process. This process begins with the submission of the protocol for the systematic review to the Joanna Briggs Institute Associate Director, Collaboration and Evidence Translation. The
protocol is peer reviewed by two other nominated Joanna Briggs Collaborating Centres not involved in the review itself. All other Joanna Briggs Collaborating Centres are able to make additional comments with regard to the protocol. When the systematic review is at draft report stage it is peer reviewed by the Collaborating Centres who appraised the protocol initially. In addition to the Joanna Briggs Collaborating Centres the systematic review report is subjected to external blinded peer review before publication by Blackwell Publishing. The draft Best Practice Information Sheet is also reviewed by the two nominated Joanna Briggs Collaborating Centres. The Best Practice Information Sheet is then distributed to all other Joanna Briggs Collaborating Centres for comment with regard to cultural, professional and organisational issues that may impact on the implementation of the Best Practice information sheet recommendations within their constituency.

**Best Practice Information Sheets ongoing review/update**

All Joanna Briggs Institute evidence publications are based on the best available evidence at the time of publication. When using the publications to inform practice the reader should consider the date of publication and the possibility that recent research may have implications about the strength or direction of recommendations. All Joanna Briggs Institute systematic reviews on which the Best Practice Information Sheets are based are assessed for update at five years post publication and at this time the relevant Best Practice Information Sheets is also reviewed.

**Funding**

Although the majority of Joanna Briggs Institute systematic reviews and Best Practice Information Sheets are funded by corporate membership funds and/or by the Joanna Briggs Collaborating Centres, external funding is occasionally used. In these cases the internal and external peer review processes ensure that editorial independence from the funding body is maintained.

**Conflict of interest**

Any conflict of interest by Joanna Briggs Collaborating Centre staff and/or advisory panel members is declared in a statement within the systematic review report.
Appendix 1 - Grades of Recommendation and Implications for Practice

It is the policy of Joanna Briggs Institute that all systematic reviews will utilise the Joanna Briggs Institute Levels of Evidence with the specific evidence hierarchy corresponding to the type of evidence identified. See evidence tables below.

<table>
<thead>
<tr>
<th>Implications for Practice</th>
<th>Feasibility</th>
<th>Appropriateness</th>
<th>Meaningfulness</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Strong support that merits application</td>
<td>Strong support that merits application</td>
<td>Strong support that merits application</td>
<td>Strong support that merits application</td>
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<tr>
<td>B</td>
<td>Moderate support that warrants consideration of application</td>
<td>Moderate support that warrants consideration of application</td>
<td>Moderate support that warrants consideration of application</td>
<td>Moderate support that warrants consideration of application</td>
</tr>
<tr>
<td>C</td>
<td>Not supported</td>
<td>Not supported</td>
<td>Not supported</td>
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</tbody>
</table>

The following implications for this Best Practice Information Sheet are based on the JBI developed Grades of Effectiveness:

- Oral supplement interventions have been found to promote weight gain and increase lean body mass (as measured by arm muscle circumference) in elderly patients experiencing under- or malnutrition (Grade A)
- Ensuring that the nutritional intervention prescribed implemented is critical to ensuring positive outcomes (Grade B)
- Using albumin and pre-albumin to monitor the effectiveness of nutrition interventions is inappropriate (Grade A)
- Encouraging patients to consume the foods and beverages served, assisting where necessary and actively monitoring intake are strategies known to improve intake level (Grade C)
- Seeking input from nutrition services if they are available earlier rather than later is important (Grade C)
- There is a need to undertake high quality research that examines specific interventions based on nursing staff interventions and practices (Grade B)
## Appendix 2 - Table of included studies from the systematic review

