




A cross-sectional, observational study of nutritional status and eating behaviours in people living with dementia in acute care settings

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Funding information

Illawarra Health and Medical Research Institute (IHMRI) Clinical Translation Grant Scheme

Abstract

Aims and Objectives: To understand the nutritional status, observing eating difficulties during mealtimes for people living with dementia in acute care settings.

Background: Changed eating behaviours caused by declining cognitive function is common in people living with dementia which can lead to malnutrition. Malnutrition is associated with prolonged hospitalisation and increased mortality. People living with dementia in acute care settings are at high risk of malnutrition. This highlights the importance of better understanding the nutritional intake and eating behaviours of people living with dementia in acute care settings.

Design: This study is a cross-sectional, observational study.

Methods: Data of mealtime difficulties and nutritional status of people living with dementia were collected in four geriatric care wards (in acute or sub-acute hospitals) by using Feeding Difficulty Index and Mini Nutritional Assessment Short-Form. The STROBE checklist was used throughout this study.

Results: The study included 94 people living with dementia. The median age of the participants was 85.86 years old, with a Feeding Difficulty Index of 8.27 and had stayed in hospitals for average 14.46 days, with an average total feeding time of 24.61 min. Only 1.2% of participants were considered to be in normal nutritional status, whereas 72.1% were malnourished. All participants required partial or full assistance during mealtime. Participants with higher scores on the Feeding Difficulty Index have longer total feeding times, compared to those with lower scores.

Conclusions: Malnutrition is prevalent in people living with dementia. People living with dementia demonstrate varying mealtime difficulties depending on the level of dependence. Mealtime assistance training programs are warranted and are beneficial for nursing staff and family members to improve their feeding skills and knowledge.

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No patient or public contribution: This study did not involve patients, service users, caregivers or members of the public.

Relevance to clinical practice: The study is relevant to clinical practice by identifying changed eating behaviours or mealtime difficulties in people living with dementia in acute care settings can significantly decrease the risk of malnutrition.

KEYWORDS

acute care settings, eating behaviours, malnutrition, nutritional status, people living with dementia

1 | INTRODUCTION

Dementia is an umbrella term describing a syndrome of cognitive impairment and functional decline, which typically occurs in later life. The cognitive impairment and functional decline in people living with dementia usually have an impact on independent eating behaviours (Liu et al., 2016), which eventually results in malnutrition in people living with dementia (Franx et al., 2017). Previous studies have found malnutrition occurring in people living with dementia is related to faster functional decline (Borda et al., 2021), increased length of hospitalisation (Kellett et al., 2016; O'Shea et al., 2017) and increased mortality (O'Shea et al., 2017). This highlights the importance of better understanding the nutritional intake and eating behaviours of people living with dementia.

2 | BACKGROUND

Dementia continues to grow at a rapid rate, with nearly 10 million new cases every year (World Health Organisation [WHO], 2022). Currently, it is estimated that more than 55 million people are living with dementia worldwide. Therefore, as the dementia population increases, so will the proportion of people living with the impairment in daily functioning, which is one of the hallmark features of dementia. Impairment of daily functioning refers to the incapability to perform basic activities of daily living (e.g. eating), and the more advanced instrumental activities of daily living (e.g. meal preparation) (Lawton & Brody, 1969).

Eating is one of the daily functioning tasks which people living with dementia might find difficult to perform, given their impaired cognition and limited physical ability. Approximately 45%–86% of people living with dementia may experience mealtime difficulties throughout the disease course (Chang et al., 2017; Kai et al., 2015; Mitchell et al., 2009). For instance, very mild mealtime difficulties such as reduced appetite and changes in food preference could appear in the early stage of dementia, whereas severer mealtime difficulties such as forgetting to eat and drink as well as problems with chewing and swallowing might be seen in the later stage of dementia (Abdelhamid et al., 2016; Espinosa-Val et al., 2020; Kai et al., 2015). As a result of inadequate intake of food, a high prevalence of malnutrition has been reported in people living with dementia across different settings. Previous studies have found that 14% of people

What does this paper contribute to the wider global clinical community?

