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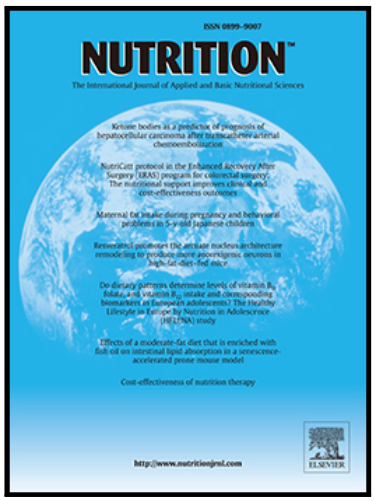

Nurses' knowledge about malnutrition in older people: A multicenter cross-sectional study

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Nurses' knowledge about malnutrition in older people: A multicenter cross-sectional study

Nurses' knowledge malnutrition older people

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HIGHLIGHTS

- Malnutrition is still an unsolved problem among older people
- An adequate nurses' knowledge is important to prevent it
- KoM-G Italian version confirmed its reliability and validity
- Useful to investigate nurses' knowledge and implement corrective strategies

Abstract

Objective: Malnutrition is a prevalent phenomenon among older people with a prevalence of 22.0% in hospitals, 17.5% in nursing homes and 8.7% in home care. Adequate knowledge among health care staff is necessary for risk identification and for adequate intervention. This study is aimed to translate and validate the Knowledge of Malnutrition-Geriatric (KoM-G) questionnaire in Italian and to investigate malnutrition knowledge of registered nurses working in hospitals, nursing homes, home care and palliative care in Italy.

Research method & procedures: The KoM-G questionnaire was translated and validated in terms of content validity, internal consistency and inter-rater reliability. Subsequently, a multi center cross-sectional study in different settings was performed.

Results: The KoM-G ITA questionnaire has shown excellent content validity, internal consistency and a good inter-rater reliability. 513 nurses completed the questionnaire. On average, 61.9% of the respondents answered the questions correctly.

Conclusion: The level of knowledge about malnutrition in nurses is adequate. Training courses and management protocols should be implemented to improve nursing care for malnourished older people.

Keywords

malnutrition, older people, nutritional status, nursing, knowledge

INTRODUCTION

According to the Global Leadership Initiative on Malnutrition (GLIM) malnutrition is defined by both phenotypic (weight loss, low body mass index (BMI) and reduced muscle mass) and etiologic criteria (reduced food intake or assimilation and inflammation)[1].

Older people have a higher risk for malnutrition. Factors influencing this risk are poor nutritional intake, decay of general conditions, loss of appetite, chewing difficulties, infections, pain, fatigue, loneliness or depression, changes in their gastrointestinal tract, in their metabolism and hormones production. Multiple diseases and multiple drugs, specifically analgesics and antibiotics, also affect this risk [2]. A recent systematic review found a 22% prevalence rate of malnutrition among older people in hospitals, 17.5% in nursing homes and 8.7% in home care[3]. A study among older people in Italian hospitals showed that 20% were malnourished and 50% had a malnutrition risk [4].

Malnutrition consequences are manifold. Malnutrition does not only lead to decreased quality of life and autonomy in everyday activities of the affected persons, it also increases the risk of bone fractures, the rates of pressure ulcers, and the susceptibility to infections. Malnourished older people have a longer healing time for ulcers which leads to longer hospital stays, higher social costs and higher mortality rate [5–9].

In order to prevent the serious consequences of malnutrition, a potential malnutrition risk need to be assessed early on and adequate interventions should be initiated [10]. Nevertheless, some studies showed that nutritional care in health care institutions is not adequate [11,12]. Proper nutritional care is affected by many factors such as the availability of guidelines, the education and knowledge of health care staff [13–16], and the patient-staff ratio [17,18]. Several authors have

pointed out hat knowledge and attitudes of health care staff play a fundamental role in the provision of adequate nutritional care [13,19–21]. However, many studies shown that nurses have an inadequate knowledge about nutritional problems [4,18,22].

