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The Routines, Knowledge and Attitudes towards Nutrition and Documentation of Nursing Staff in Primary Healthcare: A Cross-Sectional Study

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Abstract

Primary health care faces challenges concerning high malnutrition rates. Attention to documentation is important for ensuring that health care professionals in primary health care deliver appropriate and timely nutritional care and treatment, hence maintaining continuity of care and enhancing patient outcomes. Healthcare professionals' competencies have been shown to be of great importance in delivering high quality documentation and nutritional care.

This aim of this study was to investigate the routines, knowledge and attitudes towards nutrition and documentation in primary health care of the primary healthcare workforce.

Using a descriptive cross-sectional design, a validated questionnaire on registered nurses, social and health service assistants, social and health service helpers' attitudes, routines and knowledge about nutrition and documentation was delivered to eligible participants.

The questionnaire was distributed to 1,391 eligible participants in a municipality in Denmark. The overall response rate was 32%, leaving a total number of 449 respondents.

The study shows that the level of nutritional knowledge and nutritional routines and documentation practices was poor in all three healthcare professional groups. The respondents showed large variations in knowledge and routines, hence complicating the accurate transfer of relevant nutritional related data in the patients' healthcare record and thereby compromising continuity of care. Overall, the three groups of healthcare professionals indicated a somewhat positive attitude towards documentation and nutrition and regarded nutrition and documentation as a part of their area of responsibility, although there were discrepancies in the self-perceived degree of responsibilities among the groups of healthcare professionals.

The regression analysis conducted in this study showed that a high degree of nutritional knowledge and attitudes did not determine nutritional routines. This information suggests that a focus on increasing healthcare professional's nutritional knowledge may be redundant if the organizations and management do not continuously articulate and prioritize nutritional care and documentation.

Keywords: Cross-sectional Study; Primary Health Care; Community; Healthcare Professionals; Healthcare Personnel; Knowledge; Routines; Attitudes; Documentation; Nutrition

Background

Malnutrition is a common and well-known problem in primary health care and is related to higher rates of morbidity and mortality [1-3]. More than half of the elderly living in Danish nursing homes or receiving home or nursing care share the same nutritional challenges as in other countries and are at nutritional risk [4]. A study among 441 elderly at three nursing homes revealed that 16% had a BMI under 18.5, while three out of five elderly were at risk of malnutrition (under-nutrition) with a BMI under 24 [4]. This malnutrition rate may be a consequence of unrecognized and untreated nutritional issues within the elderly population in primary health care. Nutritional care is interdisciplinary and carried out by several healthcare professionals. In Denmark, registered nurses, service and health service assistants and service and health service helpers usually perform nutritional care within the primary healthcare area. In other countries matters may be different. The healthcare system's increasing demands for complex nutritional care and treatment in patients own home or nursing home requires that the communication between the diverse healthcare professionals are precise, structured and standardized. The accurate transfer of nutrition related information in the patients' healthcare record is fundamental to supporting continuity of care and delivering high quality nutritional care and treatment [5]. Studies report up to 25% of unintended nutritional related incidents being related to poor documentation [6-8]. Issues with documentation have been reported and discussed for many years and have been described to center around lack of structure, lack of standardization and lack of precision [9]. These issues affect both the daily workflow and delivery of therapeutic nutritional programs, hence affecting continuity of nutritional care and treatment [10-12].

High quality documentation is conditional on both external and internal factors. The external factors consist of organizational obstacles

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such as lack of prioritization and lack of time and resources allocated for documentation, cultural aspects and lack of available and intuitive systems (both IT and manual) that support the documentation process [13-17]. The internal factors include healthcare personnel's knowledge, their practices and routines and their perceptions and attitudes towards documentation and nutrition [11,16,18-24]. Several studies have investigated nurses' and doctors' nutritional routines, their knowledge and attitudes and also found that the level of nutritional knowledge was inadequate leading to poor clinical decisions regarding nutritional interventions [18-20,25]. However, no studies have described the level of knowledge, the routines and attitudes towards documentation and nutrition among the three primary caregivers in primary healthcare in Denmark; registered nurses, social and health service assistants and social and health service helpers. These three groups of professionals have a close degree of collaboration with each other and with the patient, whether in a nursing home or in the patient's own home. Furthermore, there are no studies that have investigated whether there are differences in healthcare personnel's routines, knowledge and attitudes when comparing their place of employment; nursing home or home care/home nursing.

