

REVIEW PAPER

Mini Nutritional Assessment: An Evidence Based Screening Tool for Identifying Geriatric Malnutrition

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ABSTRACT

Malnutrition in older adults is associated with complications and premature death. The progression to malnutrition is often insidious and undetected. The nurse plays a key role in prevention and early intervention of nutritional problem. The Mini Nutritional Assessment (MNA) or Mini Nutritional Assessment- Short Form (MNA-SF) is a screening tool used to identify older adults (>60 years) who are malnourished or at risk of malnutrition. The MNA or MNA-SF is a noninvasive and inexpensive practical evaluation instrument which provides a simple, quick method of identifying older adults who are at risk of malnutrition. The aim of the systematic review is to summarize the available literature on feasibility of MNA for identifying geriatric malnutrition. Computerized searches were performed on the Pubmed, MEDLINE, Google-searches, Cochrane Library databases and also various journals to locate all the articles from 2004 - 2014 on feasibility of MNA and MNA-SF tool for evaluating nutritional status of geriatric people (>60 years). After eliminating the unwanted items based on inclusion and exclusion criteria selected only six studies, which depict specific information about full MNA score and MNA-SF score. This systematic review implies that the MNA and MNA-SF are the most validated and accepted screening tool for geriatric patients, no matter the setting, with clearly defined thresholds. It is the most efficient, simple and appropriate nutritional assessment tool for older people which can detect malnutrition or at risk of

malnutrition before severe weight or albumin loss is present. A physician or a dietician, can complete it easily and nurses in few minutes can not only detect malnutrition but also favor early nutritional intervention in order to improve quality of life.

Keywords: *Malnutrition, Nutritional Screening tool, MNA, MNA-SF.*

BACKGROUND

Malnutrition in older adults is associated with complications and premature death. The progression to malnutrition is often insidious and often undetected. The nurse plays a key role in prevention and early intervention of nutritional problems.

The Mini-Nutritional Assessment Short-Form (MNA-SF) is a screening tool used to identify older adults (> 60 years) who are malnourished or at risk of malnutrition. The MNA-SF is based on the full MNA, the original 18-item questionnaire published in 1994 by Guigoz, et al.¹ The most recent version of the MNA-SF was developed in 2009² and consists of 6 questions on food intake, weight loss, mobility, psychological stress or acute disease, presence of dementia or depression,

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and body mass index (BMI). When height and/or weight cannot be assessed, then an alternate scoring for BMI includes the measurement of calf circumference. Scores of 12-14 are considered normal nutritional status; 8-11 indicates at risk of malnutrition; 0-7 indicates malnutrition. An advantage of the tool is that no laboratory data are needed. An in-depth assessment and physical examination should be performed when patients are identified to be malnourished or at nutritional risk. A 72 hour food diary recording the patient's consumption is another important supplement to the MNA-SF.

The MNA-SF provides a simple, quick method of identifying older adults who are at risk of malnutrition. The MNA-SF should be completed quarterly for institutionalized older adults and yearly for normally nourished community-dwelling older adults.

The full MNA has been validated in many research studies with older adults in hospital, nursing home, ambulatory care, and community settings. Studies have demonstrated internal consistency and inter-observer reliability to range from 0.51 to 0.89.³ The MNA-SF has a sensitivity of 89%, specificity of 82%, and a strong positive predictive value (Youden Index = 0.70).² While the MNA-SF was developed from the full MNA, reliability of the MNA-SF is not yet available.⁴

AIM OF THE STUDY

The aim of this review of literature is to summarize the available literature on feasibility of MNA for identifying geriatric malnutrition.

MATERIAL AND METHODS

A comprehensive search from international Journals, Pub med, Google search, MEDLINE and Cochrane databases were carried out. A systematic review of the published literature 2004- 2014 has been used. The search terms or key words used were Malnutrition, Nutritional Screening tool, MNA (Mini Nutritional Assessment), MNA-SF (Mini Nutritional Assessment-Short Form). The reference lists of articles were checked for further relevant publications. Systematic mixed review approach is used. This approach integrates study findings from studies conducted within the country and outside the country.

STUDY SELECTION

Articles were screened to determine whether the studies found in the search met following inclusion and exclusion criteria.

