**Abstract**

**Aim:** To determine the composition of usual nutrition care provided by Australian dietitians to patients with a falls related femoral neck fracture.

**Methods:** A cross-sectional survey administered via the World Wide Web using Survey Monkey to dietitians across Australia.

**Results:** One hundred and sixty eight dietitians working with patients with a femoral neck fracture in Australia responded to the survey. Few dietitians (n=7) indicated they worked in the community setting. Nutritional screening was used among respondents (n=93), but 32/93 indicated they did not use a validated tool. Most commonly used interventions included strategies to increase intake of nutrients, such as provision of nourishing meals, snacks, and oral supplements.

**Conclusions:** Some concerns remain regarding provision of optimal nutritional care of femoral neck fracture patients in Australia. There were few respondents working
in the community with falls related femoral neck fracture patients, with a greater number of dietitians working in the metropolitan area responding to the survey. The Dietitians working in this area are implementing a great variety of screening methods, with a large number of using non-validated screening tools. Clearer guidelines for health professionals involved in femoral neck fracture aftercare would be beneficial to standardise care in this area. A useful first step for dietitians would be to advocate for the use of evidence-based practice resources in selection of site and age appropriate nutrition screening tools.

**Key Words:** Femoral neck fractures, Malnutrition, Ageing.
Introduction

Femoral neck fracture is a serious cause of morbidity and mortality in Australia currently. There were an estimated 15,000 femoral neck fractures in Australia in 2006, and this figure is suggested to increase to over 24,000 by 2021\(^1\). Along with an increase in the incidence of hip fractures in Australia, an increase in the total cost associated would be expected. Data indicates the cost of hip fracture is projected to increase from $7.2 billion in 1984 to $16 billion in 2040 in America\(^2\). More recent American data has estimated the lifetime cost of hip fracture as $81,300, with nursing costs making up almost half of that amount\(^3\). A femoral neck fracture in older adults can be the first step in a decline in health, functional capacity, and independence. Mortality in the 12 months following a femoral neck fracture has been reported as high as 25\(^%\)\(^4\).

Malnutrition among both the elderly and femoral neck fracture patients in acute care has been well documented, while the level of malnutrition in rehabilitation services is much less commonly studied\(^5\)-\(^17\). The level of malnutrition identified across all settings varies between 6 and 78\(^%\), likely due to the variety of methods used to determine a malnourished state and differences in populations studied. Seven out of thirteen studies included those individuals from nursing homes or with cognitive deficits which have independently been identified as risk factors for poor nutritional status\(^5\),\(^7\),\(^10\),\(^13\)-\(^16\). Excluding those studies, between 9 and 25\(^%\) of femoral neck fracture patients were identified as being malnourished\(^8\),\(^11\)-\(^12\),\(^17\)-\(^18\). There is evidence that malnutrition can be treated and can be cost effective\(^19\).
Low nutritional intake post surgery in femoral neck fracture patients has also been identified. In five studies, all in the acute phase, between 75 and 100% of participants did not meet their estimated energy intakes. While Carlsson et al. deliberately targeted those patients with poor nutritional status, Lumbers et al. included all cognitively aware patients greater than 60 years old. An Australian study found that 48% of cognitively impaired and 52% of non-cognitively impaired older adults admitted with a lower leg fragility fracture (86% femoral neck fracture patients), did not meet estimated energy requirements. In addition, a number of studies showed association between LOS, mortality, and independence in ADLs and either anthropometric or biochemical indicators of nutritional status.

Therefore, it appears poor nutritional intake is common in falls related femoral neck fracture patients, and could be a possible point for intervening to improve outcomes.

Treatment regimes including a variety of nutrition support measures such as providing enteral or oral supplementation with nourishing fluids has been shown to have positive effects on fluid, energy and protein intake, complications, pressure ulcers, body composition, strength, functional outcomes, quality of life, length of stay, and mortality. Length of supplementation varies in the studies from only a few days to six months. It appears that a longer period of treatment is associated with greater improvements, however this needs further clarification.