Aim

This aim of this study was to investigate the routines, knowledge and attitudes towards nutrition and documentation in primary health care of primary healthcare workforce.

Research questions

1) What **routines, knowledge and attitudes** do registered nurses, social and health service assistants and social and health service helpers have in relation to nutrition and documentation in primary health care?

2) Are there differences in **routines, knowledge and attitudes** towards nutrition and documentation between these groups of personnel in nursing homes and home care/home nursing?

Methods and Materials

Design

Using a descriptive cross-sectional design a web-based questionnaire regarding registered nurses, social- and health service assistants, social and health service helpers' attitudes, routines and knowledge about nutrition and documentation as delivered to eligible participants. See Table 1 for an overview of the professional characteristics of the participants.

Setting and sample

A municipality in Denmark participated in the study representing a primary care setting. Both home care, home nursing and nursing homes were identified and a local project coordinator contacted the heads of departments *via* email to participate in the study and to provide local distribution and promotion of the questionnaires to eligible participants. The municipality was divided into four rural and urban districts (District 1-4). Each district has a local leader but they all refer to an overall center manager. The data were collected within these four districts from April 2017 to June 2017.

Questionnaire

As there were no valid and reliable questionnaires available, the authors developed a questionnaire specifically for this study, based on current research and expert opinion.

The questionnaire consisted of 40 questions divided into four subscales; 1) demographic data, consisting of 9 questions, 2) routines in relation to nutrition and documentation, consisting of 10 questions, 3) knowledge in relation to nutrition and documentation, consisting of 11 questions and 4) attitudes in relation to nutrition and documentation consisting of 10 questions. It mainly used closed questions with only a few open-ended questions with the possibility of further elaboration. The majority of the questions had a numeric scale of answer options from 0-10 (0 typically being never or very difficult and 10 typically being always or not difficult), where the remaining questions can be answered dichotomously (yes/no).

To test face and content validity of the questionnaire, four registered nurses and non-registered nurses, three leaders within primary health care and three experts within the nutritional area and documentation were asked to judge whether the questions appeared to be reasonable and if they covered relevant and important data with clarity [26]. This was done using a 4-point scale ranging from "not relevant" (1) to "highly relevant" (4). If questions were scored 3 or less the item were

Education	Length	Length and content of the theoretical part of the education	Length and content of the practical part of the education	Typical work assignments
Registered nurses	3 years and 6 months	60% of the education (120 ECTS credits) The theoretical training includes nursing science, medical science, natural science, humanities and social science.	40% of the education (90 ECTS credits) Practical training takes place in a variety of settings in order to learn to observe, diagnose, assess, manage, evaluate, document and adjust nursing care for citizens and patient in stable, acute and complex care and treatment pathways.	The work assignments of a registered nurse include independent, professional, well-founded and reflective nursing practice in interaction with patients, citizens and relatives, as well as other professionals throughout the healthcare system with special focus on patient experienced continuity and quality.
Social-and health service assistants	1 year and 8 months	32 weeks The theoretical teaching includes health and nursing studies, medical subjects, social science subjects, pedagogy with psychology, cultural and physical activity subjects.	45 weeks Practical training takes place in somatic and psychiatric hospitals as well as in community care facilities and nursing homes.	The work assignments of a social- and health service assistant include care, basic nursing and implementation of physical activity to elderly people as well as ill and disabled people. This takes place at hospitals, mental institutions and in the homes of citizens and nursing homes.
Social and health service helpers	1 year and 2 months	17 weeks The theoretical teaching includes health studies, social science subjects, pedagogy with psychology, physical activity and practical subjects.	38 weeks Practical training takes place in the homes of citizens as well as in nursing homes.	The work assignments of a social- and health service helper include assisting mostly elderly people in practical and personal tasks and basic hygiene as well as implementing physical activity.

Table 1: Professional characteristics of the participants.

revised. The total score was 3.7 and resulted only in minor linguistic changes and layout changes.

To test internal consistency, Cronbach's alpha coefficients were calculated, resulting in coefficients of 0.85 (routines), 0.56 (knowledge) and 0.69 (attitudes). The summarized Cronbach's alpha coefficient for the three subscales is 0.86.