Inclusion criteria

- Studies related to geriatric nutritional screening tool to identify and management of malnutrition.
- Studies related to Mini Nutritional Assessment – an assessment tool for grading nutritional state of elderly.
- Studies related to Mini Nutritional Assessment-Short Form.
- Studies included that had adequate information pertaining to the objectives.
- Studies which were available in English.
- Literature published from 2004 to 2014.

Exclusion criteria

- Studies with insufficient information

Initial search started with 120 studies. After eliminating the unwanted items based on inclusion and exclusion criteria, only 6 studies were selected which depict specific information about full MNA score and MNA-SF for evaluating nutritional status of geriatric people aged 60 years and above.

STUDY CHARACTERISTICS

Six studies which were conducted in India/abroad included and data were extracted independently by the investigator to obtain details about the sample characteristics, number of samples for the study, detailed information of methodology, tools used and its outcomes. The review was done under the following headings such as authors, title, methodology, results, and source.

DISCUSSION

The systematic review was undertaken to provide necessary information regarding feasibility of use of the MNA tool in routine geriatric assessment and also found that MNA is able to classify the elderly as well nourished and malnourished with reasonable accuracy.

Study Characteristics:

AUTHOR	TITLE	METHODOLOGY	RESULTS	SOURCE
Bawejas, Agarwal H, Mathur A, Haldiya KR (2008) ⁵	Assessment of nutritional status and related risk factors in community dwelling elderly in Western Rajasthan	Cross sectional study. 1000 community dwelling elderly population aged 60 years and above (both rural and urban). Nutritional assessment was done by MNA.	7.1% were malnourished, 50.3% were at risk of malnutrition and only 42.6% were well nourished. Rural elderly were more malnourished (11.0%) and at risk of malnutrition (61.6%) than urban elderly (2.1% and 36.4% respectively).	Journal of the Indian Academy of Geriatrics 2008;4(1):5-13.
Vedantam A, Subramaniam V, Rao NV and John KR(2010) ⁶	Malnutrition in free living elderly in rural South India: prevalence and risk factors	Cross sectional study. 227 free-living rural elderly aged 60 years and above selected randomly. Nutritional status was assessed by using MNA	14% were malnourished and 49% were at risk of malnourishment. No significant difference was found between men and women. More than 60% of the subjects had low MNA scores (<23.5) indicating deficit in protein energy intake.	Public Health Nutrition 2010;13(9):1328-32
Valeria Maria Caselato Sousa, Maria Elena Guariento, Gilberto Crosta, Mariangela Antunes da Silva Pinto and Valdemiro Carlos Sgarbieri (2011) ⁷	Using the Mini Nutritional Assessment to evaluate the profile of elderly patients in a Geriatric Out patient Clinic and in long term institution	Transversal observation study. 90 elderly people of both gender over 60 years of age in 3 different settings. The MNA-SF was used to evaluate the patients for this study.	At the HC Geriatric outpatient clinic the risk of malnutrition was found to be 72.73% while 27.27% of the patients were eutrophic; no malnourished elderly were found. At the ASVP, 15.38% of elderly patients were found to be malnourished, 35.90% were found to be at risk of malnutrition and 48.72% were eutrophic. At the PMI, 42.50% of the elderly patients were found to be malnourished, 2.5% were at risk of malnutrition and 32.50% were eutrophic.	International Journal of clinical medicine 2011; 2:582-587
Kaiser MJ, Baver JM, Uter W, Domini LM, Stange I, et al (2011) ⁸	Prospective Validation of the Modified Mini Nutritional Assessment Short Forms in the community, nursing home and rehabilitation setting	Prospective analysis study. Setting was community, nursing home and rehabilitation. 657 elderly aged 65 years and above. Measurement was done by classification agreement between full MNA score and MNA-SF.	The MNA classified 56.3% of participants were well nourished, 29.7% as at risk and 14.0% as malnourished. Agreement between the full MNA and classification using the MNA-SFs was 84.6% when the MNA-SF using body mass index (BMI) was applied and 81.4% when the MNA-SF using calf circumference(cc) was applied. The highest agreement of classification was found in the community setting (90.8% and 90.4%, respectively) and the lowest in the rehabilitation setting (72.4% and 71.4% respectively).	Journal of American Geriatric Society, 2011;59(11):2124-28.