<table>
<thead>
<tr>
<th>Study</th>
<th>Methods</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
<th>Notes</th>
<th>Allocation concealment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barton 2000</td>
<td>Randomised cross-over trial</td>
<td>35 – elderly: 14 N menu; 13 F menu; 8 CB menu</td>
<td>Normal hospital diet F menu (treatment 1) CB menu (treatment 2) N+F menus</td>
<td>Dietary intake measure over 28 day period</td>
<td>Compliance: mean energy and protein during the study period RCT</td>
<td>Unclear</td>
</tr>
<tr>
<td>Bastow 1983</td>
<td>RCT</td>
<td>122 – elderly women: control group 58; treatment group 64</td>
<td>Control group: normal ward diet, etc. Treatment group: L Clinifeed iso</td>
<td>Dietary intake, biochemical markers, body composition, mortality</td>
<td>Unclear</td>
<td></td>
</tr>
<tr>
<td>Bos 2001; Bos 2000</td>
<td>RCT</td>
<td>23: control group 6; treatment group 17</td>
<td>A two-phase strategy: control group given 1360 kcal; treatment group given 400 kcal</td>
<td>Dietary intake, biochemical markers, body composition an clinical outcomes</td>
<td>Protocol dietary intake recorded for compliance</td>
<td>Inadequate</td>
</tr>
<tr>
<td>Bourdel-Marchasson 2001</td>
<td>Cluster randomisation</td>
<td>24 elderly patients: control group 13; treatment group 11</td>
<td>Control group: usual hospital diet; treatment group given supplements</td>
<td>Dietary intake, biochemical markers</td>
<td>No comparison made following treatment; difficult to assess compliance</td>
<td>Not used</td>
</tr>
<tr>
<td>Bourdel-Marchasson 2000</td>
<td>RCT</td>
<td>672: control group 295; treatment group 377</td>
<td>Control group: standard care; treatment group same but with supplements</td>
<td>Dietary intake</td>
<td>Dietary intake monitored on ward level during follow-up period</td>
<td>Adequate</td>
</tr>
<tr>
<td>Brown 1992</td>
<td>RCT</td>
<td>23: control group 13; treatment group 10</td>
<td>3 arms: control-1; control-2; treatment – thin treatment</td>
<td>Body composition, clinical outcomes</td>
<td>Intake recorded at each meal but compliance results not provided</td>
<td>Unclear</td>
</tr>
<tr>
<td>Carver 1995</td>
<td>RCT</td>
<td>46: control group 23; treatment group 23</td>
<td>Control group: placebo; treatment group: oral supplement</td>
<td>Body composition</td>
<td>Method of measurement not recorded</td>
<td>Unclear</td>
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<tr>
<td>Delmi 1990; Rapin</td>
<td>RCT</td>
<td>59: control group 32; treatment</td>
<td>Control group:</td>
<td>Dietary intake, Supplements</td>
<td>Supplements</td>
<td>Unclear</td>
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<tr>
<td>Year</td>
<td>Study Type</td>
<td>Control Group</td>
<td>Treatment Group</td>
<td>Outcomes</td>
<td>Notes</td>
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<tr>
<td>1989</td>
<td>RCT</td>
<td>group 27</td>
<td>standard care with usual hospital diet; Treatment group: oral nutritional supplement</td>
<td>biochemical markers, clinical outcomes</td>
<td>completely ingested by treatment group; mean energy and protein intake reported</td>
<td></td>
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<tr>
<td>Elmstahl 1987</td>
<td>RCT</td>
<td>28: group A – 8; group B – 11; group C - 9</td>
<td>All groups 3 meals/day. Group A – Clinifeed ISO Rousell; Group B – dietary supplement with Caloreen Rousell; Group C – Semper Kostillagg Semper</td>
<td>Dietary intake, biochemical markers, body composition</td>
<td>Results only presented for 24 studies completed; compliance not recorded but lower differences in energy intake than amount of supplementation</td>
<td>Not used</td>
</tr>
<tr>
<td>Eneroth 2005</td>
<td>RCT</td>
<td>80: control group 40; treatment group: 40</td>
