



Research article

Malnutrition knowledge among nursing staff in four European countries: A cross-sectional study

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ARTICLE INFO

Keywords:

Malnutrition
Knowledge
Nursing staff
Associated factors
Europe

ABSTRACT

Background: Nursing staff must have sufficient knowledge in order to adequately prevent and treat malnutrition. However, only a marginal amount of information on this topic is available in the literature.

Objectives: This paper provides a comparison of the malnutrition knowledge among nursing staff in Austria, the Czech Republic, the Netherlands, and Turkey and presents factors associated with the malnutrition knowledge of nursing staff.

Design: A cross-sectional study was performed.

Setting and participants: Nursing staff from different care settings in Austria, the Czech Republic, the Netherlands, and Turkey participated in the study.

Methods: The KoM-G 2.0 (Knowledge of Malnutrition – Geriatric) questionnaire was used for data collection.

Results: In total, 2056 participants from different care settings took part in the study. Between 11.7 % (Turkey) and 32.5 % (Austria) of the participants had high levels of malnutrition knowledge. The country itself was the factor most strongly associated with malnutrition knowledge. The nurses' educational level and specialised training of nursing staff were also significantly ($p < 0.001$) associated with malnutrition knowledge. Questions about "factors that should be considered during older persons' food intake" were most frequently answered correctly, while questions about "different aspects of nutritional screening" were less often answered correctly in all four countries.

Conclusions: This study was one of the first to describe the rather low level of malnutrition knowledge among nursing staff in different countries. The country itself was identified as the factor most strongly associated with the nurses' knowledge of malnutrition, while the nursing staff's basic education as well as further training were also detected as significant factors. These results indicate that it is necessary to extend and improve (academic) nursing education and to offer specialised training programmes which may improve nutritional care across country borders over the long run.

1. Introduction

Malnutrition is defined as a state resulting from a lack of intake or uptake of nutrition which leads to an altered body composition (decreased fat free mass) and body cell mass. This state, which results in a diminished physical and mental function and impaired clinical outcome from disease (Cederholm et al., 2017), is highly prevalent among older persons (Leij-Halfwerk et al., 2019). A recent systematic

review described the pooled prevalence of malnutrition risk in several European countries as 28 % in hospitals, 17.5 % in nursing homes, and 8.5 % in home care settings (Leij-Halfwerk et al., 2019). Older persons are especially affected by malnutrition (Volkert et al., 2019a; Torbahn et al., 2022), and this can have severe health consequences, such as increased mortality and morbidity, as well as negative implications for recovery, such as longer hospital stays, more complications, and the higher utilisation of health resources (Volkert et al., 2019a).

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<https://doi.org/10.1016/j.nedt.2023.105887>

Received 9 January 2023; Received in revised form 24 May 2023; Accepted 15 June 2023

Available online 24 June 2023

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2. Background

Internationally, nurses are health care professionals who take care of patients 24 h a day. They are the first-line contact persons when problems with eating or drinking arise (Kowanko, 1997; Dabbous et al., 2021; Arvanitakis et al., 2009). In older people, offering appropriate nutritional care often relies on the ability to identify the multiple causes of nutritional problems (Volkert et al., 2019a). Therefore, nursing staff need to pay attention and be aware of potential nutritional problems and associated risk factors in order to prevent the (further) deterioration of the patient's nutritional status and overall health (Kowanko, 1997). The nurses must also have a firm knowledge of malnutrition symptoms, as well as how to identify and treat malnutrition, so that they can recognise and detect signs of nutritional problems in older persons early on and plan tailored nutritional care (Volkert et al., 2019a; Dabbous et al., 2021; O'Connell et al., 2018; Bjerrum et al., 2012).

The Council of Europe had already underlined the importance of health professionals' knowledge and education with regard to malnutrition in 2009 (Arvanitakis et al., 2009), and international experts have recognised that insufficient nutritional knowledge is perceived as a common barrier to adequate nutritional practice (Bjerrum et al., 2012; Papier et al., 2017). The recently published International Declaration on the Human Right to Nutritional Care also states that clinical nutrition education is a fundamental axis of the human right to nutritional care (ESPEN, 2022).