It has been recommended that routine nutritional assessment be carried out, due to the high incidence of malnutrition in this patient group, and that dietetic intervention to increase protein and energy intake be undertaken where appropriate. However it
is likely this is not being undertaken due to the frequent under-recognition of
malnutrition and its risks in the acute care setting. While increasing evidence is
mounting on the impact malnutrition can have on the outcomes of these patients, and
its widespread nature, there are no clear guidelines on how the nutritional
management of these patients should occur. The aim of this study was to determine
the current usual nutritional care being provided to these patients by Australian
dietitians.

Methods

An online survey of dietitians with membership of the Dietitians Association of
Australia was administered between July 1st and September 19th 2009 in accordance
with ethical standards of the Flinders University Social and Behavioural Research
Ethics Committee (approval number 4477, approval date 28/5/09, expiry 30/10/09).

Dietitians were invited to take part in the survey via a weekly email alert sent to
members of the Dietitians Association of Australia. In the email, members providing
services to patients with a falls related femoral neck fracture were requested to
complete the survey via an online link provided via SurveyMonkey. To increase
response rate, participants were offered the chance to enter into a random prize draw
to win one of three prizes to the value of $150.

Consistent with the Dillman protocol a reminder was sent to the possible
participants via the same email alert system two months following the initial
notification. The results of the survey were kept on a secure server. All potential
participants were advised the survey was confidential.
The survey questions were developed using relevant literature as a guide in addition to discussions with key researchers in the field. The survey included an initial question on whether the participant treated femoral neck fracture patients, and those who answered no were redirected to the end of the survey. The remainder of the survey included 31 questions on demographics of participants, referral processes, treating team organisation, early discharge programs, nutritional assessment and interventions, education, and follow up. The survey was largely structured with respondents having the ability to select from a list of likely options with the flexibility to include other responses if an appropriate option was unavailable. For some questions more than one answer was allowed. Questions were worded such that the response reflected dietetic practice of the individual dietitian with the exception of questions relating to implementation of screening tools, use of dietetic assistants, composition of multi-disciplinary teams and early-supported discharge programs. A copy of the survey questions is available on request to the corresponding author.

Data collected was imported into SPSS, version 17.0 (Chicago, IL, USA). Descriptive statistics and graphical displays were used to present the responses. The majority of responses were categorical (nominal and ordinal), and hence the frequency and percentage of each response within the data set was presented.
Results

Of the 168 respondents to the survey 14 did not work with patients with a femoral neck fracture and were prevented from answering practice based questions in the survey. 77 (58.3%) of respondents had been practicing for less than 5 years. 108 (70.1%) of respondents were working in the public hospital system, 20 (13.0%) private hospital system, and 21 (13.6%) in the community setting, while 5 (3.2%) did not indicate where they worked. 32 (20.8%) indicated they worked in a rural or remote setting, while 112 (72.7%) worked in a metropolitan or urban setting.

The number of referrals for femoral neck fractures received in the previous 3 months for respondents is shown in figure 1. This includes those referrals managed by automatic referral systems (e.g. routine referral of all femoral neck fracture patients).

The main sources of referral for patients with a falls related femoral neck fracture in respondents workplace are shown in table 1. Other responses included a research trial, doctors, screening processes, dietitians, dietetic assistants, case managers, or self referral.

Ninety three out of 133 (69.9%) who completed the question indicated a nutrition screening tool was being utilized at their workplace. Those tools used in the group included the MST (Malnutrition Screening Tool) (n=65, 69.9%), a workplace developed or modified tool (n=25, 26.9%), MNA-SF (6 items of Mini Nutritional Assessment) (n=12, 12.9%), MUST (Malnutrition Universal Screening Tool) (n=6, 6.5% of respondents), Simple Nutrition and Appetite Questionnaire (n=3, 3.2%), Short Nutritional Assessment Questionnaire (n=1, 1.1%), the Victorian HACC
Nutrition Risk Screening Tool (n=1, 1.1%) and the Nutrition Risk Screening and Monitoring Tool (n=1, 1.1%)\textsuperscript{33-34}.

