Original Article

Validity and user-friendliness of the minimal eating observation and nutrition form – version II (MEONF – II) for undernutrition risk screening

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Abstract

Objective: To analyze the criterion-related validity and user-friendliness of the Minimal Eating Observation and Nutrition Form – Version II (MEONF – II) and Malnutrition Universal Screening Tool (MUST) in relation to the Mini Nutritional Assessment (MNA). In addition, the effect of substituting body mass index (BMI) with calf circumference (CC) was explored for the MEONF-II.
Methods: The study included 100 patients who were assessed for nutritional status with the MNA (full version), considered here to be the gold standard, and screened with the MUST and the MEONF-II. The MEONF-II includes assessments of involuntary weight loss, BMI (or calf circumference), eating difficulties, and presence of clinical signs of undernutrition.
Results: The MEONF-II sensitivity (0.73) and specificity (0.88) were acceptable. Sensitivity and specificity for the MUST were 0.57 and 0.93, respectively. Replacing the BMI with CC in the MEONF-II gave similar results (sensitivity 0.68, specificity 0.90). Assessors considered MEONF-II instructions and items to be relevant, easy to understand and complete (100%), and the questions to be relevant (98%). MEONF-II and MUST took 8.8 and 4.7 minutes to complete, respectively, and both were considered relevant and easy to finish. In addition, MEONF-II was thought to reveal problems that allows for nursing interventions.
Conclusions: The MEONF-II is an easy to use, relatively quick, and sensitive screening tool to assess risk of undernutrition among hospital inpatients, which allows for substituting BMI with CC in situations where measures of patient height and weight cannot be easily obtained. High sensitivity is of primary concern in nutritional screening and the MEONF-II outperforms the MUST in this regard.

Keywords: *undernutrition*; *screening*; *criterion-related validity*; *acceptability*; *MEOF*; *MNA*; *MUST*; *MEONF*

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Background

Undernutrition is associated with poorer health, compromised ability to recover from medical conditions, and increased mortality (1). People at risk for or who have already developed undernutrition, therefore, need to be identified in order to initiate prevention or treatment interventions. Methods to assess risk of undernutrition can generally be divided into: initial screening tools (quick and simple assessments to identify people at potential risk for undernutrition) and later assessment tools (more detailed and in-depth evaluations of nutritional status) (2). A low body mass index (BMI) and unintentional weight loss are considered key indicators of undernutrition (3). This is reflected in commonly used tools such as the MUST (4) and the Mini Nutritional Assessment (MNA) (5, 6). The MUST and the first part of the MNA (MNA-SF, short form) are initial screening tools, whereas the full MNA also includes a later detailed assessment tool (4–6).

Recently it was shown that when replacing the BMI in MNA-SF with a measure of calf circumference (CC) there was a large congruence between the original MNA-SF and the one based on CC (7). This increases its usefulness in cases when height and/or weight cannot be obtained. The CC is a specific indicator for sarcopenia, correlating with serum albumin and BMI (8, 9).

In Sweden, guidelines for undernutrition risk screening have been developed based on three criteria: unintentional

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weight loss, eating difficulties, and low BMI (10). These criteria were recently operationalized in the MEONF-I (11) and its subsequent modification (MEONF-II). Since food and nutrition is an interdisciplinary field where nurses typically have a central assessment and intervention role, MEONF is based within an interdisciplinary nursing framework (11). Specifically, since the nutritional screening typically is carried out by nurses, assessments should be relevant to nursing care by identifying care needs in order to increase the likelihood that it will be carried out and followed up. This may be achieved through the MEONF (11) as it combines an effort to describe mealtime problems with the classical signs of undernutrition. However, its usefulness relative to other tools such as the MNA and MUST remains untested.

Here we tested the criterion-related validity and user-friendliness for the modified MEONF, hereafter labeled MEONF-II, and MUST in relation to MNA, and whether CC can be substituted for the BMI criterion in MEONF-II.

Methods

Sample

The sample consisted of inpatients >65 years old at three departments (orthopedics, stroke, and cardiology) at a hospital in southern Sweden. The selection of specialties was based on the prior knowledge that many patients with such illnesses are at risk for undernutrition (stroke 31%, cardiopulmonary 58%, and orthopedic conditions 60%) (12). One hundred and ten consecutive people were invited to participate, of which 10 declined participation in the study. The study was approved by the local ethics council (Reg. No. ER 2008-20).