Although international experts have highlighted the fact that nursing staff working with older patients must have adequate malnutrition knowledge, few studies have been performed to assess nurses' knowledge of malnutrition in older persons (Beattie et al., 2014; Crogan et al., 2001; Bassola et al., 2020; Endevelt et al., 2009). To the best of our knowledge, most of these studies were only based on low sample sizes and did not use systematically developed and comprehensively psychometrically tested instruments. Furthermore, no study has been conducted to compare the knowledge about malnutrition in nursing staff among different European countries.

We recognised that the cross-culturally adapted KoM-G (Knowledge of Malnutrition-Geriatric) 2.0, which is available in the Austrian, Czech, Dutch, and Turkish languages, could help to close this gap (Bauer and Eglseer, 2020; Bauer and Eglseer, 2022). By applying this systematically developed and psychometrically tested tool, malnutrition knowledge could be measured and the level of knowledge could be compared among these different countries. Therefore, this study was carried out to compare the levels of malnutrition knowledge among nursing staff in Austria, the Czech Republic, the Netherlands, and Turkey and to identify factors associated with this knowledge.

3. Methods

3.1. Design

This study follows a cross-sectional design and was carried out in 2020 and 2021.

3.2. Sample and setting

The invitation to take part in the study was distributed by applying a convenience sampling method and by using different social media platforms in all four countries. The aim was to achieve a minimum of 10 respondents per question (Sousa and Rojjanasrirat, 2011). All nursing staff from hospitals, nursing homes, and home care organisations who have good command of the German language and who gave informed consent were included.

3.3. Data collection and measurement

Conveniently chosen hospitals, nursing homes, and home care

organisations and their nursing staff were invited to take part in the survey. For data collection purposes, we used LimeSurvey, which is a software tool that can be used to collect data anonymously. We collected data on the general characteristics (country, age, sex, years of experience, kind of education, and work setting) and malnutrition knowledge of nursing staff with the KoM-G 2.0 (Bauer and Eglseer, 2020; Bauer and Eglseer, 2022). Since nursing education systems differ in the included countries, we used the following categorisation: nurse assistant (nurse aides or assistants without a diploma; course duration ≤ 2 years), registered nurse (nursing diploma from a nursing school but no academic degree; course duration of 3 years), and bachelor's/master's degree (nurses with an academic degree; course duration > 3 years) (Lahtinen et al., 2014).

The KoM-G 2.0 is an up-to-date, multiple-choice questionnaire consisting of 12 questions. The original questionnaire (KoM-G) was systematically developed in 2012 for use in nursing homes (Schönherr et al., 2015). In 2020, a revision and cross-cultural adaptation was performed to update the questionnaire based on recent evidence (Volkert et al., 2019b), as well as to make the questionnaire available for use in different languages and different health care settings (Bauer and Eglseer, 2020; Bauer and Eglseer, 2022). The content validity of the English version was subsequently evaluated by 16 international experts in the field, yielding a Scale-Content Validity Index/Average (S-CVI/Ave) of 94.5 %. The KoM-G 2.0 was then systematically translated into the Austrian (AT), Czech (CZ), Dutch (NL), and Turkish (TR) languages and pilot-tested. The pilot test was performed in all four countries, and the results reveal that between 96.9 % (NL) and 97.8 % (AT) of the questions are understandable. The mean discrimination index ranged from 0.33 (NL) to 0.40 (TR) and the mean item difficulty ranged from 36.9 % (TR) to 54.5 % (AT). The discriminative validity was analysed and the analysis results support the hypothesis that nursing staff with higher education and fewer years of experience have higher knowledge scores. Further information about the cross-cultural adaptation, and psychometric evaluation has been described elsewhere (Bauer and Eglseer, 2020; Bauer and Eglseer, 2022).

3.4. Ethical considerations

The study complies with ethical principles described in the Declaration of Helsinki and was approved by the ethical committees of the universities in the participating countries, as well as (if requested) by the responsible ethics committees at the participating institutions. All participants had to give their informed consent by clicking on "I agree to participate" before participating in the study.

