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Inadequate fluid intake in long term care residents: prevalence and determinants

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ABSTRACT

Dehydration is estimated to be present in half of long term care residents, as many do not consume the recommended levels of fluid intake. This study aims to describe fluid intake in long term care residents and identify the factors associated with fluid intake. Data were collected from 622 long term care residents, with a mean age of 86.8 ± 7.8. Total fluid intake was estimated over three non-consecutive days. Potential resident and unit-level variables risk factors for low fluid intake were collected, such as dementia status, activities of daily living, and eating challenges. Average daily fluid intake ranged from 311–2390 mL (1104.1 ± 379.3). Hierarchical regression analysis revealed that fluid intake was negatively associated with increased age, cognitive impairment, eating challenges and increased dining room staffing. Being male and requiring more physical assistance were positively associated with intake. Variables identified to predict intake could help inform strategies and targeted interventions to improve fluid intake.

Contribution of the paper

What is already known about the topic?

- Older adults may not regularly drink enough because of a reduced thirst sensation,[1] fear of incontinence that may lead to intentional fluid restriction,[2] forgetting to drink secondary to cognitive impairment[2] and psychotropic medication use may reduce intention to drink.[3]
- It is recommended that older men drink 3700 mL of fluid per day, and older women consume 2700 mL of fluid per day.[4]

What this paper adds

- The present study provides new insight into the potential reasons for low fluid intake that can lead to dehydration, a form on malnutrition in the institutionalized elderly.
- Based on the current sample, residents in long term care are not consuming the daily recommended amount of fluids. Moreover, the majority of residents are not even consuming 1500 mL of fluids per day.
- This study shows that the factors that are contributing the most to poor fluid intake are: older age, being female, presence of mealtime difficulties and requiring physical assistance at meals. The latter two factors should be the focus of future research interventions.

Introduction

Malnutrition is commonly defined as a state of nutrition in which either over- or under-consumption of energy, macro and micronutrients or their utilization by the body, leads to a change

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in body composition and diminished function.[5] Previous research has suggests that approximately 44% of older long term care (LTC) residents are undernourished due to poor food intake, and which is associated with older age, number of eating challenges, pureed/liquidized diet and requiring eating assistance, amongst other variables.[6] Malnutrition could lead to falls, chronic and poor wound healing, hospital admission, disproportionate use of health services and reduced quality of life.[7–11]

A form of malnutrition is dehydration, which refers to insufficient fluid in the body.[12] Dehydration has been conceptualized as various combinatons of intracellular and extracellular fluid depletion,[12,13] and adequate fluid intake is critical for the safe elimination of toxins and waste products, as well as whole-body thermoregulation.[14,15] Insufficient fluid intake can lead to delirium and is a relevant concomitant disorder that can complicate the treatment of many other illnesses, including thrombo-embolic complications, urinary tract or pulmonary infections, kidney stones, hyperthermia, constipation and orthostatic hypotension.[16–19] According to recommendations by the Institute of Medicine (2005),[4] older individuals may not be consuming adequate amounts of fluid; recommendations are 3700 mL and 2700 mL in men and women, respectively. The recommendations also specify that approximately 81% of total water intake should come from beverages, including drinking water, and only 19% of fluids should come from foods.[4] These recommendations for adequate total water intake for older adults were based on self-reported water intake in a young community-dwelling population as part of the NHANES III survey.[4]

According to the National Center for Health Statistics, in 2014 there were 15,600 LTC homes in the United States accommodating approximately 1.4 million older people.[20] Similarly, in 2013 there were an estimated 5,153 nursing homes and 12, 525 residential care homes in the United Kingdom, of which over 90% of residents were 65 years of age or older.[21] Likewise, as of 2015 in Japan, approximately 1.69 million people lived in LTC homes, which was a 40% increase from 2012.[22] These numbers will continue to grow given our rapidly aging population. An international survey of 19 nursing home experts from 8 countries (Australia, Canada, China, Czech Republic, England, France, Italy, the Netherlands, Scotland, and the United States) has cited nutrition as an important research priority.[23] As such, in order to further our knowledge of nutrition in LTC, limit and mitigate the consequences of dehydration, and improve fluid intake in older people, it is critical that we understand the factors associated with and contributing to fluid intake for those residing in LTC.