- This study reveals that malnutrition is prevalent in people living with dementia and their lengthy feeding time in acute care settings.
- Patients admitted to acute care settings might demonstrate different feeding difficulties depending on the level of dependence. This emphasises the importance of tailored feeding assistance for people living with dementia according to individual needs.
- Mealtime assistance training programs are warranted and are likely to benefit nursing staff and family members to develop their feeding skills and knowledge about feeding difficulties.

living with dementia were at risk of malnutrition in a community-based sample (Droogsmas et al., 2013), 38.4% of people living with dementia were at risk of malnutrition in long-term care settings (Park et al., 2018), and this seems to be even more prevalent at 53%–87% of people living with dementia in acute care settings (Kellett et al., 2016; Manning et al., 2012).

Importantly, malnutrition has been identified as a contributing factor to several clinical outcomes. For instance, previous studies have indicated that malnutrition is associated with higher rates of medical complications (Kellett et al., 2016), prolonged hospitalisation (Kellett et al., 2016; O'Shea et al., 2017) and increased mortality (O'Shea et al., 2017) in people with dementia in acute care settings. However, there is an increasing recognition that the quality of care for people living with dementia in hospital settings may not be optimal (Dewing & Dijk, 2016; Zekry et al., 2008). For instance, a scoping review has indicated that more training is needed for primary carers (i.e. nurses) in hospital settings (Griffiths et al., 2015). It is important to maintain the nutritional intake of people living with dementia and more research with respect to support people living with dementia in acute care settings is required (Kelly et al., 2015). As was pointed out in the introduction, eating behaviours is a daily function which directly impacts the nutritional intake of people living with dementia. Thus, this study aimed to (1) observe the nutritional intake of people living

with dementia in acute care settings, (2) identify common eating behaviours occurring in people living with dementia in acute care settings and (3) compare the clinical characteristic between the people living with dementia with high feeding difficulty and low feeding difficulty in acute care settings.

3 | METHODS

3.1 | Study design

A cross-sectional, observational study was undertaken. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies were followed (see Appendix A).

3.2 | Settings and participants

Participants were people living with dementia admitted to geriatric care wards in acute care or sub-acute care public hospitals located in the Illawarra Shoalhaven Local Health District (ISLHD) in New South Wales, Australia. The inclusion criteria are people who (i) ≥ 65 years old, (ii) have a diagnosis of dementia based on chart review or a Mini Mental Status Examination score less than 24 and (iii) receive oral feeding with food intake. Patients requiring artificial feeding or who are comatose will be excluded. Observations were conducted in four geriatric care wards of two acute care hospitals and two sub-acute care hospitals.

3.3 | Sampling and recruitment

Purposive sampling was used to gather participants in this study. The clinical nurse educator (CNE) and nursing unit manager (NUM) at the geriatric care wards were provided with a detailed standardised recruitment criterion (see Appendix B) which was used to identify potential participants among inpatients. Once potential participants were determined, a research assistant spoke with the people identified and/or their families to gather informed consent. They also obtained informed consent from the nursing staff who were to assist during the inpatient's mealtime. Participant information sheets were distributed and consent forms were signed by the nursing staff and the inpatients identified or their families. The sample size estimation was conducted using G* power version 3.0.10 software. The statistical test and model settings for the sample size estimation were as follows: *t* tests (means: difference between two independent means). Given the parameter of $\alpha=0.05$, $1 - \beta=0.95$ and a large effect size ($d=0.80$) according to our pilot result, a sample size of 70 was suggested. An attrition rate of 20% was taken into account, thus an estimated sample size of 88 participants was determined and considered sufficient.

3.4 | Instruments

The instruments used in the current study to assess the nutritional status and eating behaviours of the participants include Mini Nutritional Assessment Short-Form (MNA-SF) and Feeding Difficulty Index (FDI).

3.4.1 | Nutritional status

To determine the nutritional levels of the participants, their Mini Nutritional Assessment Short-Form (MNA-SF) scores were collected. The MNA-SF is a validated rapid screening tool that measures the nutritional status of older people and considers their food intake, weight loss, mobility, psychological stress or acute disease, neuropsychological problems (dementia severity) and body mass index or calf-circumference. Each item is scored between 0 and 3, depending on the specific item (see Appendix C). A total screening score is calculated, which could then be classified into three groups: normal nutritional status (12–14 points), at risk of malnutrition (8–11 points) and malnourished (0–7 points) (Kaiser et al., 2009). It is important to determine the nutritional status of people living with dementia in acute care settings and how it may be connected to their feeding difficulties.