Ninety six out of 133 (72.2%) respondents indicated a multidisciplinary team was in place for care of clients with a falls related femoral neck fracture at their workplace. 41 out of 92 respondents (44.6%) indicated an early supported discharge program (support and rehabilitation services allowing a patient to be discharged home) was available for patients with a falls related femoral neck fracture at their workplace. Disciplines respondents indicated as involved in early supported discharge programs included physiotherapists (36 responses, 87.8% of respondents), occupational therapy (33 responses, 80.5%), social work (26 responses, 63.4%), rehabilitation medicine (23 responses, 56.1%), nursing (22 responses, 53.7%), dietitian (21 responses, 51.2%), allied health assistant (9 responses, 22.0%), surgeon (5 responses, 12.2%), psychologist (2 responses, 4.9%) and nursing clinical care co-ordinator, speech pathologist, discharge planner, aged care day rehabilitation team, and exercise physiologist (all 1 response each, 2.4% each).

Forty six of 131 respondents (35.1%) indicated they had dietetics assistants working in their workplaces. Of those, 33 (71.7%) reported dietetic assistants being available to assist patients with a falls related fractured neck of femur. By far the main tasks respondents indicated dietetic assistants were involved in were screening patients for risk of malnutrition and assistance with choosing appropriate menu items (29 responses each, 63.0% of respondents). 8 respondents (17.4%) indicated dietetic assistants were involved in feeding assistance with the most at risk patients. A
smaller number (n=7, 15.2%) indicated dietetic assistants assisted dietitians with nutritional assessment of patients with a falls related femoral neck fracture. ‘Other’ tasks carried out by dietetic assistants included assisting with weighing of patients, ordering high energy high protein diets for all patients with a falls related fractured neck of femur, offering high energy high protein snacks, monitoring tolerance and dietary intake of patients, and educating patients on the importance of a high energy high protein diet.

The main nutrition interventions the 132 dietitians who responded to this question indicated they utilized with these patients are included in Table 2. Other responses (3), included use of the Medpass program, supplementation with vitamins D and C and Calcium and Zinc in patients, and including calcium rich foods.

Out of 130 respondents, 4 (3.1%) routinely conducted only an initial consult with patients recovering from a falls related fractured neck of femur. 16 (12.3%) indicated they routinely reviewed these clients once, 45 (34.6%) twice, 31 (23.8%) three times, and 34 (26.2%) greater than three times.

Ninety of 127 (70.9%) respondents to the question indicated they undertook education routinely with clients with a falls related femoral neck fracture. 87 (96.7%) respondents indicated they would routinely educate these clients on use of small frequent meals, 86 (95.6%) a high protein diet, 85 (94.4%) nourishing mid meals, 83 (92.2%) nourishing fluids, 80 (88.9%) use of oral supplements, 77 (85.6%) a high energy diet, 31 (34.4%) the Australian Guide to Healthy Eating, 10 (11.1%) an
increase in meal size, 8 (8.9%) a reduction in fat intake, 4 (4.4%) an increase in

calcium or vitamin D intake, and 1 (1.1%) weight modification.

Eighty out of 130 respondents (67.7%) indicated they would transfer the nutritional
care of these clients to another health care provider after their intervention.

Respondents indicated they routinely transfer nutritional care of these patients to

included another dietitian (67 responses, 76.1% of respondents), aged care nurse (26
responses, 29.5%), general practitioner (18 responses, 20.5%), community health

nurse (5 responses 5.7%), district nurses (3 responses, 3.4%), and 14 (15.9%) ‘other’

responses including various dietitians, CACP and EACH packages, rehabilitation

facilities, and dietetic assistants.

The number of respondents who indicated they agreed or disagreed with statements

surrounding nutrition and falls related femoral neck fracture clients is shown in table

3.