Study Characteristics:

AUTHOR	TITLE	METHODOLOGY	RESULTS	SOURCE
Abdul Ghani, Sarfraz Hussain, Muhhamad Zubair (2013) ⁹	Assessment of Nutritional Status of Geriatric Population in Sargodha city	Cross sectional study. Study was conducted in four randomly selected Union Council of Sargodha city. 380 geriatric people aged 60 years and above selected by systematic random sampling. Nutritional status was evaluated by MNA.	5.53% of subjects were malnourished and 42.10% were at risk of malnutrition. Malnutrition was more prominent in males (3.16%) as compared to the females (2.37%) of same age group. The prevalence of malnutrition was significantly higher in upper age group of geriatric (80 years and above)	Int J med Appl health, 2013;1 (1)
Jose Shilpa and Kumari KS (2014) ¹⁰	Validity assessment of MNA among an elderly population in Kerela, South India	Two stage cluster sampling. 500 elderly persons above 60 years. Nutritional status was assessed by using a comprehensive approach including anthropometry, biochemical and clinical assessment, and also MNA tool.	Nutritional status assessment by MNA score revealed that more than half of elderly (53.6%) were well nourished, followed by “at risk” elders (39.6%) and malnourished (6.8%). Using clinical status of subject as “gold standard” the MNA demonstrates a sensitivity of 90.2% and specificity of 96.4% in identifying well nourished and malnourished elderly, which is excellent. Use of BMI as a ‘gold standard’ also showed that MNA had excellent sensitivity (95.4%) and specificity (93.9%) in identifying malnutrition.	International Journal of Advanced Research, 2014;2 (2):214-221

Baweja S, Agarwal H, Mathur A, and Haldiya KR⁵ conducted a cross sectional study to assess nutritional status of 1000 community dwelling elderly population aged 60 years and above (43.8% subjects from urban area and 56.2% subjects from rural areas) in western Rajasthan. Nutritional status assessment was done by using 18 items (30 points) Mini Nutritional Assessment (MNA) scale. The result of the study revealed that 7.1% elderly were malnourished while 50.3% were at risk of malnutrition and only 42.6% were well nourished. Rural elderly were more malnourished (11.0%) and at risk of malnutrition (61.6%) than urban elderly (2.1% and 36.4% respectively).

Vedantam A, Subramanian V, Rao N. V and John KR⁶ carried out a cross sectional study to estimate the prevalence of malnutrition among free living elderly (aged

60 years and above) in a rural population of Kaniyambadi block, a rural development block in the state of Tamil nadu. Nutritional status was assessed using the Mini Nutritional Assessment (MNA) questionnaire. The result of the study revealed as evaluated by the MNA 14% of the 227 subjects were malnourished and 49% were at risk of malnourishment. More than 60% of the subjects had low MNA scores (<23.5) indicating deficit in protein-energy intake which is common among the rural elderly of South India and requires more attention.

Valeria Maria Caselato-Sousa, Maria Elena Guariento, Gilberto Crosta, Mariangela Antunes da Silva Pinto, Valdemiro Carlos Sgarbieri⁷ conducted a study to verify the nutritional profile of elderly individuals through the application of the MNA in three different locations: at the

Geriatric outpatient clinic and two long-term institutions. Through transversal observation study, the MNA was applied to 90 elderly people of both genders over 60 years of age. The MNA version modified by Rubenstein et al.¹⁴ and translated into Portuguese was used to evaluate the patients for this study. Results of the study revealed that at the AG, the risk of malnutrition was found to be $72.73\% \pm 3.77\%$, while $27.27\% \pm 3.77\%$ of the patients were eutrophic; no malnourished elderly patients were found. At the ASVP, $15.38\% \pm 11.28\%$ of elderly patients were found to be malnourished, $35.90\% \pm 15.10\%$ were found to be at risk of malnutrition and $48.72\% \pm 15.72\%$ were eutrophic. At the PMI, $42.50\% \pm 15.30\%$ of the elderly patients were found to be malnourished, $25\% \pm 13.40\%$ were at risk of malnutrition and $32.50\% \pm 14.50\%$ were eutrophic.