3.4.2 | Eating behaviours

The Feeding Difficulty Index (FDI) is a tool developed to evaluate feeding difficulties in older Taiwanese people living with dementia (Liu et al., 2015). The index consists of 19 items that focus on four domains concerned with people's eating behaviours each mealtime: their condition or distractibility, their difficulty in getting food, food refusal and motor difficulties. Each of the 19 items is scored on a 3-point scale where the observed behaviours frequency is tallied and documented (where 0=behaviours not observed, 1=behaviours observed 1–2 times, 2=behaviours observed 3–5 times and 3=behaviours observed greater than 6 times) (Liu et al., 2015). Once the 19 items are individually scored, values are added to gather a total FDI score ranging from 0 to 57 points, where higher scores indicate greater mealtime or feeding difficulties (Liu et al., 2015). In this study, the FDI is used to observe the participants' mealtime difficulties during the observed mealtimes (see Appendix D).

3.5 | Data collection process

The data collected include the (i) demographic characteristics, (ii) nutritional status through MNA-SF and (iii) eating behaviours through observations and FDI. Observations were conducted between June 2020 and April 2022 and the research assistant was well-trained in advance regarding the use of instruments as

well as the observations. The research assistant visited the wards throughout the week to observe the identified participants during their mealtimes. After acquiring informed consent from both the people living with dementia recruited or their families and their nurses, the research assistant observed these people living with dementia from a distance (i.e. across the room, outside the door) as avoid observer bias. The research assistant filled out a 'paper-based observation checklist and FDI for each participant throughout each mealtime, indicating the eating behaviours they observed. The data in the demographics section of the checklist for staff participants, including the level of assistance of the recruited inpatients, were collected through consultation by the registered and enrolled nurses assigned to the recruited inpatients identified by the NUM and CNE. The information on MNA-SF was provided by the dietitians assigned to the wards or collected by the trained research assistant.

3.6 | Data analysis

Data analyses were performed using the Statistical Package for the Social Sciences (SPSS) for Windows, version 25, with the alpha level set at 0.05 for all tests. First, frequency of gender, age, duration of staying in acute care settings, total feeding time, BMI, FDI and MNA-SF were included in the demographic characteristics. Sequentially, the frequency of each FDI item was calculated to compare feeding difficulties between people living with dementia who need partial assistance and those who need full assistance. In addition, the receiver operating characteristic (ROC) curve was calculated to the FDI cut-off point for assistance level (e.g. partial assistance and full assistance). The area under the ROC curve was computed in the ROC analysis for evaluating the discriminatory ability of the diagnostic test (Mandrekar, 2010). Finally, known group analysis was used to compare demographic characteristics between people living with dementia with high FDI scores and low FDI scores.

3.7 | Ethics

As an observational study conducted under the 'MEALS project', ethics approval was provided by the Health and Medical Human Research Ethics Committee (HREC) at the University conducting the study (Grant number: 2019/ETH13112, approved on: 24 March 2020). Informed consent was provided by the administration and staff members of respective Illawarra and Shoalhaven Local Health District hospitals and the next of kin of observed in patients living with dementia.

4 | RESULTS

4.1 | Participants characteristics

Overall, 94 older people participated in the current study, comprising 46 females and 48 males. Table 1 shows participant characteristics,

TABLE 1 Characteristics of the study sample (N = 94).