Procedure

A web based questionnaire (developed in an online survey system, www.onlineunderoegelse.dk) was linked to an e-mail and sent to all relevant participants with information about complete anonymity. After two weeks, one reminder was sent by heads of departments to those who had not answered the questionnaire. This procedure was repeated three times every two weeks. The connection between questionnaires and e-mail addresses was deleted after data collection was complete, ensuring complete anonymity.

Data Analysis

For statistical analyses, the Statistical Package for Social Sciences (SPSS), version 22.0 (SPSS Inc., Chicago, IL, USA), was used. The dichotomous results are presented as percentages. The remaining results are given as means +/- 1 SD. Parametric data were tested for distribution by the F-test. If data were normally distributed Student's paired and unpaired two-tailed t-test was used. To test for significance between more than two groups of data the one-way ANOVA was used. P-values below 0.05 were considered significant. Linear regression analyses were conducted to determine whether knowledge and attitude scores predicted routine scores.

Ethical Considerations

The registered nurses, social and health service assistants and social and health service helpers' participation in the study was voluntary. They responded anonymously and all data were treated with confidentiality. In the information letters to the heads of departments and to the registered nurses, social and health service assistants and social and health service helpers, we emphasized that the aim of the study was not to audit individual staff members, but to describe the routines, knowledge and attitudes towards nutrition and documentation of the healthcare staff surveyed.

Results

The questionnaire were distributed to 1,391 eligible registered nurses, social and health service assistants and social and health service helpers in a municipality in Denmark. The overall response rate was 32%, leaving a total number of 449 respondents. A total of 54% of eligible registered nurses, 47% of eligible social and health service assistants and 26% of eligible social and health service helpers responded to the questionnaire. Employees from all four districts were represented among the respondents. District 3 was strongly represented by 57% of the respondents. It is however, also by far the largest district in terms of the number of employees. The response rate in nursing homes was equivalent to the response rate in home care/home nursing, 52% and 48% respectively. Respondents' years of experience in their respective profession ranged from less than one year to 48 years. Thirty-four (62%) nurses had a bachelor's degree or equivalent and 21 (4.8%) had completed a Diploma. Table 2 depicts the demographic characteristics of the respondents.

	Registered Nurses 55 (54)	Social-and Health Service Assistants 129 (47)	Social- and Health Service Helpers 265 (26)	TOTAL 449 (32)
SETTING				
Nursing home	10 (18)	81 (63)	143 (54)	234 (52)
Home Care / Home Nursing	45 (82)	48 (37)	122 (46)	215 (48)
DISTRICT				
District 1	15 (27)	18 (14)	67 (25)	100 (22)
District 2	5 (9)	31 (24)	38 (14)	74 (16)
District 3	26 (47)	77 (60)	152 (57)	255 (57)
District 4	9 (16)	3 (2)	10 (4)	22 (5)
SEX				
Female	54 (98)	127 (98)	255 (96)	436 (97)
Male	1 (2)	2 (2)	10 (4)	13 (3)
AGE				
20-30 years	2 (4)	14 (11)	29 (11)	45 (10)
31-40 years	12 (22)	36 (28)	52 (20)	100 (22)
41-50 years	15 (27)	32 (25)	67 (25)	114 (25)
51-60 years	20 (36)	40 (31)	100 (38)	160 (36)
+ 60 years	6 (11)	7 (5)	17 (6)	30 (7)
BACHELOR DEGREE				
Bachelor degree	34 (62)	N/A	N/A	34 (62)
NUMBER OF YEARS EDUCATED				
0-5 years	2 (4)	32 (25)	65 (25)	99 (22)
6-10 years	11 (20)	32 (25)	44 (17)	87 (19)
11-15 years	8 (15)	26 (20)	32 (12)	66 (15)
16-20 years	13 (24)	22 (17)	62 (23)	97 (22)
21+ years	21 (37)	17 (13)	62 (23)	100 (22)

Number of respondents (% of respondents)

Table 2: Demographic characteristics of the respondents.

Routines in relation to nutrition and documentation

No significant differences were found between registered nurses with a bachelor degree with regard to their routines when compared to registered nurses without a bachelor degree.