3.5. Data analysis

The IBM SPSS Statistics 26.0 software version for Windows was used for data analysis. First, we performed a descriptive analysis of the data. To analyse differences between groups, a Chi-squared test and Kruskal-Wallis test as well as an analysis of the percentages of correct answers (Tables 1 and 2) was performed. Knowledge was categorised and grouped into low (< 33 % correct answers), moderate (33–66 % correct answers), and high knowledge levels (> 66 % correct answers). A multiple linear regression was performed with malnutrition knowledge as the dependent variable (Field, 2005) (Table 3). All assumptions for the linear regression were considered. The linear relationship was examined with a scatter plot (Field, 2005), and the multicollinearity was analysed based on variance inflation factors. The latter was below four (Field, 2005; Hair et al., 2016). The exogeneity of the independent variables and homogeneity of the variance were also examined. *P*-values were based on two-sided tests and were set at 0.05.

4. Results

In this study, 1231 participants were nursing staff from AT, 467 were

Table 1
Sample characteristics.

	AT (n = 1231)	CZ (n = 467)	NL (n = 238)	TR (n = 120)	p-value
Sex (%)					<0.001
Female	86.3	94.2	93.3	71.7	
Male	13.2	5.6	6.7	28.3	
Other	0.5	0.2	–	–	
Age (years) median [IQR] ^a	43.4 [33.0–53.0]	47.3 [41.0–55.0]	49.6 [41.0–60.0]	36.4 [28.0–44.0]	<0.001
Setting (%)					<0.001
Hospital	73.1	80.1	21.9	52.5	
Long-term care	16.5	–	24.4	36.7	
Home care	3.8	1.5	36.6	–	
Other	6.6	18.4	17.3	10.8	
Nursing education (%)					<0.001
Nurse assistant	10.1	61.2	25.2	4.2	
Registered nurse	72.5	7.3 ^b	16.4	–	
Bachelor's/Master's	17.4	23.3	50.9	95.8	
Other	–	8.1	7.6	–	
Years of experience (%)					<0.001
≤10 years	36.3	17.1	27.7	36.6	
>10 years	63.7	82.9	72.3	63.3	
Working hours (%)					<0.001
≤30 h/week	25.3	10.5	68.5	10.8	
≥31 h/week	74.7	89.5	31.5	89.2	
Specialised training in malnutrition (%)					0.330
Yes	14.6	15.0	11.3	18.3	

Chi-squared test or Kruskal-Wallis test were used due to the non-parametric distribution of the data.

^a 10 respondents in total were excluded in the analysis of age due to unpaluable age.

^b Diploma nurse in Czech settings.

nursing staff from CZ, 238 were nursing staff from NL, and 120 were nursing staff from TR. The majority of the participants were female in all countries. The mean age differed significantly and was highest in NL (49.6 years) and lowest in TR (36.4 years). The level of education of the participants differed significantly among the countries as well. In AT, most of the participants were registered nurses (72.5 %), and in NL and TR most of the participants had a bachelor's or master's degree (50.9 % and 95.8 %). The rate of malnutrition training was highest in TR (18.3 %) and lowest in NL (11.3 %) (Table 1).

The average level of knowledge differed significantly among the countries and was highest among AT participants (54.5 %) and lowest among TR participants (36.9 %) (Table 2). In total, the categorisation into low, moderate, and high levels of knowledge revealed significant differences among the countries ($p < 0.001$); for example, 32.5 % of the participants in AT and 11.7 % of the participants in TR had high levels of knowledge (Fig. 1). The question regarding “factors that should be considered during older persons' food intake” was answered most often correctly in AT (83.7 %) and NL (84.5 %), and the question regarding “possible signs of malnutrition” was answered most often correctly in CZ (70.9 %) and TR (71.7 %). The latter was also the only question with similarly high scores for all countries and where no significant difference in the proportion of correct answers among the countries could be detected. The questions with the lowest proportion of correct answers were “indicators that should be included in nutritional screening” (AT 32.3 %), “malnutrition risk screening” (CZ 12.8 %), “daily total fluid requirements of an older person” (NL 13.9 %), and “possible risk factors for malnutrition” (TR 11.7 %) (Table 2).