Assessments

Background data such as age, sex, perceived disease severity – rated as mild, moderate, or severe (13) – was registered.

Mini Nutritional Assessment (MNA)

The MNA was developed for use among elderly patients (14). The initial screening part of the MNA (MNA-SF) contains six items yielding a score between 0 and 14, where scores below 12 are considered indicative of risk for undernutrition (15). The second, more detailed assessment part consists of 12 items and is carried out if the MNA-SF score is less than 12. The maximum possible total score for the entire MNA (all 18 items) is 30. A score less than 17 is indicative of undernutrition. Patients scoring 17–23.5 are at risk for undernutrition, while patients scoring more than 24 points are considered well-nourished (15). The tool has been shown to have high sensitivity (96%), specificity (98%), and positive predictive value (97%) when compared with extensive assessments of patients' nutritional status (5). Inter-rater reliability (Kappa, K) for the final assessment has ranged between 0.41 (16) and 0.51 (5). Here we used the full 18-item version as the gold standard for determination of nutritional status (2).

Malnutrition Universal Screening Tool (MUST)

The MUST is an undernutrition risk screening tool based on BMI, unintentional weight loss, and whether the patient is acutely ill and has not or probably will not be able to eat for more than 5 days (4). The MUST yields a score between 0 and 6, where 0 indicates low risk for undernutrition, a score of 1 indicates moderate risk, and ≥2 indicates high risk. Compared with the MNA-SF, MUST-based assessments have yielded moderate (17) Kappa values (0.55–0.60) among medical and surgical patients (4), and fair to moderate Kappa values (0.36–0.45) when using the full MNA as the comparator among surgical and elderly patients (4). Inter-rater reliability has been high (K, 0.81–1.00) (18, 19).

Minimal Eating Observation and Nutrition Form (MEONF)

The MEONF-I was developed from the MEOF (12, 20) and the criteria unintentional weight loss, low BMI (<20 for 69 years or younger or <22 for 70 years or older) (10), and an additional assessment of the presence or absence of clinical signs of undernutrition (11). All problems are scored 1 besides if having unintentional weight loss (score 2) and if having decreased energy/appetite (score 2) since such problems are significant indicators or predictors of undernutrition (12, 20). MEONF-I yields a total score ranging from 0 to 7 in the main part followed by clinical signs giving a score of either 0 or 1 (11). Inter-rater reliability (weighted Kappa) has been 0.81 (11).

In MEONF-II (Appendix 1), the main part and clinical signs are combined to yield a total score ranging from 0 to 8. A score of 0–2 is interpreted as low risk for undernutrition, a score of 3–4 is considered a moderate risk, and a score ≥5 as high risk for undernutrition. In this study we also tested whether CC (<31 centimeters = risk) could be substituted for BMI without loss of precision in the tool, hereafter labeled MEONF-II-CC.

Procedure

Two nurses on two wards and one nurse on one ward received written information about the study and the included assessment methods. In addition, the assessment methods were reviewed with the nurses separately on the various wards for about 30 minutes per ward. Assessments according to the respective tools were made by the first author (CV) or one of the selected nurses during lunch or dinner.

User-friendliness of the three tools was evaluated by recording the time required to complete each tool and by inquiring the assessors of their perceived ease of

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understanding and following instructions, ease of understanding and completing items, and whether items were perceived as relevant. Assessors were also invited to provide additional comments.

Analyses

Sensitivity, specificity, positive and negative predictive values (PPV and NPV, respectively), and accuracy was calculated providing values ranging from 0 to 1 (or equivalently expressed as a percentage), where higher values are preferred (21, 22). User-friendliness data were analyzed descriptively. The analyses were carried using SPSS 16.0 for Windows (SPSS Inc., Chicago, IL).