In international literature, several questionnaires are available for the measurement of knowledge among nursing staff. The KoM-G (Knowledge of Malnutrition – Geriatric) questionnaire had systematicaly been developed and psychometrically tested and is intended to measure nurses' knowledge in nursing homes [22,23]. Bauer-Schönherr et al., in 2015, reported that 60.0% of registered nurses and nurse assistants answered correctly to the KoM-G questionnaire [22,23]. Results showed a significant difference in knowledge between registered nurses and nurse assistants (65.6% of registered nurses correctly answered the KoM-G questionnaire). Furthermore, nursing staff with training in nutrition had significantly better knowledge (65.2% of correct answers) compared to nursing staff without training in nutrition (59.6% of correct answers) [22,23]. The questions with the lowest percentage of correct answers were related to the health professionals involvement in malnutrition care, which obtained only 26.1% correct answers, and about the 'normal' healthy Body Mass Index (BMI) in aged residents, which obtained 31.6% correct answers. The percentage of correct answers and median values didn't differ significantly with regard to gender, age and years of working experience [22]. Literature explained that a lack of knowledge of the important concepts of malnutrition can lead to an underestimation of the phenomenon and to behaviors that don't prevent the onset of malnutrition. Therefore, it's important to measure the level of health professionals knowledge on these matters to implement targeted training interventions and, therefore, to promote better care [24,25].

To our knowledge there are no validated tools that can investigate nurses' knowledge in different care settings in Italy. Therefore, this study aimed to translate and validate the KoM-G to the Italian language and to investigate malnutrition knowledge of registered nurses working in different health care settings in Italy.

MATERIAL AND METHODS

Study Multi center cross-sectional.

Participants and clinical settings We enrolled a convenience sample of registered nurses (RNs) working in a large general hospital, two home care agencies, a residence for the aged people and a rehabilitation center in the North of Italy. Medical, surgical, rehabilitation, intensive care, outpatients, palliative care, nursing home and home care nurses were included. The inclusion criteria were met if the RN's were working for more than 6 months.

Description of the tool Knowledge was measured with the Knowledge of Malnutrition-Geriatric (KoM-G) questionnaire. The KoM-G questionnaire was validated by Schönherr et al. in 2015 in the German language in residential settings for the older people [22].

In the first place the KoM-G questionnaire had been cross-cultural validated in the Italian language referring to the Beaton et al. guidelines [26]. The consent of the original developers was requested and obtained. The tool was initially translated from the German to the Italian language by two bilingual people, a doctor and a German-language teacher, both living in Italy. Two independent versions in Italian (T1 and T2) were obtained and named, so that the two versions were compared to obtain a third version, called T12, which obtained a consensus from both translators. Subsequently, a Consensus meeting was held in order to assess the content validity and the relevance to nurses working in different health care services. The Consensus included eight experts: 1 Medical Director of Dietetics and Clinical Nutrition, 1 Dietician, 1 Nurse Coordinator expert in nutrition, 1 Nursing Director, 4 Nursing Teachers. They were asked to evaluate the tool content and its adaptability to the Italian context, with a 4-point Likert scale (1 complete disapproval - 4 complete approval). Suggestions and changes were allowed. Items-Content Validity (CVR) and Scale-Content Validity (CVI) were calculated and suggestions proposed by the experts accepted. The CVR ranged from 0.75 to 1, the CVI index was 0.90. After the changes, the tool underwent a second phase of content validation. The second CVR ranged from 0.93 to 1, with a CVI of 0.99. The T12 modified was then re-translate in German language by two bilinguals (Italian and German), a medical doctor and a professional translator, both native German speakers, residing in Italy. The two back-to-back

versions were called BT1 and BT2. A final Consensus was held to reach a common consensus and the final version of the tool (BT12) called KoM-G ITA was sent to the original author that approved it [26,27].

The KoM-G ITA questionnaire consists of 19 multiple choice questions, with 6 possible answers, one of which is "I don't know". Each of other five answers can be right or wrong, the question is considered correct if all the answers are correctly marked. A correct answer assigns 6 points, an incorrect answer 1 point. The score goes from a minimum of 19 points to a maximum of 114 points; no cut-off was specified.

The KoM-G ITA and a personal data sheet was used to collect information on age, gender, seniority, current and previous work experience, education, malnutrition training courses, use of guidelines or recommendations about malnutrition in clinical practice.

Data collection procedure Data collection was done in July 2018. The nursing directors of each institution approved the study, obtained the informed consent, and distributed the questionnaires to the nursing staff. In doing so they stressed the importance of completing the questionnaire without using resources such as Internet or books.

