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Original article

Nutritional status predicts preterm death in older people: A prospective cohort study

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SUMMARY

Background & aims: There is an association between malnutrition and mortality. However, it is uncertain whether this association is independent of confounders. The aim of the present study was to examine whether nutritional status, defined according to the three categories in the full Mini Nutritional Assessment (MNA) instrument, is an independent predictor of preterm death in people 65 years and older.

Methods: This prospective cohort study included individuals aged ≥65 years who were admitted to hospital between March 2008 and May 2009 and followed-up after 50 months ($n = 1767$). Nutritional status was assessed with the MNA, and possible risk factors associated with malnutrition were recorded during participants hospital stay. Main outcome measure was overall survival.

Results: Based on the MNA definitions, 628 (35.5%) were well-nourished, 973 (55.1%) were at risk of malnutrition, and 166 (9.4%) of the participants were malnourished at baseline.

During the follow-up period 655 (37.1%) participants died. At follow-up, the survival rates were 75.2% for well-nourished participants, 60.0% for those at risk of malnutrition, and 33.7% for malnourished participants ($p < 0.001$). After adjusting for confounders the hazard ratios (95% CI) for all-cause mortality were 1.56 (1.18–2.07) in the group at risk of malnutrition and 3.71 (2.28–6.04) in the malnourished group.

Conclusions: Nutritional status defined according to the three categories in the full MNA independently predicts preterm death in people aged 65 years and older. These findings are clinically important and emphasise the usefulness of the MNA for screening of nutritional status.

1. Introduction

Malnutrition is one of the most important medical conditions that affect the prognosis in old age.[1] In Europe about one third of older patients admitted to hospital are malnourished,[2–4] which makes it a widespread problem.[2–4] The condition is associated with several negative outcomes such as declined functional ability,[5,6] readmissions, and a prolonged length of stay in hospital.[7] Even more critically, a systematic review from 2012 evaluating different nutrition screening tools concludes that there is some evidence that malnutrition is associated with an increased mortality.[8] However, it is still uncertain whether this association is independent of confounders. The most widely used instrument to assess nutritional status in older people is the Mini Nutritional Assessment (MNA),[2,8] which is recommended by the European Society for Clinical Nutrition and Metabolism (ESPEN).[9]

When examining the relationship between malnutrition and mortality, most studies analyse the total MNA score or use varying methods of subcategorization. Fewer studies investigate the three nutritional status groups separately.[8] The three MNA categories (well-nourished, at risk of malnutrition, malnourished) are used in clinical practice. Further, as the aforementioned systematic review

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includes studies in different residential settings,[10–12] it does not specifically address the question of whether there is a relationship between nutritional status according to the MNA and mortality in older people in hospital.[8] Finally, considerable covariation may exist between nutritional status and possible confounders. Therefore, it is important to determine whether nutritional status predicts early death after adjusting for possible confounders.

The aim of the present cohort study was to examine whether nutritional status defined according to the three categories in the full MNA instrument is an independent predictor of preterm death in people aged 65 years and older.

2. Materials and methods

2.1. Study design and participants

A baseline survey was performed to estimate the prevalence of malnutrition among people ≥65 years of age admitted to a medium-sized Swedish hospital.[13] A total of 2517 individuals were assessed for eligibility to participate in the cross-sectional study. The sample at baseline consisted of 1771 participants in two internal medicine wards ($n = 706$), two surgical wards ($n = 681$), and one orthopaedic ward ($n = 384$). The final cohort for the present study consisted of 1767 participants. Figure 1 describes the recruitment, reasons for exclusions and loss to follow-up.

2.2. Data collection procedure

Baseline data were collected from 3 March 2008 to 29 May 2009. The patients were recruited consecutively during the study period, except on weekends, holidays, and when the wards were closed due to a calicivirus outbreak. The nutritional status was assessed with the MNA instrument during the participants' hospital stay, and possible risk factors associated with malnutrition were recorded. Trained personnel obtained data for participant characteristics and nutritional status at baseline. A detailed description of the baseline survey has been previously published.[13]

The data collected at baseline included clinical characteristics: sex, BMI, smoking status, medication use, diagnoses, length of overnight fast, number of eating episodes, meal provision and living situation. Age was retrieved from the personal identification numbers. Smoking status was defined as current or non-smoker. Medication use before admission and the patient's diagnoses at discharge were retrieved from the patient's medical records. The diagnoses were defined according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10).