Items	Mean (SD)	n	%
Age	85.86 (6.41)		
Duration of staying in an acute care setting (days)	14.46 (18.53)		
Total feeding time (min)	24.61 (10.03)		
BMI	24.99 (5.42)		
FDI total score	8.27 (2.80)		
MNA-SF total score	6.31 (2.19)		
0-7 points: malnourished		62	72.1
8-11 points: at risk of malnutrition		23	26.7
12-14 points: normal nutritional status		1	1.2
Gender			
Female		46	48.9
Male		48	43.6
Cognitive status			
Diagnosed with dementia		66	70.2
No formal diagnosis		28	29.8
Anti-psychosis medication			
Yes		41	43.6
No		53	56.4
Level of assistance			
Partial assistance		71	75.5
Full assistance		23	24.5
Assisted by nurse or family member			
Nurse		42	44.7
Family member		52	55.3

Note: The MNA-SF data were missing for eight participants.

including age, duration of staying in acute care settings, total feeding time, BMI, FDI and MNA-SF. On average, participants were 85.86 years old (range = 68-98), with a BMI of 24.99, with an FDI of 8.27 (SD = 2.8) and had stayed in acute care settings for 14.46 days, with an average total feeding time of 24.61 min.

Most of the participants were diagnosed with dementia (n = 66, 70.2%), and 41 participants were taking anti-psychosis medication (43.6%). Regarding nutritional status, 86 (91.4%) participants completed the MNA-SF. The result of the MNA-SF showed that 72.1% of participants were in the range of 0-7 points indicating malnourished, 26.7% of participants were in the range of 8-11 points indicating at risk of malnutrition and only 1.2% of participants were in the of 12-14 points which are typically considered as normal nutritional status. Unsurprisingly, all participants required assistance during mealtime and 24.5% of the participants even required full assistance during mealtime. 55.3% of assistance during mealtime was from a family member, whereas 44.7% of assistance was from a nursing staff.

4.2 | Frequency of FDI items across participants in different assistance levels

As shown in Table 2, there are significant differences in the frequency of the following behaviours between people who require partial assistance and those who require full assistance, including item 1 'Pushes or resists food offered by hand' ($p=0.029$), item 4 'Turns head away or tilts head backward' ($p<0.001$), item 6 'Does not open the mouth or bites the utensils when food is offered' ($p<0.001$), item 10 'Becomes drowsy or falls asleep' ($p=0.040$), item 11 'Discontinues eating for over 1 min' ($p<0.001$), item 14 'Unable to successfully pick up food with utensil' ($p<0.001$), item 15 'Once food is on an eating utensil, unable to get the food effectively into the mouth' ($p<0.001$), item 16 'Uses hand to feed self' ($p<0.001$) and item 19 'Chokes or gags on food' ($p=0.037$). In general, participants report a high frequency of items including item

11 'Discontinues eating for over 1 min' (75.5%), item 12 'Distracted from eating by talking, looking around or watching TV' (70.2%), item 9 'Does not start to eat for at least 1 min when invited to do so' (60.6%), item 17 'Once food is in the mouth, food dribbles out from the mouth' (56.4%) and item 16 'Uses hand to feed self' (51.1%) (see Table 3). Interestingly, people who require partial assistance and those who require full assistance reported different frequencies of items of FDI. Participants who need partial assistance reported higher frequency in item 11 'Discontinues eating for over 1 min' (85.9%), item 12 'Distracted from eating by talking, looking around, or watching TV' (77.5%), item 16 'Uses hand to feed self' (63.4%), item 9 'Does not start to eat for at least 1 min when invited to do so' (59.2%) and item 15 'Once food is on an eating utensil, unable to get the food effectively into the mouth' (59.2%) (see Table 4), whereas participants who need full assistance report higher frequency in item 4 'Turns head away or tilts head backward' (73.9%), item 9 'Does

TABLE 2 Feeding difficulty index items ($N=94$).