Statistical analysis The sample population was calculated assuming a loss of responses in the 10-15% range, a 0.05% accuracy and a 61% response rate, therefore a minimum sample size of 450 nurses was considered adequate.

The Kuder-Richardson test was conducted to validate the internal consistency of the tool. A portion of the sample was subjected to test-retest and the intra-rater reliability of the Intra class correlation (ICC) was calculated. To manage missing data, we used multilevel imputation. Questionnaire results were analyzed using descriptive statistics. ANOVA regression analysis was performed to determine which factors influence the results. A p-value of 0.05 was considered significant. We used SPSS 22.0 software for statistical analysis [27].

Ethical considerations

The study was conducted in agreement with the current privacy legislation and the principles stated in the Helsinki Declaration and was approved by the local Institutional Review Board. All the participating nurses signed an informed consent.

RESULTS

Sample characteristics

The questionnaire was administered to 535 RN's: 513 completed the personal data sheet and the Kom-G ITA questionnaire. 2 tests were excluded from the analysis because less than 80% of the questions were answered. 43 RN's were test retested.

The sample included 127 males (24.7%) and 386 females (75.3%), the mean age was 37 ± 10 years. 93 RN's worked in surgical areas (18.1%), 157 in medical areas (30, 6%), 79 in critical areas (15.4%), 40 in home cares (7.8%), 50 in nursing homes and long-term care (9.7%), 29 in outpatient services (5.6%), 60 in rehabilitations (11.7%) and 5 in palliative care (1.1%). 174 RN's (33.9%) had a work experience of less than five years, the average working experience was 13 years. The average working experience in the last ward/service was eight years. All responders had Bachelor Degree in Nursing (or other equivalent title); 103 of them (20.1%) had an academic qualification in addition to their bachelor's degree, 89 of them (17.3%) participated in courses or conferences related to malnutrition in the previous two years and 132 of them (25.7%) used guidelines or recommendations about malnutrition in clinical practice along the previous two years. The characteristics of the sample are shown in Table 1.

Validation of the questionnaire

The result for the Kuder-Richardson 20 test was 0.914. 43 nurses were test-retested and the intraclass correlation coefficient for the total scores was ICC 0.981, $p < .0001$. The intraclass correlation (ICC) coefficient for every single item is shown in Table 2. Item 1 (ICC, 0.413) and item 2 (ICC, 0.280) did not demonstrate an adequate intraclass correlation coefficient (p = ns).

Knowledge of nursing staff

The study score of the questionnaire ranged from 19 to 114 points, the mean score of respondents was 77.2 ± 31.86. On average, 61.9% of the respondents answered the questions correctly. The items that obtained the higher score were item 14 "What are the particular variations in the nutrient requirements of people with pressure injuries" with 438 correct answers out of 509 respondents (86%), item 2 “What are possible consequences of malnutrition?” with 394 correct answers (77%) and item 17 “What factors can negatively affect oral food intake?” with 389 correct answers (76%); the item that obtained the lowest number of correct answers was "For which patients is enteral nutrition indicated" with 235 correct answers out of 509 respondents (46%) (see Table 3).

The regression analysis performed showed that the nurse age (r-square 0.0102) and years of work (r-square 0.003) didn’t explain the variability of the responses to the test. Also work department didn’t explain the variability (F=1.48; Prob>F 0.1719). We had not been able to identify any variable able to influence and explain the variability.

DISCUSSION

This study aimed to translate and validate the KoM-G to the Italian language and to investigate malnutrition knowledge of registered nurses working in different health care settings. The KoM-G ITA questionnaire was translated, adapted and validated in the Italian language and it shown an excellent validity of content (CVR from 0.93 to 1, CVI of 0.99), an excellent internal consistency (alpha 0.914) and a good inter-rater reliability (ICC 0.981 p<0.0001). Item 1 (ICC, 0.413) and item 2 (ICC, 0.280) did not demonstrate an adequate intraclass correlation coefficient (p = ns). This two items checked knowledge about risk’s factors of malnutrition and malnutrition’s consequences: it’s possible that the answers could have been too general and confounder.

The mean score of nurses’ knowledge about malnutrition was 77.2 ± 31.86/114 (19-114). In the KoM-G scale the higher the score, the greater the knowledge. The questionnaire doesn’t present a cut off, therefore, it’s not possible to affirm that the knowledge is adequate. Further studies will be needed to determine the cut-off for sufficiency. In our study 61.9% of the respondents answered the

questions correctly, in Bauer' study 60.0% of the sample, composed of RN's and nurses aides, answered correctly [22].