<td>Control group: standard care with usual hospital diet; Treatment group: same diet + intravenous supplement</td>
<td>Dietary intake, clinical outcomes,</td>
<td>Proportion of meal eaten at each meal recorded by ward staff, + number of drinks consumed</td>
<td>Adequate</td>
</tr>
<tr>
<td>Hankey 1993</td>
<td>RCT</td>
<td>20: 16 female and 4 male</td>
<td>Control group: standard care with usual hospital diet; Treatment group: same diet + build-up supplements</td>
<td>Dietary intake, biochemical markers, body composition</td>
<td>Food intake measured at baseline and week 8; unclear of dietary intake during intervention period</td>
<td>Unclear</td>
</tr>
<tr>
<td>Hartgrink 1998</td>
<td>RCT</td>
<td>140 in treatment and control group</td>
<td>Control group: standard hospital care and diet; Treatment group: nasogastric tube feeding</td>
<td>Dietary intake, biochemical markers, clinical outcomes</td>
<td>Compliance: n=25 received tube feeding for 1 week; n=16 received tube feeding for 2 weeks</td>
<td>Unclear</td>
</tr>
<tr>
<td>Hebeterne 1995</td>
<td>Case Series (no control)</td>
<td>46: 28 women and 18 men</td>
<td>Treatment: cyclic enteral nutrition</td>
<td>Dietary intake, biochemical markers, body composition</td>
<td>Compliance: measure of compliance with intervention used; energy and protein intakes measured</td>
<td>Not used</td>
</tr>
<tr>
<td>Study</td>
<td>Design/Method</td>
<td>Participants</td>
<td>Intervention Details</td>
<td>Outcome Measures</td>
<td>Compliance/Measurements</td>
<td>Adequacy</td>
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<tr>
<td>Henry 2003</td>
<td>Interrupted time series (no control)</td>
<td>14: &gt;65 years patients</td>
<td>Control period: day 1 and 2 standard meals; Treatment period: day 3 and 5 natural food flavours added to lunch and dinner</td>
<td>Dietary intake</td>
<td>Compliance: dietary intake measured on all days and recorded as main outcome measure.</td>
<td>Not used</td>
</tr>
<tr>
<td>Hickson 2004; Hickson 1999</td>
<td>RCT</td>
<td>592: control group 300; treatment group 292</td>
<td>Control group: usual ward care with medical and nutrition therapy; Treatment group: same + additional nutritional care</td>
<td>Biochemical markers, body composition, functional outcomes, clinical outcomes</td>
<td>Compliance: no measure of healthcare assistant’s work completed</td>
<td>Adequate</td>
</tr>
<tr>
<td>Katakity 1983</td>
<td>Interrupted time series</td>
<td>40: elderly patients 71-84</td>
<td>Supplement 3 times per day (malted milk drink)</td>
<td>Functional outcomes</td>
<td>Compliance: no measure of consumption of supplement or dietary intake included.</td>
<td>Not used</td>
</tr>
<tr>
<td>Larsson 1990; Unosson 1992; Unosson 1994</td>
<td>RCT; blinded study</td>
<td>501: control group 241; treatment group 202</td>
<td>Control group: standard hospital diet, 3 meal system; Treatment group: same + dietary supplement</td>
<td>Biochemical markers, body composition, clinical outcomes</td>
<td>Compliance: no measures of consumption of total supplement or dietary intake included.</td>
<td>Unclear</td>
</tr>
<tr>
<td>McDermott 2002</td>
<td>Non-randomised cross-over trial</td>
<td>10: patients 65 and over</td>
<td>Control period: standard hospital care and diet; Intervention: dessert at main meals and snack in afternoon</td>
<td>Dietary intake</td>
<td>Measures of compliance not used</td>
<td>Not used</td>
</tr>
<tr>
<td>McEvoy 1982</td>
<td>RCT</td>
<td>51: control group 25; treatment group 26</td>
<td>Control group: normal hospital diet; Treatment group: same + 2 sachets of ‘build up’</td>
<td>Biochemical markers, body composition</td>
<td>Compliance: diet history but no results reported</td>
<td>Unclear</td>
</tr>
<tr>
<td>Odlund-Olin 1996</td>
<td>Randomised cross-over design</td>
<td>39: 26 women, 13 men spread</td>