The four districts in the municipality differed significantly on five questions concerning their routines. Their mean scores were statistically significantly different in question 2, 3, 5, 7 and 8. The routines covered in Q2), weighing newly referred patients at first visit (p-value=0.045), Q3) planning regular nutritional assessments (p-value=0.017), Q5) reporting about nutritional issues if there is a problem (p-value=0.030), Q7) contacting General Practitioner on having identified or suspected a nutritional problem (p-value=0.017) and Q8) reporting nutritional intake in patients whom are identified at being at nutritional risk (p-value=0.000) were different in the four districts.

Routines regarding nutrition and documentation were significantly different in seven out of ten questions when comparing educational level. Where results were statistically significant, social and health service assistants had the highest score (closer to always maintaining a routine) and social and health service helpers had the lowest score (closer to never maintaining a routine) (Table 3).

Routines concerning nutrition and documentation were significantly different in five out of ten questions when comparing the setting (home care/home nursing versus nursing homes). Where results were statistically significant, nursing homes entered the highest score (closer to always maintaining a routine) and home care/home nursing entered the lowest score (closer to never maintaining a routine) (Table 3).

Knowledge in relation to nutrition and documentation

No significant differences were found between registered nurses with a bachelor's degree with regard to their knowledge of nutrition and documentation, when compared to registered nurses without one.

The four districts in the municipality did not differ significantly with regard to their knowledge of nutrition and documentation.

Knowledge of nutrition and documentation were significantly different in nine out of eleven questions when comparing educational level (Table 4). Social and health service helpers showed a lower level of knowledge in nine questions when compared to registered nurses and social and health service assistants. No differences between registered nurses and social and health service assistants were found.

Knowledge about nutrition and documentation was significantly different in seven out of eleven questions when comparing the setting (home care/home nursing versus nursing homes). Where results were statistically significant, nursing homes showed the highest level of knowledge and home care/home nursing the lowest level (Table 4).

Attitudes in relation to nutrition and documentation

No significant differences were found between registered nurses with a bachelor's degree concerning their attitudes towards nutrition and documentation when compared to registered nurses without one. Only in question 2 (Should there be a care-plan for routine evaluation of patients' nutritional status? (10=always, 0=never) did two groups differ. Nurses without a bachelor's degree had a mean score of 8.52 (SD 2.46) and nurses with a bachelor's degree had a mean score of 6.91 (SD 3.78).

The four districts in the municipality did not differ significantly with regard to respondents' attitudes towards nutrition and documentation.

Attitudes towards nutrition and documentation were significantly different in eight out of ten questions when comparing educational level (Table 5).

Attitudes towards nutrition and documentation were significantly different in five out of ten questions when comparing the setting (home care/home nursing versus nursing homes) (Table 5).

Linear regression analysis of attitude and knowledge scores against routine scores

Linear regression analysis was used to test if knowledge and attitudes significantly predicted participants' routines. The results of

	Registered Nurses	Social-and Health Service Assistants	Social- and Health Service Helpers	Home care / home nursing	Nursing homes
1: Do you assess newly referred patients' nutritional status within the first 14 days of the first visit? (10=always, 0=never)*	6.56 (3.27)	6.83 (3.65)	6.03 (3.54)	6.07 (3.47)	6.51 (3.62)
2. Are newly referred patients weighed at the first visit? (10=always, 0=never)	4.00 (4.02)[a]	5.30 (4.06)[b]	2.79 (3.55)[c]	3.24 (2.34)[d]	4.87 (4.08)
3. Do you plan regular assessments (e.g. Every 14 days, every 3 months.) of the patient's nutritional status? (10=always, 0=never)*	5.36 (3.53)[a]	6.13 (3.87)[b]	4.45 (3.78)[c]	4.26 (3.71)[d]	5.80 (3.84)
4. Do you report nutritional issues in the care plan? (10=always, 0=never)*	7.37 (2.98)	7.88 (3.09)[b]	6.25 (3.65)[c]	6.47 (3.42)[d]	7.34 (3.45)
5. Do you report about the patient's nutritional issues if there IS a problem? (10=always, 0=never)*	8.63 (2.82)	9.33 (1.53)	8.76 (2.45)	9.01 (2.14)	8.84 (2.30)
6. Do you report about the patient's nutritional issues if there is NOT a problem? (10=always, 0=never)*	4.2 (3.86)	4.3 (3.65)[b]	2.92 (3.48)[c]	3.43 (2.87)[d]	4.03 (3.71)
7. Do you contact the patient's General Practitioner if you suspect a nutritional problem or have identified a nutritional problem? (10=always, 0=never)*	6.84 (3.23)	6.96 (3.49)[b]	4.01 (3.86)[c]	4.86 (4.10)	5.27 (4.11)
8. Do you report nutritional intake in patients who are estimated to be at nutritional risk? (10=always, 0=never)*	5.30 (3.58)[a]	7.17 (3.24)[b]	6.12 (3.79)[c]	6.08 (3.69)	6.63 (3.55)
9. Do you assess the patient's need for energy (Calories, carbohydrates, protein, fat, etc.) before starting nutritional therapy in patients you assessed to be at nutritional risk? (10=always, 0=never)*	6.14 (3.28)	6.45 (3.20)[b]	4.42 (3.59)[c]	4.66 (3.45)[d]	5.67 (3.64)
10. To what extent is it routine (through careplans) that patients at nutritional risk are being weighed? (10=always, 0=never)*	6.61 (3.29)	6.37 (3.35)	5.69 (3.82)	5.78 (3.63)	6.15 (3.64)