The multiple linear regression revealed several significant factors, with the variable “country” having the greatest influence on the level of malnutrition knowledge. We found that nursing staff in TR had a mean malnutrition knowledge that is 23.211 (Beta -0.291) units less than that of AT nursing staff. The education of the nursing staff was also identified as a significant influencing factor for knowledge. Nursing staff with a bachelor's or master's degree had a mean malnutrition knowledge that is 7.359 (Beta 0.175) units higher than that of the nurse assistants or specialised nurse assistants. Furthermore, nursing staff who had already completed specialised training in malnutrition had a mean malnutrition

knowledge that is 3.696 (Beta 0.069) units higher than that of nursing staff who had not completed such training (Table 3).

5. Discussion

The aim of this study was to compare the malnutrition knowledge among nursing staff in different countries and to identify factors associated with these nurses' level of malnutrition knowledge. We found that between 11.7 % (TR) and 32.5 % (AT) of the participants had high levels of malnutrition knowledge, while the Austrian nursing staff had the highest levels of knowledge. The linear regression identified a significant association between the country and the education of the nursing staff with nurses' level of knowledge.

In general, the level of malnutrition knowledge is rather low in the studied population, and only approximately one in four participants had a high level of malnutrition knowledge. Most nursing staff displayed a moderate level of knowledge, which seems to be similar to or, in some cases, slightly lower than other study findings (Crogan et al., 2001; Bassola et al., 2020; Bauer et al., 2015). The KoM-G 2.0 consists of questions that enable users to assess the knowledge of the most recent clinical practice guidelines (Cederholm et al., 2017; Volkert et al., 2019b) which may have also contributed to the slightly lower level of knowledge detected in our study as compared to others.

The knowledge levels among the countries differed considerably. We have shown that nursing staff in Austria had the highest levels of malnutrition knowledge followed by NL, CZ, and TR. Several factors contribute to these differences. Nursing education is highly heterogeneous in European countries, with only certain skills and competencies being regulated on a European level. Nursing education is mainly offered at higher educational institutions, but nursing schools also co-exists in many countries (Panteli and Maier, 2021; Lahtinen et al., 2014). As a result, nursing students' nutrition education is also quite heterogeneous (Arvanitakis et al., 2009). No European regulation currently define how many hours of nutrition education should be included in nursing education programmes (Cuerda et al., 2020; Cuerda et al., 2021). Furthermore, nutrition education are commonly assigned a low priority in the European nursing curricula across country borders

Table 2
Percentage of correct answers per question compared among the countries.

	AT (n = 1231)	CZ (n = 467)	NL (n = 238)	TR (n = 120)	p-value
What are possible risk factors for malnutrition?	57.7 %	30.6 %	39.1 %	11.7 %	<0.001
What are possible consequences of malnutrition?	58.6 %	53.1 %	52.1 %	36.7 %	<0.001
What are possible signs of malnutrition?	67.9 %	70.9 %	70.2 %	71.7 %	0.572
What are possible signs of dehydration?	64.7 %	55.5 %	47.5 %	39.2 %	<0.001
Which statements on malnutrition risk screening are correct?	35.5 %	12.8 %	54.2 %	25.0 %	<0.001
Which of the following indicators should be included in nutritional screening?	32.3 %	30.6 %	48.7 %	24.2 %	<0.001
Which statements on the collaboration of different health professionals in a nutrition support team are correct?	40.5 %	30.8 %	37.4 %	32.5 %	0.002
The daily total fluid requirement of an older person...	43.5 %	22.1 %	13.9 %	33.3 %	<0.001
What should be considered during older persons' food intake?	83.7 %	48.4 %	84.5 %	50.8 %	<0.001
Which statements about the treatment of malnutrition are correct?	53.0 %	51.4 %	44.1 %	41.7 %	0.014
What is important regarding the use of oral nutritional supplements in older persons?	80.8 %	57.0 %	64.3 %	46.7 %	<0.001
Which statements on tube feeding and parenteral nutrition are correct?	36.2 %	27.4 %	37.4 %	29.2 %	0.003
Average knowledge score	54.5 %	40.9 %	49.5 %	36.9 %	<0.001

(Arvanitakis et al., 2009). In a survey of 131 nursing schools and universities, Eglseer et al. (2018) found that 26.7 % did not include malnutrition in older persons in the curriculum and that about 30.0 % did not teach its nursing students how to perform malnutrition screening. Therefore, a European regulation on the minimum amount of nutrition education necessary for nursing staff is highly recommended (Cuerda et al., 2020; Eglseer et al., 2018). The recent International Declaration on the Human Right to Nutritional Care also clearly states that all health care professionals should receive a mandatory education in nutrition (ESPEN, 2022).