Older adults are particularly at risk for developing dehydration, as their kidneys are less able to concentrate urine and some medications, such as diuretics, increase fluid excretion.[13] However, the main reason for dehydration in older adults is reduced fluid intake.[24] Older adults may not regularly drink enough because of: a reduced thirst sensation[1]; fear of incontinence that may lead to intentional fluid restriction to avoid needing to get to a toilet or to avoid difficult or painful position changes[2,25]; forgetting to drink secondary to cognitive impairment[2]; decreased access to fluids due which could be exacerbated by poor ambulation[26]; and psychotropic medication.[3] Given that a large proportion of older people who reside in LTC have cognitive impairment, are incontinent of urine and/or have difficulty ambulating,[6] they are also at risk for low fluid intake and becoming dehydrated. Moreover, previous reports have suggested that up to 60% of LTC residents are dehydrated when hospitalized, and end up re-hospitalized due to persistent dehydration.[27] In a recent review, the economic burden of dehydration in older adults was directly associated with increased hospitalizations and use of intensive care units.[28] There are a wide range of interventions and environmental factors that may increase fluid intake and reduce dehydration risk in older people, but the efficacy of many strategies, particularly within the LTC setting, has not been assessed.[29]

In the long term care setting where resident disability in communication, mobility, cognition and eating prevents many from accessing fluid independently,[30] a simple and appropriate approach to assess hydration status is monitoring fluid intake. Previous research studying fluid intake in this setting has only focused on water consumption,[31] used a sample size of less than 50,[30,32] and/or did not include resident-level, unit-level and home-level variables as potential risk factors for low intake.[33] The present study will be the first to look at multiple sources of fluid intake, in a large sample of LTC residents, and consider multiple variables as factors potentially influencing fluid intake. The objectives of this study were to: 1) using a large and diverse sample report the average fluid intake and proportion consuming less than the recommendations; and 2) identify factors associated with fluid intake in LTC residents when adjusting for covariates. Our hypotheses included:

H1: Average fluid intake of participants will be less than 1500 mL /day.
H2: Older participants, those with more eating challenges, those consuming a pureed/liquidized diet, and those requiring eating assistance will consume significantly less fluid than participants without these characteristics.
H3: Participants with greater mobility disability (i.e. poor ambulation) will have significantly lower fluid intake than residents with less mobility disability.
H4: Participants with urinary incontinence will have significantly lower fluid intake than those who are continent.

Materials and methods

The present study is part of the Making the Most of Mealtimes (M3) study, which is a large cross-sectional, multi-site project that took place between 2015 and 2016. The complete protocol is described in detail elsewhere.[34] In brief, 32 Canadian LTC homes participated, and each was purposively selected from four Canadian provinces. Two to three units within each LTC home were randomly selected for recruitment, and a unit specializing in dementia care if available. A total of 82 units participated. Eligible residents: (1) were 65 + years of age; (2) were medically stable (no hospital admission in previous month or palliative); (3) had been in the home for at least one month; (4) ate an oral diet; (5) and typically ate in the dining room. There were 2358 residents living on the recruited units; however, not all residents were eligible. All eligible residents for the selected units within the home were listed in a random number table that was used by trained home staff to determine order for approaching potential participants to see if they were interested in the study. Once 40 eligible residents agreed to hear more about the study, this list was provided to researchers to complete the informed consent process. The first 20 residents or their alternative decision maker who agreed to participate were included for the home. As described in the protocol paper, participants were representative of the units where they lived; age, proportion of males and those requiring alternative decision-makers for consent did not differ between participants and eligible non-participants.[34]

Trained research personnel (4 per province; one research coordinator, two research assistants and one dental hygienist) used consistent methods across all homes to collect data. Three, non-consecutive days (including one weekend day) of weighed and estimated food and fluid intake were collected for each meal and snacks for each participating resident. RAs were typically at the home from before breakfast until after dinner, so most food and fluids throughout the day were tracked by the study team. Plates were