*Mean (SD), a=P-value <0.05, registered nurses vs social-and health service assistants, b=P-value <0.05, social-and health service assistants vs social-and health service helpers, c=P-value <0.05, social-and health service helpers vs registered nurses, d=P-value <0.05, home care / home nursing vs nursing homes.

Table 3: Routines in relation to nutrition and documentation.

	Registered Nurses	Social-and Health Service Assistants	Social- and Health Service Helpers	Home care / home nursing	Nursing homes
1: Do you find it difficult to identify people who are at nutritional risk? (10=very difficult, 0=not difficult)*	2.53 (2.15)	3.36 (3.26)	4.05 (2.95)[c]	3,83 (2,90)	3,38 (3,21)
2. Do you need screening tools to identify people who are at nutritional risk? YesNo	26.3%73.7%	20.4%79.6%	27.2%72.8%	32.5%[d]67.5%[d]	17.2% 82.8%
3. Are you familiar with locally recommended screening tools? YesNo	57.9%42.1%	47.3%52.7%	11.8%[b,c]88.2%[b,c]	12.9%[d] 87.1%[d]	40.5%59.5%
4. Do you use the locally recommended screening tools? YesNo	48.6%51.4%	48.9%51.1%	13.0%[b,c] 87.0%[b,c]	14.7%[d]85.3%[d]	40.1%59.9%
5. Do you consider patients with chronic diseases as a vulnerable groups and therefore perform nutritional screening as fixed routine? (10=always, 0=never)*	6.14 (3.28)	6.48 (3.20)	4.42 (3.60)[b,c]	4.66 (3.45)[d]	5.67 (3.64)
6. Do you consider palliative and/or cancer patients as a vulnerable groups and perform nutritional screening as fixed routine? (10=always, 0=never)*	6.61 (3.29)	6.37 (3.35)	5.69 (3.82)[b,c]	5.79 (3.63)	6.15 (3.64)
7. Do you find it complicated to develop a care plan with in nutrition? (10=very complicated, 0=not complicated)*	6.79 (2.78)	7.17 (2.46)	5.58 (2.94)	5.90 (2.85)	6.40 (2.91)
8. To what extent do you consider that your training as a registered nurse, social- and health service assistants, social- and health service helpers have given you a reasonable basis for making decisions and taking action on patient nutrition-related issues? (10=to a high degree, 0=not at all)*	7.79 (2.78)	8.20 (2.46)	6.60 (2.94)[b,c]	6.93 (2.85)	7.40 (2.91)
9. To what extent do you think that malnutrition (including both under- and over-nutrition) is a frequent condition in home care? (10=to a high degree, 0=not at all)*	7.32 (1.92)	7.00 (2.17)	5.49 (2.84)[b,c]	5.80 (2.71)[d]	6.43 (2.61)
10. Can you calculate BMI (Body Mass Index)? YesNo	94.7%5.3%	97.8%2.2%	79.5%[b,c] 20.5%[b,c]	81.6%[d]18.4%[d]	92.3%7.7%
11. Can you interpret BMI (Body Mass Index)? (10=to a high degree, 0=not at all)*	8.53 (2.15)	8.62 (1.86)	6.46 (3.21)[b,c]	6.77 (3.14)[d]	7.83 (2.69)

*Mean (SD). a=P-value <0.05, registered nurses vs social-and health service assistants, b=P-value <0.05, social-and health service assistants vs social-and health service helpers, c=P-value <0.05, social-and health service helpers vs registered nurses, d=P-value <0.05, home care / home nursing vs nursing homes.