Kaiser MJ, Bauer JM, Uter W, Donini LM, Stange I, Volkert D et al⁸ conducted a study to validate the modified Mini Nutritional Assessment (MNA) short-forms (MNA-SFs) with respect to agreement with full MNA classification in the target populations of the MNA. A prospective analysis study was conducted in community, nursing home, rehabilitation setting. Six hundred fifty-seven individuals aged 65 and older (75.3% female; mean age 82.3 ± 7.4) were selected for the study. Measurement was done by classification agreement between full MNA score and MNA-SF scores. The result of the study revealed that agreement between the full MNA and classification using the MNA-SFs was 84.6% when the MNA-SF using body mass index (BMI) was applied and 81.4% when the MNA-SF using calf circumference (CC) was applied. The highest agreement of classification was found in the community setting (90.8% and 90.4%, respectively) and the lowest in the rehabilitation setting (72.4% and 71.4%, respectively). Both MNA-SFs tended to underestimate nutritional status, but that was significant only for the MNA-SF with CC. The study was concluded that the modified MNA-SFs represent a valuable tool for rapid and reliable nutritional screening.

Abdul Ghani, Sarfraz Hussain, Muhammad Zubair⁹ conducted a study to assess the nutritional status of geriatric people aged 60 years and above in four Union Councils of Sargodha city. A representative sample of 380 subjects (randomly selected) were studied, out of which 209 were males and 171 were females. Nutritional status was evaluated by anthropometric measurements to calculate the body mass index, mid-arm circumference,

calf circumference and by data collected through the Mini Nutritional Assessment (MNA). The MNA results revealed that 5.53% of subjects were malnourished and 42.10% were at risk of malnutrition. Malnutrition was more prominent in males (3.16%) as compared to the females (2.37%) of same age group. The prevalence of malnutrition was significantly higher in upper age group of geriatric (80 years and above) population.

Jose Shilpa and Kumari K.S¹⁰ conducted a study on validity assessment of MNA among an elderly population in Kerala, South India. Two stage cluster sampling was adopted to select 500 elderly persons, 60 years of age who were free from apparent terminal illness or psychological abnormalities. Nutritional status of elderly was assessed by using a comprehensive approach including anthropometry, biochemical and clinical assessment. Also a global tool for assessment of nutritional status of elderly, the Mini Nutritional Assessment (MNA) tool was also used. The result of the study shows that nutritional status assessment by MNA score revealed that more than half of elderly (53.6%) were well nourished followed by “at risk” elders (39.6%) and malnourished (6.8%). Using clinical status of subject as “gold standard”, the MNA demonstrates a sensitivity of 90.2% and specificity of 96.4% in identifying well nourished and malnourished elderly, which is excellent. Use of BMI as a ‘gold standard’ also showed that MNA had excellent sensitivity (95.4%) and specificity (93.9%) in identifying malnutrition.

STRENGTHS AND LIMITATIONS

Unlike many other nutritional instruments, the full MNA and the MNA-SF were developed to be user-friendly, quick, non-invasive, and inexpensive. The MNA-SF takes about 5 minutes to complete and the questions can easily be incorporated into a complete geriatric assessment. The MNA and MNA-SF have been used extensively in clinical research in over 200 international studies.¹¹ A limiting factor may be the accurate assessment of height and weight to obtain BMI in bedridden individuals. To that end, users of the MNA-SF can substitute calf circumference for BMI. However, clinician lack of familiarity with the requirement of measuring calf circumference is a potential limitation.¹² Question A focuses on food intake (not artificial nutrition), and the appropriateness of the MNA-SF for use in older adults who receive tube-feeding¹³ or total parenteral nutrition needs to be considered. Patients

receiving tube-feeding or total parenteral nutrition should be monitored by a dietician or trained nutrition support professional.

CONCLUSION

The MNA provides a number of unique opportunities useful for practice. It is important to sensitize health professional to the problem of malnutrition in older people, especially the frail and ill. Up to date, the MNA is the most validated and accepted screening tool for geriatric patients, no matter the setting, with clearly defined thresholds. It is the most efficient, simple and appropriate nutritional assessment tool for older people. BMI cannot differentiate thin with good nutritional status or obese with malnutrition; albumin plasma level is not useful in the presence of dehydration or an inflammation; previous weight (which is often difficult to determine) is not necessary; the MNA can detect malnutrition or risk of malnutrition before severe weight or albumin loss is present; the MNA allows nutritional intervention and follow-up; it can be completed easily by a physician, a dietician, a nurse or generalist assessor in few minutes and not only detect malnutrition but also favour early nutritional intervention in order to improve nutritional parameters and especially improve quality of life.

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