In our study the participating nurses worked in different care setting and had different backgrounds, but the answers were not associated with these differences. Answers were not related also with age and years of work. In previous studies investigating nurses knowledge in nursing home, correct answers and median values didn't differed significantly with regard to gender, age and years of working experience [22,23].

The questions that received answers with higher scores were related to fundamentals of nursing care, as the ability to recognize the risk factors of malnutrition and dehydration, the consequences of it and the link with complications such as pressure ulcers. Indeed, the highest percentage of correct answers concerned nutrient requirements variations in people with pressure ulcers (86%), the consequences of malnutrition (77% of correct answers), the factors that can favor nutrition (71%) or that can disadvantage it (76%) [28]. The study of Bauer in 2015 had similar results [22]. In her study more than 80% of the respondents knew possible consequences and signs of malnutrition, factors that negatively affect oral nutritional intake and possible interventions in residents with dysphagia at risk of malnutrition.

These results are also in line with a previous study carried out in the Italian hospitals, that showed that nurses know the consequences of malnutrition and the impact it has on patient outcomes [4]; this may have been caused by the increased attention of the scientific literature on this issue, as also reported by Bonetti et al.,[29] Nurses also know the strategies to prevent malnutrition, but it's possible that they are of resources and of workload [4,30]. These strategies should be tailored to the individual person [31–34].

The questions with the lowest percentage of correct answers, under 50%, were related to BMI and enteral nutrition. In the study by Bauer et al., [22] the correct answers about healthy Body Mass Index and malnutrition treatment were less than 40%. Our results confirm that the assessment of nutritional status is often not performed and the tools to determine it are not known [35]. Nurses

have an important role in nutritional status assessment, they are the only health professionals in relationship with the patient 24/7. This close and continue contact with the patients can result in an early identification of malnourished patients and, consequently, the possibility of taking timely corrective measures[18]. It is therefore necessary to improve the assessment of nutritional status by Registered Nurses and their strategic role in this regard [4,35].

61.9% of the respondents answered the questions in the KoM-G correctly, which is in line with Schaller and James[36]) who reported a mean score of 60%, Crogan [37] who reported a mean score of 60%, Warber et al., [38] who reported a mean score of 66 and Bauer et al., [22] who reported a mean score of 60%. Therefore, Italian RN's showed a better knowledge on malnutrition care compared to nurses in other countries. Despite these results, some specific knowledge, such as the assessment of nutrition status, are still lacking. It is therefore important to adopt innovative strategies to improve some specific knowledge amongst nurses. It is also important to start proper educational interventions on nutritional care at bachelor level [39]. A recent study conducted in Italian context amongst bachelor school of nursing students showed a negative attitude toward nutritional status assessment [25]. As already stated, this negative attitudes can be due to a lack of education from the very beginning of nurses school [24,25].

This study has some limitations. Firstly, it was conducted only in the north of Italy; since nurses' education and clinical environment can be different amongst regions and national areas, the results of this study cannot be generalized. Secondly, we didn't have data about the bachelor curricula of the nurses involved and for this reason we are not able to understand how their first level education influenced their knowledge. Third, the convenience sampling method do not allow generalization of the results. Nevertheless, this study involved a big sample of nurses from several clinical settings, showing no differences in nurses' knowledge. This is an important result because nurses' knowledge, based on what we found, is independent of the clinical setting in which they work.

CONCLUSION

Italian nurses showed a similar level of knowledge compared to other international studies. There is still a lack of knowledge in some aspects like nutritional status assessment. This needs to be considered, because the assessment respectively screening is the first step to identify malnourished people. The implementation of malnutrition screening tools combined with educational interventions in the clinical practice, with the aim to early identify persons at risk, seem therefore important in order to improve nurses' awareness on this specific aspect of nutritional care. Moreover, nutrition management protocols to improve nursing care for the malnourished elderly which are based on international guidelines should be implemented in all health care setting.

Based on the results of this study, the KoM-G ITA can be used to assess nurse's knowledge about malnutrition in older people among nurses working in different clinical setting. The tool can also be used to evaluate the outcome of training interventions.