Table 4: Knowledge in relation to nutrition and documentation.

the regression analysis indicated that the knowledge score was not a significant predictor of routine score ($F(2,310)=1.151$, p-value ≤0.853 with an R^2 of .007) and the attitude score was not a significant predictor of routine score ($F(1,315)=0.947$, p-value≤0.823 with an R^2 of 0.003). Furthermore, the knowledge score was also not a significant predictor of attitude score ($F(2,305)=0.907$, p-value≤0.745 with an R^2 of 0.006). Therefore, neither knowledge nor attitudes are significant predictors of routines (Table 6).

Discussion

449 registered nurses, social and health service assistants, social and health service helpers participated in this cross-sectional study in a municipality in Denmark. This is the first cross-sectional study to examine their knowledge, routines and attitudes towards nutrition and documentation. A response rate of 32% is low, but may be considered acceptable in a web based survey, which is typically 10% lower than that of mail or telephone surveys [27]. The following measures were enacted to facilitate responses to the present survey: The questionnaire was validated among a small group of nutritional and documentation experts and future respondents and thereby pilot tested in order to refine it; It was linked directly to the e-mail received and opened directly in the questionnaire and the accessibility to the questionnaire was high, as all eligible participants also frequently received reminders. Since the entire workforce in the municipality has a work e-mail and uses electronic documentation systems, the distribution of a web-based questionnaire was not considered as an obstacle.

Registered nurses and social and health service assistants were similar in their responses concerning their attitudes towards nutrition. They considered nutrition to be part of their daily work assignments and tasks. This finding is in accordance with other studies suggesting that nursing staff overall have a positive attitude toward nutritional care and feel that it is a part of their responsibility [19-20,28-31]. Bachrach-Lindström et al. [31] found however in 2007 that nursing staff working with older people do not show a definitive positive attitude concerning their nutritional care responsibilities. Concerning documentation, the two groups also had similar responses although social and health service assistants stated that documentation of nutrition is more time and resource consuming than perceived by registered nurses. Social and health service helpers differed from the two other groups in eight out of ten questions. Especially in relation to areas of responsibilities, they stated that they feel less obliged to perform nutritional related activities than the two other groups. Registered nurses and social and health service assistants however stated that all three groups have equal responsibility when it comes to nutritional care and documentation. The discrepancy in their responses could therefore indicate a different perceptions of which professional groups have which responsibilities regarding nutritional care and the results are therefore consistent with a study where nurses expressed the need for a formally clarification of nutritional care responsibilities among the healthcare professionals involved in the patientcare [32].

Overall, between 10% to 38% of the participating healthcare professionals indicated that they do not know where to document nutritional problems or develop nutritional care plans in the patients' healthcare record. The daily routines regarding nutrition and documentation, as perceived by the healthcare professionals, were widespread. This suggests that there is a large nutritional routine variation among the three groups of healthcare professionals. The continuity of nutritional care and treatment are therefore compromised and the patients are likely to be exposed to a number of nutritional routines and practices that are unnecessary or even harmful. A large cross-sectional study conducted in Scandinavia of nurses and doctors