The most commonly indicated barriers respondents indicated to increasing their

services to these clients included insufficient staff (64 responses, 51.6% of

respondents), followed closely by insufficient referrals (61 responses, 49.2%). 21

respondents indicated that these patients were not currently a priority and 21 also

indicated that there was a lack of team approach to the treatment of these patients

(16.9% respondents). Only 2 respondents (1.6%) indicated lack of expertise in the

area limited their services to these clients. ‘Other’ responses to this question (13,

10.5%) included the short stay of some patients in hospital, lack of assistance with
meals for patients, and lack of value of diet in the rehabilitation of these patients by other disciplines and hospital or lack of evidence for routine dietetic care. One respondent indicated they had adequate services and had recently formalised routine assessment and service provision to all falls related femoral neck fracture patients by dietetic assistants.
Discussion

In this survey of 168 Australian dietitians, we found that we received more responses from respondents in public acute care settings and metropolitan areas, compared to community settings and rural areas. A variety of interventions were being utilized by this group to treat these patients, but not all were evidence based. While dietitians believe they can make a difference to this group, and have the skills to do so, there were a number of barriers to them being more involved with this group which need to be addressed to ensure optimal care of these patients.

The timing of review of clients appears appropriate when compared with the average length of stay for femoral neck fractures in Australia in 2007-2008 (10.6 days) and length of stay reported in studies in Australia\textsuperscript{29, 35-38}. The majority of responses were from the public hospital sector, which also reflects the membership of DAA (personal communication via email, DAA National office, 8\textsuperscript{th} March 2011). However, there was no information available on whether membership of DAA is affected by work setting or region of work, which could have affected the responses. It appears as though the number of member dietitians working within inpatient facilities is larger than the number working within community nutrition, which reflects our responses\textsuperscript{39}. But this response could be reflecting the location of the majority of work with these patients and the likely larger number of dietitians working with these patients in the acute settings, which reflects previous work of the authors\textsuperscript{40}. Follow up post discharge is likely to be necessary given the evidence that weight loss continues for at least 12 weeks post injury in this patient group\textsuperscript{29}. This raises the issue of whether adequate dietetic services are available to those in the community for review, and
whether other services are taking on the role of monitoring nutritional status. In our
survey, respondents indicated that dietitians were their most common health worker
they transferred nutritional care of these clients too, however further work into the
mapping of interdisciplinary services providing nutritional care to elderly femoral
neck fracture patients after discharge is needed to clarify the range of follow up in the
community. This may identify opportunities to collaborate with interdisciplinary
services on the nutritional care of these patients, as experts in this area.

In this survey, the majority of respondents serviced the metropolitan area, which is
similar to membership of DAA (personal communication via email, DAA National
office, 8th March 2011). While 57% of Australians live in metropolitan urban areas,
the servicing of patients in rural areas is also an important consideration. Especially
if the trend is for supporting patients in the home as early as possible following
surgery, and for as long as possible, the double dilemma of inadequate dietetic
services not only in the community but in rural areas will need to be considered.

The respondents to the survey had been practicing for few years. On contacting
DAA, no information was available on the range of number of practicing years of
member dietitians. This would reflect the system in a large number of acute hospitals,
where orthopaedic wards are commonly included on the rotation for new graduates,
who spend time working with these patients before being moved on to “specialist”
areas. The survey did not include any questions on any supervision being provided to
respondents, which may occur in the larger hospitals, and assumptions cannot be
made on the adequacy of the service based purely on this. Implementation of
appropriate systems for routine nutrition screening and the skills required for nutrition assessment are entry level competencies and hence new graduates could be expected to have these skills. Furthermore, despite being relatively new to the workplace, respondents overwhelmingly felt their expertise available in the area was sufficient, and in addition believed that nutrition was important for these clients and did assist their recovery. But when asked they did identify a number of barriers to improving services to these clients including insufficient allocation of staff.

Of concern however are some of the interventions listed as being undertaken by dietitians in the survey, particularly the recommendation of weight loss. There is good evidence that weight loss occurs swiftly in this group following surgery, and that this is associated with poor outcomes. There is good evidence that providing nutrition support including increasing energy and protein intake through oral supplements, nourishing mid meals, and providing feeding support has positive effects on recovery and rehabilitation. In addition, evidence exists for use of vitamin D to assist in maintaining muscle mass, bone density, and preventing falls and subsequent fracture. Effective nutritional care using evidence-based and appropriate interventions is critical.