Length of overnight fast was defined as the time between the last eating episode in the evening and the first eating episode the morning after. The number of eating episodes per day was recorded as how often the patients usually ate breakfast, lunch, dinner, and between-meal and evening snacks. Meal provision was recorded

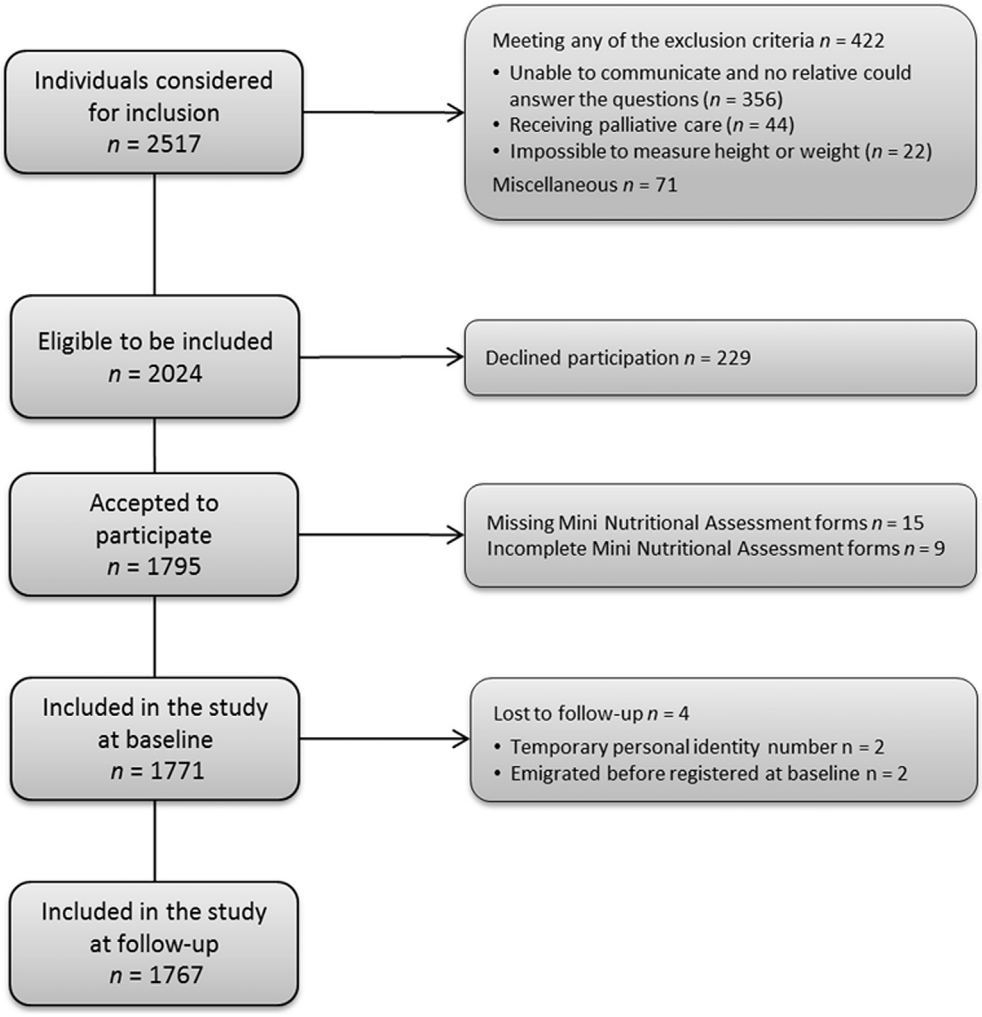

Fig. 1. Flow chart describing participant recruitment.