Not only nursing education, but also the composition of health care teams including the responsibilities of their members and staff-patient ratios differ within Europe (Eurostat, 2022; Aiken et al., 2014). For instance, the differences regarding dietitians' involvement in the care of patients with nutritional difficulties are considerable. In AT and NL, dietitians are part of the healthcare team but only physicians are allowed to refer patients to dietitians (Eglseer and Bauer, 2020), while in CZ, medical doctors with a specialisation in clinical nutrition are primarily responsible for nutritional care (Těšínský et al., 2021). Furthermore, there are 272.6 employed nurses per 100,000 inhabitants in TR, while 1048.3 nurses (i.e. nearly four times more) are employed for the same number of inhabitants in AT (Eurostat, 2022).

Studies have shown that the most important factor for the prevention of malnutrition in older people is the adequate identification of risk factors (Volkert et al., 2019a; Dabbous et al., 2021). Therefore, one of the nurse's responsibilities is to conduct nutritional screening (Bjerrum et al., 2012) which is often not included in European nursing curricula

Table 3
Multiple linear regression with malnutrition knowledge as outcome ($N = 1992$)^a.

	B (95 % CI)	SE B	Beta	p
Constant	56.994 (52.491–61.497)	2.296		<0.001
Working hours	0.096 (–1.822–2.014)	0.978	0.002	0.922
Sex ^b	0.214 (–2.258–2.686)	1.261	0.004	0.865
Age (in years)	–0.096 (–0.192–0.000)	0.049	–0.058	0.049
Specialised training in malnutrition ^c	3.696 (1.493–5.899)	1.123	0.069	0.001
Years of experience	–0.880 (–3.196–1.435)	1.181	–0.022	0.456
Nursing education: Registered nurse ^d	1.090 (–1.433–3.614)	1.287	0.029	0.397
Nursing education: Bachelor's/Master's ^d	7.359 (4.870–9.849)	1.269	0.175	<0.001
Setting: Nursing home ^e	–2.349 (–4.721–0.023)	1.209	–0.044	0.052
Setting: Home Care ^e	–2.757 (–6.271–0.757)	1.792	–0.037	0.124
Setting: Rehabilitation ^e	2.947 (–2.236–8.130)	2.643	0.023	0.265
Setting: Other ^e	0.101 (–2.861–3.062)	1.510	0.001	0.947
Country: TR ^f	–23.211 (–26.986 to –19.436)	1.925	–0.291	<0.001
Country: CZ ^f	–13.220 (–15.846 to –10.595)	1.339	–0.287	<0.001
Country: NL ^f	–5.391 (–8.570 to –2.212)	1.621	–0.089	0.001

Corrected $R^2 = 0.144$; $p < 0.001$.

B (95 % CI) = Regression coefficient with 95 % confidence interval.

SE = Standard estimation for regression coefficient.

^a A total of 64 participants were excluded due to unplausible age data ($n = 10$) and "other" education ($n = 54$).

^b Female as reference category.

^c No as reference category.

^d Nurse assistant as reference category.

^e Hospital as reference category.

^f Austria as reference category.

(Eglseer et al., 2018). This aspect is also underlined by our results, because we identified knowledge about malnutrition screening as being low in all four countries. Furthermore, former studies have also revealed that the knowledge of screening is rather low (Croghan et al., 2001; Bassola et al., 2020; Bauer et al., 2015).

We also identified considerable deficits in knowledge regarding how different health professionals and nursing staff could collaborate during the nutrition process. This constitutes a great challenge in the effort of improving nutritional care (Ten Cate et al., 2021) because nurses need to know who is involved in nutritional care to plan appropriate interprofessional interventions (Ten Cate et al., 2021; Papier et al., 2017). In addition, appropriate interprofessional collaboration is associated with a better nutritional status in older adults (Mawardi et al., 2022). ESPEN initiatives have been initiated, therefore, to improve nutrition education in medical students, because all health care professionals need to be aware of the burden of malnutrition (Cuerda et al., 2020; Cuerda et al., 2021).