Item	Total (%)	Partial assistance (%)	Full assistance (%)	χ^2	p
1. Pushes or resists food offered by hand	16	11.3	30.4	4.76	0.029
2. Negative behaviour towards feeder: pushes, hits, kicks or throws objects at feeder	4.3	4.2	4.3	0.001	0.980
3. Inappropriate verbal statement towards feeder: negative statements about feeder, such as swearing at feeder	8.5	7	13	0.804	0.370
4. Turns head away or tilts head backward	29.8	15.5	73.9	28.35	<0.001
5. Spits out the food	17	15.5	26.1	1.77	0.183
6. Does not open the mouth or bites the utensils when food is offered	20.2	11.3	47.8	14.40	<0.001
7. Leaves the table	13.8	16.9	4.3	2.30	0.130
8. Cannot sit still: slipping or twisting body to affect eating	31.9	35.2	21.7	1.45	0.228
9. Does not start to eat for at least 1 min when invited to do so	60.6	59.2	65.2	0.27	0.605
10. Becomes drowsy or falls asleep	23.4	18.3	39.1	4.20	0.040
11. Discontinues eating for over 1 min	75.5	85.9	43.5	16.93	<0.001
12. Distracted from eating by talking, looking around or watching TV	70.2	77.5	47.8	7.30	0.007
13. Plays with food: does something with food but not eat it	8.5	11.3	0.0	2.83	0.092
14. Unable to successfully pick up food with utensil	43.6	54.9	8.7	15.10	<0.001
15. Once food is on an eating utensil, unable to get the food effectively into the mouth	48.9	59.2	17.4	12.17	<0.001
16. Uses hand to feed self	51.1	63.4	13	17.62	<0.001
17. Once food is in the mouth, food dribbles out from the mouth	56.4	57.7	52.2	0.22	0.640
18. Continuously chews food or holds it in mouth but does not initiate swallowing	34.0	32.4	39.1	0.35	0.554
19. Chokes or gags on food	7.4	4.2	17.4	4.37	0.037

Note: Bold indicates statistically significance value ($p<0.5$).

TABLE 3 Top five frequent items of FDI in the total sample (N=94).

Ranking	Items	Percentage
1	11. Discontinues eating for over 1 min	75.5
2	12. Distracted from eating by talking, looking around or watching TV	70.2
3	9. Does not start to eat for at least 1 minute when invited to do so	60.6
4	17. Once food is in the mouth, food dribbles out from the mouth	56.4
5	16. Uses hand to feed self	51.1

TABLE 4 Top five frequent items of FDI in the sample need partial assistance (N=71).

Ranking	Items	Percentage
1	11. Discontinues eating for over 1 min	85.9
2	12. Distracted from eating by talking, looking around or watching TV	77.5
3	16. Uses hand to feed self	63.4
4	9. Does not start to eat for at least 1 min when invited to do so	59.2
5	15. Once food is on an eating utensil, unable to get the food effectively into the mouth	59.2

TABLE 5 Top five frequent items of FDI in the sample need full assistance (N=23).

Ranking	Items	Percentage
1	4. Turns head away or tilts head backward	73.9
2	9. Does not start to eat for at least 1 min when invited to do so	65.2
3	17. Once food is in the mouth, food dribbles out from the mouth	52.2
4	12. Distracted from eating by talking, looking around or watching TV	47.8
5	6. Does not open the mouth or bites the utensils when food is offered	47.8

not start to eat for at least 1 min when invited to do so' (65.2), item 17 'Once food is in the mouth, food dribbles out from the mouth' (52.2%), item 12 'Distracted from eating by talking, looking around, or watching TV' (47.8%) and item 6 'Does not open the mouth or bites the utensils when food is offered' (47.8%) (see Table 5).

4.3 | Differences between participants with high FDI scores and low FDI scores

As shown in Figure 1, ROC curve statistics were calculated for the FDI cut-off score of 9 to divide participants into the high FDI group and the low FDI group. The AUC of 0.703 indicates an acceptable discriminatory ability. In terms of comparisons between participants with high FDI scores and low FDI scores (see Table 6), there were no significant differences in age, gender ratio, MNA-SF total scores and use of anti-psychosis medication. However, we found that participants with higher FDI scores have longer total feeding times compared to people with lower FDI scores.

5 | DISCUSSION

The aim of the current cross-sectional, observational study was to observe the feeding difficulties and malnutrition in 94 people living with dementia in acute hospital settings. We further examined the difference in age, gender, nutritional levels and total feeding time between observed people living with dementia with high feeding difficulty and low feeding difficulty. We found that all the people living with dementia in acute care settings need either full assistance or partial assistance during mealtime as they might have difficulties eating independently due to cognitive decline (Ataiza et al., 2022). In terms of malnutrition rate, unsurprisingly, more than 70% of the people living with dementia were identified as malnourished, and more than 25% of the people living with dementia were identified as at risk of malnutrition. The high malnutrition rate is aligned with a previous study that found that 53% of people in acute hospital settings were classified as malnourished (Kellett et al., 2016).