Results

Demographical data are presented in Table 1. The proportion of people at risk for undernutrition according to the various methods ranged from 28 to 42% (Table 2). The sensitivity (i.e. proportion of people correctly identified as at risk for undernutrition according to the full MNA) for the MEONF-II and MEONF-II-CC was 73 and 68%, respectively (Table 3). For the MUST, sensitivity was 57%. That is, the three methods missed 27, 32, and 43%, respectively, of cases identified at risk for undernutrition by the MNA. The specificity (i.e. proportion of people correctly identified as not at risk for undernutrition according to the full MNA) for the MEONF-II and MEONF-II-CC was 88 and 90%, respectively, and for the MUST it was 93% (Table 3).

A positive MEONF-II result, indicating that risk of undernutrition was present, was associated with a PPV of 81%; that is, a 81% probability (MEONF-II-CC 82%) that the individual really was undernourished (according to the full MNA). A negative MEONF-II result, indicating that risk of undernutrition was not present, was associated with a NPV of 82%; that is, a 82% probability (MEONF-II-CC 80%) that the individual really was not undernourished. For the MUST, PPV and NPV were 86% and 75%, respectively. The exact proportion of agreement (accuracy) according to the various methods was similar (78–82%) in relation to the total MNA (Table 3).

The average time required for assessments according to the MNA (full version) was 15.25 min, for MUST it was 4.7 min, and for MEONF-II it was 8.84 min (Table 4). Most assessors considered the instructions and items easy to understand. Three quarters felt that some items in the MNA method were not relevant, while items in the MUST and the MEONF-II were considered relevant by most assessors. Items were generally found easy to complete. In addition, one nurse commented that the MEONF *is easy to use and enables one to see what the problems are and to intervene accordingly.*

Discussion

The study provides support for the validity and user-friendliness of the MEONF-II and MEONF-II-CC in a study group selected based on an earlier study in which undernutrition and eating problems were found to be common, i.e. in stroke, cardiac, and orthopedic

Table 1. Background variables for persons included in the study, $n = 100$

	Ward			
	Orthopedics *n* = 34	Cardiology *n* = 33	Stroke *n* = 33	Total *n* = 100
Age				
Median (md)	82.5	82.0	80.0	81.0
(q1–q3)	(74.0–86.3)	(74.0–85.0)	(72.0–86.5)	(73.0–85.8)
Mean	80.8	79.7	78.8	79.8
(SD)	(7.4)	(7.8)	(8.6)	(7.9)
95% CI	78.2–83.4	77.0–82.5	75.7–81.7	78.2–81.3
Sex	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Women	25 (73.5)	16 (48.5)	17 (51.5)	58 (58.0)
Men	9 (26.5)	17 (51.5)	16 (48.5)	42 (42.0)
Perceived degree of severity of illness[a]				
Mild	2 (6.0)	1 (3.0)	2 (6.5)	5 (5.0)
Moderate	26 (76.5)	23 (69.5)	18 (58.0)	67 (68.5)
Severe	6 (17.5)	8 (24.5)	11 (35.5)	25 (25.5)
No illness	0 (0.0)	1 (3.0)	0 (0.0)	1 (1.0)

[a]Internal attrition in the patient group with stroke $n = 2$.
Abbreviations: q1–q3, inter-quartile range; SD, standard deviation; CI, confidence interval.

Table 2. Percentage of individuals identified as at risk of undernutrition, $n = 100$

	Ward			
	Orthopedics $n = 34$, (%)	Cardiology $n = 33$, (%)	Stroke $n = 33$, (%)	Total $n = 100$, (%)
MEONF-II	13 (38.2)	9 (28.1)[a]	15 (45.4)	37.4[a]
MEONF-II-CC	13 (38.2)	7 (21.9)[a]	14 (42.4)	34.4[a]
MUST	9 (26.4)	7 (21.3)	12 (36.4)	28.0
MNA (full version)	9 (26.4)	17 (51.6)	16 (48.5)	42.0

[a]Internal attrition $n = 1$.
Abbreviations: MEONF-II, Minimal Eating Observation and Nutrition Form – Version II; MEONF-II-CC, the MEONF-II based on calf circumference (instead of BMI); MNA, Mini Nutritional Assessment; MUST, Malnutrition Universal Screening Tool.

patients (12). Similarly, user-friendliness of the MUST was also supported but its ability to detect cases at risk for undernutrition was limited.