Insufficient referral was also indicated to be a barrier to providing better services to these clients. The under-recognition of the malnourished patients within the healthcare system is well established, and leads to patients missing out on assessment and treatment. It is also known that treatment of malnutrition can be effective in improving patient outcomes which then translate into cost effective healthcare.
Therefore, nutrition screening processes have been developed to help identify those patients who are malnourished or at risk of malnutrition, so they can be treated in a timely manner. Without use of valid and reliable screening mechanisms, it is likely that malnourished patients are going unnoticed and untreated, leading to greater loss of muscle mass and physical function at a time when the entire healthcare team is working towards trying to maximise this to enable patients to return home as quickly and as independently as possible. While screening tools were utilized by respondents, a large proportion were using workplace developed tools, which may not have been validated to ensure they identify appropriate patients for referrals, as recommended in the recent DAA Guidelines. In addition, one respondent was using a tool which has not been validated, the Victorian HACC Nutrition Risk Screening Tool. Therefore the actual number of respondents using non-validated tools according to the guidelines is 26. The guidelines include recommendations for nutrition screening tools validated for use in acute settings, residential facilities, and the community, and we found respondents utilized screening tools for all these settings. While some individual markers of nutritional status have been shown to predict risk of malnutrition, the use of a validated tool including multiple markers of nutritional status has been shown be able to identify at risk patients more accurately. Screening tools have been created to suit a variety of settings, and skill levels of the person administering it, which are important considerations for those choosing one. A screening tool left uncompleted due to lack of time, or completed incorrectly due to difficulty in collecting some of the markers, is not useful.
Dietetic assistants were employed in the workplaces of only one third of respondents. However, where they were, they were commonly used to assist patients with a femoral neck fracture. Their major roles appear to be in screening patients and in the selection of menu choices, both tasks which DAA and Victorian state government include in their scope of practice for Dietetic Assistants. Less were involved in assisting clients with their meals, despite this being a task undertaken by dietetic assistants in a study shown to increase nutritional intake in femoral neck fracture patients when compared to a group receiving regular dietetic care including routine provision of oral nutritional supplements to patients. Educating clients is another task which appears within the scope of practice for Dietetics Assistants but was reported as being undertaken uncommonly in this survey. Given that insufficient staff or insufficient referrals were consistently reported as the two largest barriers to dietitians providing more services to this group, the use of dietetic assistants to undertake supportive tasks is an area worthy for further investigation and consideration, as a possible novel solution.

Previous guidelines released by SIGN on the management of femoral neck fracture in older people included a high level recommendation of providing high energy and protein supplementation to patients in rehabilitation and that subsequently “Patients’ food intake should be monitored regularly, to ensure sufficient dietary intake”.

However, the document doesn’t detail who should undertake this monitoring, how it should occur, or define an ‘adequate diet’, leaving nutritional care to occur in an ad-hoc basis. Similarly, while the Australian and New Zealand Society for Geriatric Medicine’s position statement on Under Nutrition and the Older Person outlines that
under nutrition is common, costly, and that nutritional supplementation can reduce
unfavourable outcome\textsuperscript{50}, their earlier guidelines on Orthogeriatric Care does not
mention dietetics as a key discipline in the treatment team\textsuperscript{51}. The Australasian
Faculty of Rehabilitation Medicine’s Standards for Adult Rehabilitation Medicine
Services in Public and Private Hospitals\textsuperscript{52} gives similarly mixed messages. The
standards state that the “majority of patients in a Rehabilitation Medicine Service will
require input from dieticians”, but provides no guidelines on what sort of patients to
refer, and does not include a dietitian in their recommendations for the number of staff
to patient ratios\textsuperscript{52}. So while nutrition has been included in the recommendations for
care of these patients recently, the recommendations have been sparse in practical
details which could be used to shape future nutrition care.

It is important to acknowledge a range of limitations that may impact on the findings
of this study and the potential application. Firstly, the survey was not designed to
allow a comparison to be made across settings such as acute care and rehabilitation. It
is possible that services may differ although there is little evidence for this in the
literature or from previous work of the authors. In addition, it was not possible to
calculate the service provided per admission as this information was not recorded.
Secondly, it is clear that the survey responses to questions relating to the benefit of
nutrition support in this patient group when applied to a nutrition workforce are
expected. Selection bias may also arise in the sampling for this survey with those
Dietitians more interested or motivated more likely to respond. In addition, while
responses appear to follow the membership of DAA, it is important to note the survey
was distributed using DAA email services to member dietitians. There is currently no
data on whether membership of DAA differs among dietitians working in the various
settings or within rural or metropolitan areas.