It is not enough to simply include the topic of nutrition in basic education programmes. Our results also show that the type of basic education (i.e. academic or other) plays a fundamental role: Nursing staff with a bachelor's or master's degree had a mean malnutrition knowledge that is 7.359 (Beta 0.175) units higher than that of nurse assistants or specialised nurse assistants. Furthermore, the higher level of malnutrition knowledge demonstrated by nursing staff with higher academic

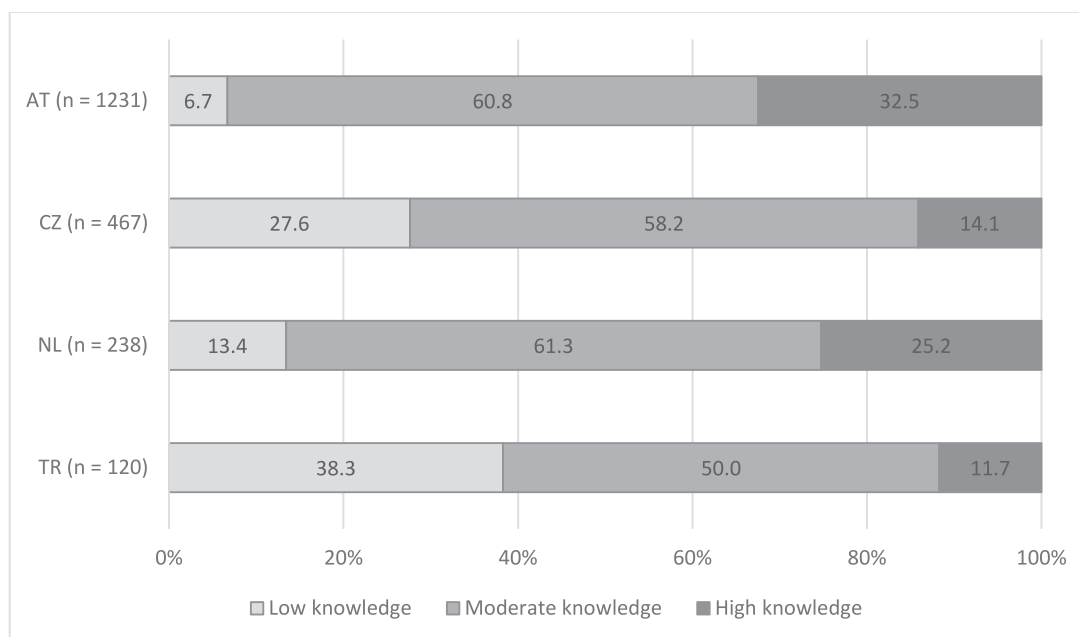


Fig. 1. Categorisation of knowledge into low, moderate, and high categories (in %). Low knowledge: < 33 % correct answers; moderate knowledge: 33–66 % correct answers; high knowledge: > 66 % correct answers.

education is also associated with better patient outcomes (Aiken et al., 2014; Djukic et al., 2019). Despite the Bologna process, the cultural, social, and economic differences among the countries lead to differences in the implementation of nurses with higher levels of academic education (Panteli and Maier, 2021; Collins and Hewer, 2014). Nevertheless, the aging population calls for nurses who are both theoretically and practically well-educated and are able to meet the complex needs of their patients (Collins and Hewer, 2014; United Nations, 2019). This is especially relevant in AT, where the number of nurses with a bachelor's or master's degree is rather low and the aging population is growing relatively quickly (WHO, 2019).

The basic academic education is vitally necessary, but continued education and additional training in malnutrition is also of the utmost importance. Our results show that nursing staff who had already completed a specialised training course in malnutrition had a mean level of malnutrition knowledge that is 3.696 (Beta 0.069) units higher than that of nursing staff who did not receive such training after graduating from the nursing programme. These numbers should be interpreted with caution, however, because the general number of nursing staff who received malnutrition training was rather low in all countries, ranging from 11.3 % in NL to 18.3 % in TR.