Criterion-related validity for the MEONF-II was generally high with exact agreement of 82% (MEONF-CC, 81%) as compared to the gold standard (MNA, full version). However, this conclusion is dependent on the appropriateness of the MNA as the gold standard. For example, one review [(15), p. 395] notes that although MNA 'may not serve as a gold standard, it nevertheless must be recognized as a relevant reference in the field.' A major strength of the MNA, however, is that it detects risk of malnutrition at a time when BMI and albumin levels are still normal (14). Furthermore, the MNA has been used as the comparator, or gold standard, also in numerous studies [e.g. (4, 23, 24)].

Agreement greater than 80% is considered to be reasonably high (21). The MEONF-II assessment correlated well with the MNA with specificity, NPV, PPV, and exact agreement of 81% or more, while sensitivity was 73%. The MEONF-II is a screening tool designed to detect risk of undernutrition. As such, it is reasonable for sensitivity to be given priority at the cost of specificity since overidentification is preferable to underidentification, given that positive screening results are followed by in-depth assessment (7, 22). To reduce the risk of undernutrition it is important in the hospital and long-term care settings to screen for such risk using a validated tool that can culminate in an effective individualized prevention or treatment plan (25). In this respect the MUST appears less well suited, since its sensitivity was noticeable lower compared to that of MEONF-II.

Previously the MEONF-I was shown to have high inter-rater reliability (weighted Kappa, 0.81) (11, 17). In addition, the MEONF-II demonstrated good user-friendliness in terms of easily understood instructions, as well as item relevance and completion. Similarly, Cansado et al. (26) concluded in their study that the MUST was more user-friendly than the MNA. In these respects, our observations suggest that MEONF-II compares favorably to both the MNA and the MUST. One reason that the MEONF-II is considered to be user-friendly and relevant in the care setting may be because it can enable staff to identify the patient's problems and intervene directly.

The time requirement was shortest for the MUST (4.7 minutes), followed by the MEONF-II (8.84 minutes), and then the MNA (15.25 minutes). A study conducted by

Table 3. Criterion-related validity of the MEONF-II and MUST compared to MNA (full version), $n = 100$

	Number of patients								
	A	B	C	D	SENS[b] (95% CI)	SPEC[c] (95% CI)	PPV[d] (95% CI)	NPV[e] (95% CI)	Accuracy[f]
MEONF-II[a]	30	7	11	51	0.73 (0.57–0.86)	0.88 (0.77–0.95)	0.81 (0.65–0.92)	0.82 (0.70–0.91)	0.82
MEONF-II-CC[a]	28	6	13	52	0.68 (0.52–0.82)	0.90 (0.79–0.96)	0.82 (0.65–0.93)	0.80 (0.68–0.89)	0.81
MUST	24	4	18	54	0.57 (0.41–0.72)	0.93 (0.83–0.98)	0.86 (0.67–0.96)	0.75 (0.63–0.84)	0.78

	MNA	
MEONF-II/ MEONF-II-CC/ MUST	UN-risk/UN	Not at risk
UN-risk/UN	A	B
Not at risk	C	D

[a]Internal attrition $n = 1$; [b]SENSitivity = A/(A + C); [c]SPECificity = D/(B + D); [d]Positive Predictive Value (PPV) = A/(A + B); [e]Negative Predictive Value (NPV) = D/(C + D); [f]Accuracy = A + D/(A + B + C + D).
Abbreviations: CI, confidence interval; MEONF-II, Minimal Eating Observation and Nutrition Form–Version II; MEONF-II-CC, MEONF-II based on calf circumference (instead of BMI); MNA, Mini Nutritional Assessment; MUST, Malnutrition Universal Screening Tool; UN, undernutrition.

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Table 4. Acceptability; that is, user-friendliness of the MNA, MUST, and MEONF-II methods, $n = 100$

	MNA	MUST	MEONF-II
Time requirement (minutes)			
Mean (SD)	15.25 (4.5)	4.7 (1.4)	8.84 (3.3)
Min–max	10–30	1–10	5–20
Instructions easy to understand (%)	100	98	100
Items easy to understand (%)	96	100	100
Items easy to answer (%)	94	100	100
Items relevant (%)	23	89	98

Abbreviations: MEONF-II, Minimal Eating Observation and Nutrition Form – Version II; MNA, Mini Nutritional Assessment; MUST, Malnutrition Universal Screening Tool.