In conclusion and consistent with workforce distribution (personal communication via
email, DAA National office, 8th March 2011) responses to this survey indicated
dietetic services to this group are mainly concentrated around public metropolitan
centres. Which raises the questions – what is follow up in the community like for
these patients? Who is supporting their nutritional status after discharge? Use of
interventions supported by the evidence base was widespread, but some respondents
indicated using interventions unsupported by the literature. Use of non-validated
screening tools appears widespread. Dietitians would be well supported by current
malnutrition guidelines to advocate for the use of evidence based tools chosen for the
appropriate population. Dietetic assistants could be further utilized to assist dietitians
to provide effective care to these clients. More detailed evidence based guidelines on
appropriate care for femoral neck fracture patients would assist not only dietitians but
also all those involved in the care of these patients to improve the nutritional care of
these clients, given the effect of malnutrition on all facets of these patient’s recovery.
Further research might focus on other services which could be taking on the role of
monitoring nutritional status in the community for these patients, and strategies to
provide cost effective care to these patients, such as the utilization of dietetic
assistants.
1 References


47 Dietitians Association of Australia. SCOPE OF PRACTICE-SUPPORT STAFF IN NUTRITION & DIETETIC SERVICES


Table 1 Source of majority of referrals for patients with a femoral neck fracture indicated by respondents

<table>
<thead>
<tr>
<th>Referral Source</th>
<th>Number of responses (% of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing staff</td>
<td>70</td>
</tr>
<tr>
<td>Automatic referral systems</td>
<td>42</td>
</tr>
<tr>
<td>Other allied health</td>
<td>26</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>12</td>
</tr>
<tr>
<td>Surgeons</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>34</td>
</tr>
</tbody>
</table>

†= total number of respondents = 137. Respondents could choose more than one option.
### Table 2: Variety of Interventions Routinely Utilized by Dietitians

<table>
<thead>
<tr>
<th>Intervention</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nourishing snacks</td>
<td>127 (96.2)</td>
</tr>
<tr>
<td>Oral supplements</td>
<td>124 (93.9)</td>
</tr>
<tr>
<td>Nourishing meals</td>
<td>121 (91.7)</td>
</tr>
<tr>
<td>Recommending food providers for discharge</td>
<td>60 (45.5)</td>
</tr>
<tr>
<td>Providing recipes</td>
<td>32 (24.2)</td>
</tr>
<tr>
<td>Food texture modification</td>
<td>29 (22.0)</td>
</tr>
<tr>
<td>PEG/Nasogastric feeding</td>
<td>13 (9.9)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>14 (10.6)</td>
</tr>
<tr>
<td>No intervention routinely</td>
<td>2 (1.5)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (2.3)</td>
</tr>
</tbody>
</table>

†Number of respondents indicating they utilize the intervention routinely with patients with a femoral neck fracture. Respondents could choose more than one option.
Table 3 Opinion of respondents on the importance and effectiveness of nutrition for recovery following falls related femoral neck fracture

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree/Strongly Disagree</th>
<th>Did Not Respond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important†</td>
<td>55</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>96</td>
</tr>
<tr>
<td>Effective‡</td>
<td>55</td>
<td>50</td>
<td>3</td>
<td>0</td>
<td>59</td>
</tr>
</tbody>
</table>

†Important= “Nutrition is important to the recovery of clients with a falls related fracture of the femoral neck or hip”
‡Effective= “Dietary strategies are effective in improving the recovery of clients with a falls related fracture of the hip of femoral neck”

n=number of respondents
Figure 1 Dietitians who responded to the survey estimated the number of patients with a femoral neck fracture referred to them in the previous 3 months (including those managed by automatic referral processes). Above figure gives the number of respondents who received no referrals, between 1 and 5, 6 to 10, 11 to 15, 16 to 20, 21 to 25, or greater than 26 referrals for femoral neck fracture patients in the previous 3 months.