The present study also reported the frequency of FDI categories occurring in people living with dementia based on a previous

FDI validation study (Liu et al., 2015). The results found that people living with dementia have more feeding difficulties related to distraction (e.g. discontinue eating for over 1 min and distracted from eating by talking, looking around or watching TV and do not start to eat for at least 1 min when invited to do so). This might be due to significant cognitive decline occurring in people living with dementia (e.g. inhibitory deficits) (Amieva et al., 2004). In addition, although people living with dementia observed to require full assistance and partial assistance shared some common feeding difficulties due to distraction, the results also showed a distinctive pattern of feeding difficulties between the two subgroups. For instance, people living with dementia who require partial assistance have more feeding difficulties related to motor problems (e.g. Uses hand to feed themselves, and Once food is on an eating utensil unable to get the food effectively into the mouth), whereas people living with dementia who require full assistance have more difficulties related to getting food (e.g. Turns head away or tilts head backward, Once the food is

in the mouth, food dribbles out from the mouth and Does not open the mouth or bites the utensils when food is offered). This result highlights the importance of differentiating the needs of people living with dementia between two subgroups (e.g. full assistance and partial assistance), as subgroups require different assistance in addition to basic assistance to minimise distraction. This is where either nursing staff or family members could provide personalised assistance to the people living with dementia that they are caring for in order to provide efficient assistance as well as decrease total feeding time.

Regarding the comparison between the high FDI group and the low FDI group using a cut-off point of nine, the results indicated that there is no difference in age, gender ratio, nutritional level and use of anti-psychosis medication between the two groups. However, we found that the high FDI group has a longer total feeding time than the lower FDI group. These results reflect the fact that people with higher FDI scores require more time with feeding assistance compared to the lower FDI group which might be because of the efficacy of feeding. However, both the higher FDI and the lower FDI groups have a score that indicates a malnourished level. This study confirms a previous study that mealtime assistance training programs for staff and family carers may be crucial in terms of using efficient feeding skills to help people living with dementia have a sufficient food intake disregarding the feeding difficulties people living with dementia are experiencing (Batchelor-Murphy et al., 2015).

Taking the above results into consideration, it seems that people living with dementia who require full assistance and those who require partial assistance need different feeding assistance during mealtime. Therefore, mealtime assistance training programs that help nursing staff and family members to increase awareness of different feeding difficulties and knowledge of feeding skills might be the key factor facilitating nursing staff and family members to provide more efficient feeding assistance to people living with dementia based on their clinical portfolio. Ultimately, mealtime assistance training programs could help to improve the nutritional status of people living with dementia and enhance the feeding assistance skills of staff and family carers. This study provides insights into inform the development of mealtime assistance training programs in both research and clinical practice aspects.

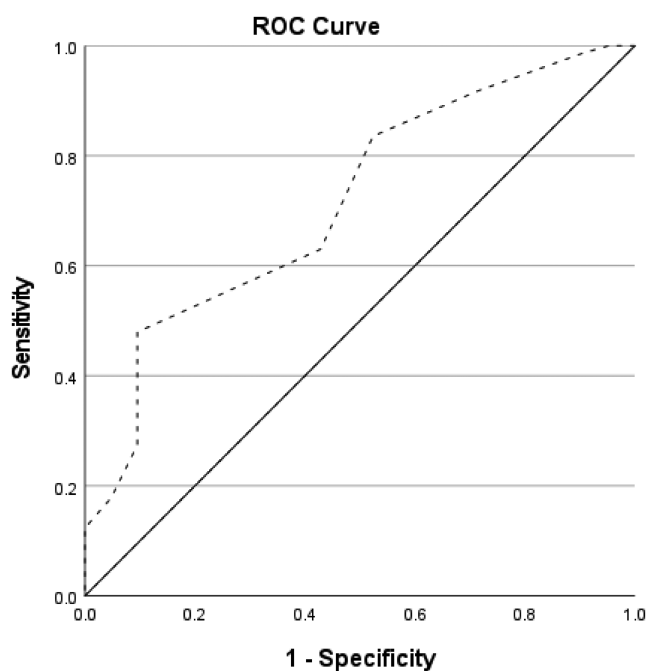


FIGURE 1 Receiver operating characteristic curve.