Harris and Haboubi (27) also shows that the MUST takes between three and five minutes. Since the MNA is not exclusively a screening method but alsoan assessment tool, the amount of time required for its full version cannot be directly compared. Another aspect of user-friendliness is calculation of BMI, which may be considered difficult and time-consuming; in addition, height and weight cannot always easily be obtained (28). This study showed that sensitivity of the MEONF-II was similar regardless of whether it was based on BMI or CC. This is in accordance with previous findings (7). Although this facilitates its use among, for example, bedridden patients for whom weight and height may not be readily obtained, it must be stressed that weight and BMI are important measures that should be obtained whenever possible in order to monitor nutritional status.

Conclusion

The MEONF-II is an easy to use, relatively quick, and sensitive screening tool to assess risk of undernutrition among hospital inpatients, which allows for substituting BMI with CC in situations where measures of patient height and weight cannot be easily obtained.

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Conflict of interest and finding

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References

1. Dey DK, Rothenberg E, Sundh V, Bosaeus I, Steen B. Body mass index, weight change and mortality in the elderly. A 15 y longitudinal population study of 70 y olds. Eur J Clin Nutr 2001; 55: 482–92.
2. Kondrup J, Allison SP, Elia M, Vellas B, Plauth M. ESPEN guidelines for nutrition screening 2002. Clin Nutr 2003; 22: 415–21.
3. Locher JL, Roth DL, Ritchie CS, Cox K, Sawyer P, Bodner EV, et al. Body mass index, weight loss, and mortality in community-dwelling older adults. J Gerontol A Biol Sci Med Sci 2007; 62: 1389–92.
4. Stratton RJ, Hackston A, Longmore D, Dixon R, Price S, Stroud M, et al. Malnutrition in hospital outpatients and inpatients: prevalence, concurrent validity and ease of use of the 'malnutrition universal screening tool' ('MUST') for adults. Br J Nutr 2004; 92: 799–808.
5. Vellas B, Guigoz Y, Garry PJ, Nourhashemi F, Bennahum D, Lauque S, et al. The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. Nutrition 1999; 15: 116–22.
6. Guigoz Y, Vellas B, Garry PJ. Assessing the nutritional status of the elderly: the Mini Nutritional Assessment as part of the geriatric evaluation. Nutr Rev 1996; 54: S59–65.
7. Kaiser MJ, Bauer JM, Ramsch C, Uter W, Guigoz Y, Cederholm T, et al. Validation of the Mini Nutritional Assessment short-form (MNA-SF): a practical tool for identification of nutritional status. J Nutr Health Aging 2009; 13: 782–8.
8. Rolland Y, Lauwers-Cances V, Cournot M, Nourhashemi F, Reynish W, Riviere D, et al. Sarcopenia, calf circumference, and physical function of elderly women: a cross-sectional study. J Am Geriatr Soc 2003; 51: 1120–4.
9. Bonnefoy M, Jauffret M, Kostka T, Jusot JF. Usefulness of calf circumference measurement in assessing the nutritional state of hospitalized elderly people. Gerontology 2002; 48: 162–9.
10. SWESPEN. Nutritionsbehandling i sjukvård och omsorg. Swedish Society for Clinical Nutrition and Metabolism; 2006.
11. Westergren A, Vallén C. Validity and reliability of minimal eating observation and nutrition form (MEONF). Clin Nutr 2010; 5: 61.
12. Westergren A, Unosson M, Ohlsson O, Lorefalt B, Hallberg IR. Eating difficulties, assisted eating and nutritional status in elderly (> or = 65 years) patients in hospital rehabilitation. Int J Nurs Stud 2002; 39: 341–51.
13. Hagell P, Sandlund B. Patients' self-assessment of disease and symptom severity in Parkinson's disease. Qual Life Res 2000; 9: 285.
14. Guigoz Y, Lauque S, Vellas BJ. Identifying the elderly at risk for malnutrition. The Mini Nutritional Assessment. Clin Geriatr Med 2002; 18: 737–57.
15. Bauer JM, Kaiser MJ, Anthony P, Guigoz Y, Sieber CC. The Mini Nutritional Assessment – its history, today's practice, and future perspectives. Nutr Clin Pract 2008; 23: 388–96.