Further validation and adaptation studies in other languages and cultures are desirable. Items 1 and 2 require further investigation since they obtained a low ICC. Additionally, further studies should include a bigger sample of nursing staff from various regions in order to increase the chance of generalization.

Author statement

Bassola Barbara, Bonetti Loris, Tommasi Valentina, Bauer Silvia, Lusignani Maura: Conception and design; **Bassola Barbara, Tommasi Valentina:** Data collection; **Bassola Barbara, Bonetti Loris; Tommasi Valentina,** Analysis and interpretation of data; **Bassola Barbara, Tommasi Valentina:** Writing the manuscript; **Bassola Barbara, Bonetti Loris, Tommasi Valentina, Bauer Silvia, Lusignani Maura:** Critical revision of the manuscript; **Bassola Barbara, Bonetti Loris**;: Statistical expertise; **Bassola Barbara, Tommasi Valentina**: Administrative, technical or material support; **Bauer Silvia, Lusignani Maura:** Supervision.

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Declaration of Competing Interest

None

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Table 1: Sample's characteristics (N=513)

Characteristics	N	%
Registered Nurses	513	100
Gender Male	127	24.7
Age (years) M(± SD)*	37 (±10)	
Work area	**N**	**%**
Surgical	93	18.1
Medical	157	30.6

Critical	79	15.4
Home care	40	7.8
Nursing home and long term care	50	9.7
Outpatients services	29	5.6
Rehabilitations	60	11.7
Palliative care	5	1.1
Sample's Experience		
Working years M(± SD)*	13(±10)	
	N	**%**
< 5 years	174	33.9
5 – 15 years	145	28.3
> 15 years	174	33.9
missing	20	3.9
Sample's Education	**N**	**%**
Nursing Bachelor Degree or equivalent	513	100
Master or PhD in Nursing	103	20.1
Specific Nutrition Training	89	17.3

**Mean ± Standard Deviation*

Table 2 Intraclass Correlation Coefficient(ICC) for the single items of the KOM-G ITA questionnaire

Item	ICC	95% Confidence Interval(CI)	*p* value
1	.413	.041 - .674	.034
2	.280	.341 - .612	.149
3	.817	.661 - .901	<.0001
4	.678	.410 - .825	<.0001
5	.919	.851 - .956	<.0001
6	.976	956 - .987	<.0001
7	.950	.908 - .973	<.0001
8	.864	.748 - .926	<.0001
9	.898	.812 - .945	<.0001
10	.954	.915 - .975	<.0001
11	.668	396 - .819	<.0001
12	.920	.852 - .957	<.0001
13	.854	.733 - .921	<.0001
14	.918	.849 - .955	<.0001
15	.890	.797 - .941	<.0001
16	.780	.593 - .881	<.0001
17	754	.550 - .866	<.0001
18	.665	379 - .819	<.0001
19	.746	.522 - .864	<.0001

Table 3: Percentage of correct answers on the Kom G ITA questionnaire (N %)

Questionnaire items	**Correct answers N (%)**
1- What are possible risk factors for malnutrition?	278 (55)
2 - What are possible consequences of malnutrition?	394 (77)
3 - What are possible signs of malnutrition?	335 (66)
4 - What are possible signs of dehydration?	329 (65)
5 - What indicators should be considered during nutritional screening?	338 (66)
6 - When should nutrition screening be performed on all patients?	262 (51)
7 - What should be the BMI of the healthy aged population?	250 (49)

8 - From which% of involuntary weight loss there is a nutritional risk?	323 (63)
9 - Which health care professionals should be involved in nutritional care?	288 (57)
10 – A patient has unintentionally weight lost. What steps can be taken?	306 (60)
11 - How does daily energy and nutrient requirement in aged people change?	304 (60)
12 - The daily fluid requirement of a person ...	254 (50)
13 - What factors may cause greater energy and nutrient requirements?	253 (50)
14 - What are nutrient requirements variations in people with pressure ulcers?	438 (86)
15 - Why a protocol for detecting food and drink intake is needed?	326 (64)
16 – What factors can positively affect oral food intake?	362 (71)
17 – What factors can negatively affect oral food intake?	389 (76)
18 – Which actions should be taken for old patient at risk of malnutrition with slight swallowing problems?	328 (64)
19 - For which patients is enteral nutrition indicated?	235 (46)