	FDI ≥ 9 ($n = 37$)	FDI < 9 ($n = 57$)	t (df)	p
Age	85.65 (6.19)	86.00 (6.60)	-0.26 (92)	0.80
Gender, female [reported as n (%)]	16 (43.2%)	30 (52.6%)	0.79 (1)	0.37
MNA-SF total score#	6.17 (2.23)	6.41 (2.17)	-0.50 (84)	0.62
Total feeding time (min)	27.62 (10.59)	22.65 (9.22)	2.41 (92)	0.02
Anti-psychosis medication, yes [reported as n (%)]	20 (54.1%)	21 (36.8%)	2.70 (1)	0.100

Note: The MNA-SF data were missing for eight participants. The cut-off points = 9.

Bold indicates statistically significance value ($p < 0.5$).

TABLE 6 MNA-SF and total feeding time between the participants with high FDI score and low FDI score ($N = 86$).

5.1 | Strengths and limitations

Some limitations to be acknowledged include (1) we observed only one meal of the day and most were at lunchtime while some agitated behaviours such as the impact of sundown syndrome in people living with dementia during mealtime may not be observed. Future studies can consider observing both lunch and dinner meals to compare the differences between mealtimes, (2) we did not include lab data and biomarkers such as albumin level to reflect the nutritional status. This was unfortunately not included in the routine laboratory data and blood tests in all the people admitted to the hospitals visited and (3) the data were collected from ISLHD in Australia and the sample was skewed toward malnourished identified by MNA-SF (72.1%). As a result, these findings may not be generalizable to other regions or conditions among people living with dementia. Nevertheless, this is the first study to adopt FDI in hospital settings which provides valuable information for feeding difficulties using a structured observational instrument among people living with dementia. This study has the potential to improve eating difficulties through evaluating mealtime behaviours as well as informing the development of continued training and relevant education programs.

6 | CONCLUSION

Overall, this study reveals that malnutrition is prevalent in people with dementia and their lengthy feeding time in acute care settings. Moreover, people living with dementia might demonstrate different feeding difficulties depending on the level of dependence. This not only expands the current knowledge of malnutrition and feeding difficulties in people living with dementia in acute care settings but also emphasises the importance of tailored feeding assistance for people living with dementia. Therefore, mealtime assistance training programs are warranted and are likely to benefit nursing staff and family members to develop their feeding skills and knowledge about feeding difficulties.

AUTHOR CONTRIBUTIONS

Made substantial contributions to conception and design, or acquisition of data or analysis and interpretation of data: Ping-hsiu Lin, Chell Ataiza, Mu-Hsing Ho, Yen-Yeh (Vera), Liam Sharp, Hui-Chen (Rita) Chang. Involved in drafting the manuscript or revising it critically for important intellectual content: Ping-hsiu Lin, Chell Ataiza, Mu-Hsing Ho, Yen-Yeh (Vera) Chung, Hui-Chen (Rita) Chang. Given final approval of the version to be published: Ping-hsiu Lin, Chell Ataiza, Mu-Hsing Ho, Yen-Yeh (Vera) Chung, Liam Sharp, Hui-Chen (Rita) Chang. Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: Ping-hsiu Lin, Chell Ataiza, Mu-Hsing Ho, Yen-Yeh (Vera) Chung, Liam Sharp, Hui-Chen (Rita) Chang.

ACKNOWLEDGEMENTS

This study was supported by the Illawarra Health and Medical Research Institute (IHMRI) Clinical Translation Grant Scheme, Australia. Open access publishing facilitated by University of Wollongong, as part of the Wiley - University of Wollongong agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

The authors have no potential conflict of interest relevant to this article to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

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How to cite this article: Lin, P.-H., Ataiza, C., Ho, M.-H., Chung, Y.-Y., Sharp, L., & Chang, H.-C. (2023). A cross-sectional, observational study of nutritional status and eating behaviours in people living with dementia in acute care settings. *Journal of Clinical Nursing*, 32, 5028–5036. <https://doi.org/10.1111/jocn.16729>