<td>Control period: regular</td>
<td>Dietary intake, body</td>
<td>Compliance</td>
<td>Adequate</td>
</tr>
<tr>
<td>Study</td>
<td>Design Type</td>
<td>Participants</td>
<td>Intervention Details</td>
<td>Outcome Measures</td>
<td>Compliance</td>
<td>Notes</td>
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</tr>
<tr>
<td>Ovesen 1992</td>
<td>RCT (double blind)</td>
<td>24: control group 14; treatment group 10</td>
<td>Control group: standard liquid nutritional supplement; Treatment group: nutrient dense supplement</td>
<td>Dietary intake</td>
<td>Compliance: supplement volume consumed measured daily but method unclear; results not reported</td>
<td>Unclear</td>
</tr>
<tr>
<td>Pepersack 2002</td>
<td>Historical control trial</td>
<td>206: control group 97; treatment group 109</td>
<td>Control period: nutritional assessment; Treatment period: Meals on Wheels method</td>
<td>Dietary intake, biochemical markers, clinical outcomes</td>
<td>Compliance: no measures of compliance with guidelines used or reported</td>
<td>Not used</td>
</tr>
<tr>
<td>Perry 2003</td>
<td>Historical control trial</td>
<td>400: control group 200; treatment group 200</td>
<td>24 evidence-based guidelines implemented</td>
<td>Body composition, clinical outcomes</td>
<td>Compliance: guidelines measured and reported for 18 out of 24 guidelines</td>
<td>Not used</td>
</tr>
<tr>
<td>Roberts 2003; Potter 2001</td>
<td>RCT</td>
<td>381: 186 in supplement group; 196 in control group</td>
<td>Control group: usual hospital treatment; Treatment group: same + protein energy sip feed</td>
<td>Dietary intake, body composition</td>
<td>Compliance: weighed dietary intake recorded in 1/3 participants; rated at 50%</td>
<td>Adequate</td>
</tr>
<tr>
<td>Rypkema 2004</td>
<td>Concurrent control trial</td>
<td>298: control group 158; treatment group 140</td>
<td>Control group: usual hospital care; Treatment group: screened on risk of malnutrition</td>
<td>Body composition, clinical outcomes</td>
<td>Compliance: no measures of compliance with guidelines measured or reported</td>
<td>Not used</td>
</tr>
<tr>
<td>Sullivan 1998</td>
<td>RCT</td>
<td>18: control group 10; treatment group 8</td>
<td>Control group: standard care; Treatment group: above + nightly enteral feeds</td>
<td>Dietary intake, biochemical markers; clinical outcomes</td>
<td>Compliance: nutrient intake monitored daily</td>
<td>Unclear</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Participants</td>
<td>Intervention</td>
<td>Outcomes</td>
<td>Compliance</td>
<td>Notes</td>
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<tr>
<td>Sullivan 2004</td>
<td>RCT</td>
<td>57: control group 30; treatment group 27</td>
<td>Control group: standard care; Treatment group: standard post-operative care + nightly enteral feeds</td>
<td>Dietary intake, biochemical markers, clinical outcomes</td>
<td>Compliance: monitoring of nutrient intake daily, using standard protocol</td>
<td>Unclear</td>
</tr>
<tr>
<td>Vetta 1996</td>
<td>Pre-test/post-test (no control group)</td>
<td>23: 11 males and 12 females</td>
<td>Total enteric nutrition for 45 days</td>
<td>Biochemical markers, body composition</td>
<td>Compliance: not measured</td>
<td>Not used</td>
</tr>
<tr>
<td>Williams 1989</td>
<td>RCT</td>
<td>49: control group 19; treatment group (compliant) 19; treatment group (non-compliant) 11</td>
<td>Control group: usual care; Treatment group: 2-3 cans ‘Ensure’ per day</td>
<td>Biochemical markers, body composition, clinical outcomes</td>
<td>Compliance: qualitative and quantitative assessments of food intake</td>
<td>Inadequate</td>
</tr>
</tbody>
</table>
Appendix 3 - References

These include references from the systematic review and additional references used in the development of the Best Practice information sheet