Several highly important recommendations can be derived from these study findings. First, we recommend that the academic nursing education should be extended and updated in all European countries, including adequately reflecting nutrition in the curricula, based on the fact that we identified nurses with a higher level of academic nursing education as having better knowledge. Second, we recommend developing and offering high-quality, evidence-based specialised training programs on malnutrition that are easily accessible, as this may be a promising way for nurses who have already graduated from their programme to improve their knowledge still further (Ten Cate et al., 2021; O'Connell et al., 2018). This recommendation is also supported by the fact that nurses are highly interested in learning more about malnutrition, but only a limited number of such continuing education or training programmes are often available and/or accessible (Duerksen et al., 2016). A possible and convenient approach might be to promote Massive Open Online Courses (MOOC) on malnutrition that are already available for health professionals and showed significant improvements in knowledge (Eglseer, 2023). Third, we recommend taking steps to

facilitate the implementation of evidence-based guidelines across country borders, e.g. the ESPEN guidelines (Cederholm et al., 2017; Volkert et al., 2019b), because this requires high levels of knowledge and should not rely primarily on values and expertise (O'Connell et al., 2018).

Although it is known that educational interventions improve knowledge (Sapri et al., 2022), further research is needed to elucidate the specific effects of (nutritional) training on health care professionals' knowledge and practice (Volkert et al., 2019a), as well as on patients and residents (Sapri et al., 2022). Educational interventions cannot be generalised - the diverse educational background of nursing staff needs to be considered. Furthermore, attitudes toward nutritional care may be associated with malnutrition knowledge (Bauer et al., 2015); therefore, researchers need to direct more careful attention toward the relations among knowledge, attitudes, and current practice and investigate these relations. We have now described the knowledge basis in four European countries, but it would be fascinating to compare the knowledge in other countries, as this may enable us to more clearly understand observed differences in the malnutrition knowledge of nursing staff and, in turn, this may lead to changes in nutritional care.

This study has several limitations. We used a descriptive design with a convenience non-representative sample that limits our ability to generalise our results and to draw causal relationships. The sample size varied considerably among the countries, which might have influenced the comparability among them; thus, the results should be interpreted with caution. Furthermore, care settings across European countries are very heterogeneous with regard to their funding, organization and regulation (Cushman and Wakefield, 2019; Collingridge Moore et al., 2020) because they are influenced by political, historical and cultural traditions (Ferreira et al., 2018). Nevertheless, comparisons are useful to learn from others and may help to improve the quality of care (Achtenberg et al., 2019; Ferreira et al., 2018).

6. Conclusions

This study was one of the first to describe the knowledge of malnutrition in nursing staff in various European countries. Overall, approximately one in four participants were identified as having high levels of malnutrition knowledge, and considerable differences were observed

among the four countries. The factors of the country in which the participants lived and worked, their basic education (higher education or not), and whether they had completed specialised training courses on malnutrition were significantly associated with the participants' level of malnutrition knowledge. In all countries, the knowledge of malnutrition screening, which is the first step of successful nutritional care, was low. These findings indicate that it is necessary to extend and improve higher nursing education and to offer further nutritional training programmes tailored to the diverse educational background of nurses throughout Europe. Ensuring that nursing staff have adequate malnutrition knowledge will improve nutritional care and may facilitate international nutritional projects, as well as the implementation of evidence-based guidelines (e.g. ESPEN guideline) across country borders.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Silvia Bauer: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Roles/Writing - original draft; Writing - review & editing.

Jan Pospichal: Conceptualization; Data curation; Investigation; Methodology; Project administration; Writing - review & editing.

Viviënne Huppertz: Conceptualization; Data curation; Investigation; Methodology; Project administration; Writing - review & editing.

Vit Blanař: Conceptualization; Data curation; Investigation; Methodology; Project administration; Writing - review & editing.

Bulent Saka: Conceptualization; Data curation; Investigation; Methodology; Project administration; Writing - review & editing.

Doris Eglseer: Conceptualization; Data curation; Investigation; Methodology; Project administration; Validation; Writing - review & editing.

Declaration of competing interest

None.

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