16. Wikby K, Ek AC, Christensson L. The two-step Mini Nutritional Assessment procedure in community resident homes. J Clin Nurs 2008; 17: 1211–8.
17. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics 1977; 33: 159–74.
18. Elia M. Screening for malnutrition: a multidisciplinary responsibility. Development and use of the Malnutrition Universal Screening Tool ('MUST') for Adults. Redditch: Worcs.: BAPEN; 2003.
19. Stratton R, Dixon R, Longmore D, Stroud M, Elia M. Effect of recalled weight and height on malnutrition risk. Clin Nutr 2003; 22: S9.
20. Westergren A, Lindholm C, Mattsson A, Ulander K. Minimal eating observation form: reliability and validity. J Nutr Health Aging 2009; 13: 6–12.
21. Altman D. Practical statistics for medical research. London: Chapman & Hall; 1990.
22. Loong TW. Understanding sensitivity and specificity with the right side of the brain. BMJ 2003; 327: 716–9.
23. Soderhamn U, Flateland S, Jessen L, Soderhamn O. Norwegian version of the Nutritional Form for the Elderly: sufficient psychometric properties for performing institutional screening of elderly patients. Nutr Res 2009; 29: 761–7.
24. Charlton KE, Kolbe-Alexander TL, Nel JH. Development of a novel nutrition screening tool for use in elderly South Africans. Public Health Nutr 2005; 8: 468–79.
25. Dunne A. Malnutrition and the older adult: care planning and management. Br J Nurs 2008; 17: 1269–73.
26. Cansado P, Ravasco P, Camilo M. A longitudinal study of hospital undernutrition in the elderly: comparison of four validated methods. J Nutr Health Aging 2009; 13: 159–64.
27. Harris D, Haboubi N. Malnutrition screening in the elderly population. J R Soc Med 2005; 98: 411–4.
28. Cook Z, Kirk S, Lawrenson S, Sandford S. Use of BMI in the assessment of undernutrition in older subjects: reflecting on practice. Proc Nutr Soc 2005; 64: 313–7.

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Appendix 1. **MEONF-II (Minimal Eating Observation and Nutrition Form – Version II)**

			POINTS
1	**Unintentional weight loss (regardless of time & magnitude)**	Yes, weight loss = 2 No weight loss = 0 Don't know = leave empty and continue	
2a 2b	☐ **BMI** is less than 20 (69 years or younger) ☐ **BMI** is less than 22 (70 years or older) ***Height/weight cannot be obtained, measure calf circumference (2b)*** ☐ **Calf circumference** is less than 31 centimeters	Low BMI or small calf circumference = 1 Otherwise = 0	
3	**Eating problems (mark with check on left and score according to instructions on right)** Food intake ☐ Difficult to maintain good sitting position during meals ☐ Difficulty manipulating food on plate ☐ Difficulty conveying food to mouth	One/more problems = 1 No problems = 0	
4	Swallowing/mouth ☐ Difficulty chewing ☐ Difficulty coping with food in mouth ☐ Difficulty swallowing	One/more problems = 1 No issues = 0	
5	Energy/appetite ☐ Eats less than 3/4 of food served ☐ Lacks energy to complete an entire meal ☐ Poor appetite	One/more problems = 2 No problems = 0	
6	**Clinical signs** indicate risk of undernutrition. Assess e.g. body morphology, subcutaneous fat, muscle mass, grip strength, edema (fluid retention), blood tests (e.g. serum albumin)	Clinical signs indicate risk = 1 Otherwise = 0	
	Tally observations 1–6 (min = 0, max = 8)	**TOTAL:**	

RISK OF UNDERNUTRITION
☐ 0–2 points, no or low risk
☐ 3–4 points, moderate risk
☐ 5 points or more, high risk

Gradation of high BMI

Overweight:	Obesity:	Severe/morbid obesity:
25–29.9 (69 years or younger)	30–39.9 (69 years or younger)	>40 (69 years or younger)
27–31.9 (70 years or older)	32–41.9 (70 years or older)	>42 (70 years or older)
☐	☐	☐