	Registered Nurses	Social-and Health Service Assistants	Social- and Health Service Helpers	Home care / home nursing	Nursing homes
1: Should one of the following healthcare professionals evaluate all newly referred patients' nutritional status at the first visit?					
1a: Registered Nurses	9,30 (1,45)	9,16 (2,05)	8,99 (2,27)	9,05 (2,07)	9,08 (2,17)
1b: Social-and Health Service Assistants	8.50 (2.53)	8.93 (2.26)	8.51 (2.35)	8,35 (2,53)	8,95 (2,06)
1c: Social- and Health Service Helpers	8.79 (2.35)	7.77 (3.44)[a]	6.49 (3.38)[c]	6,64 (3,38)[d]	7,63 (3,27)
(10=always, 0=never)*					
2. Should there be a careplan for routine evaluation of patients' nutritional status? (10=always, 0=never)*	7.82 (3.55)	8.86 (1.91)	8.32 (2.67)	8,43 (2,58)	8,41 (2,60)
3. How often do you think that one of the following healthcare professional should weigh newly referred patients at the first visit?					
1a: Registered Nurses	8,38 (2,77)	7,88 (3,29)	7,82 (3,09)	7,87 (3,12)	
1b: Social-and Health Service Assistants	9,13 (1,6)	8,52 (2,61)	7,71 (2,90)[b,c]	7,72 (2,82)	7,82 (3,22)
1c: Social- and Health Service Helpers	8,79 (2,35)	7,77 (3,44)	6,49 (3,38)[b,c]	6,64 (3,38)[d]	8,45 (2,65)
(10=always, 0=never)*					7,63 (3,27)
4. Do you feel obliged to discuss nutrition with the patients that have an identified or suspected nutrition-related problem? (10=to a high degree, 0=not at all)*	9,09 (2,24)	8,62 (2,14)	7,54 (3,03) [b,c]	8,02 (2,65)	8,03 (2,87)
5. Do you think that nutrition and dietary advice to your patients is an efficient use of your professional time? (10=to a high degree, 0=not at all)*	8,58 (2,41)	7,79 (3,15)	6,92 (3,08) [b,c]	7,14 (2,99)	7,57 (3,11)
6. Should nutrition and dietary advice to your patients solely be performed by other health professionals (such as dieticians, diet consultants, practitioners) rather than:	yes= 52.8% no=47.2%	yes=64.9% no=35.1%	yes=77.1%[b,c] no=22.9% [b,c]	yes=72.9% no=27.1%	yes=67.9% no=32.1%
1a: Registered Nurses	yes=68.8%	yes=69.9%	yes=74.6%	yes=70.3%	yes=73.4%
1b: Social-and Health Service Assistants	no=31.2%	no=30.1%	no=25.4%	no=29.7%	no=26.6%
1c: Social- and Health Service Helpers	yes=75.9%	yes=65.2%	yes=73.5%	yes=73.4%	yes=72.7%
(10=always, 0=never)*	no=24.1%	no=34.8%	no=26.5%	no=26.6%	no=27.3%
7. If no to question 6, do you ever refer patients to other health care professionals for nutritional advice?					
Yes	71.4%	70.5%	61.4%	69.6%	61.3%
No	28.6%	29.5%	38.6%	30.3%	39.7%
8. Do you know where you need to report the nutritional problems of the patient, including establishing careplans?					
Yes	89.2%	87.5%	62.4%[b,c]	64.9%[d]	81.3%
No	10.8%	12.5%	37.6% [b,c]	35.1%[d]	18.7%
9. To what extent do you think that documentation on nutrition is too time and resource consuming? (10=to a high degree, 0=not at all)*	4.00 (3.46)[a,c]	5.32 (3.28)	5.91 (3.52)	6.09 (3.34)[d]	5.03 (3.5)
10. To what extent do you feel that the time for the reporting is adequately adapted and incorporated into your work? (10=to a high degree, 0=not at all)*	5.11 (3.23)	4.43 (3.37)	3.05 (3.14)[b,c]	3.04 (3.19)[d]	.3 (3.30)

*Mean (SD). a=P-value <0.05, registered nurses vs social-and health service assistants, b=P-value <0.05, social-and health service assistants vs social-and health service helpers, c=P-value <0.05, social-and health service helpers vs registered nurses, d=P-value <0.05, home care/home nursing vs nursing homes.

Table 5: Attitudes in relation to nutrition and documentation.

Model	β	P Value	R^2
Knowledge scores	-0.69	0.853	0.007
Attitude scores	-0.56	0.823	0.003

Table 6: Linear model of regression analysis (Dependent variable: routine scores).

nutritional routines, supports this finding, as they found that nutritional practices was poor in all countries across both disciplines [19]. Again, registered nurses and social and health service assistants were more similar in their responses, although social and health service assistants showed a higher degree of performing specific nutritional routines and, therefore a more coherent and consistent nutrition and documentation routine and practice. Overall, the nutritional routines in this present study are characterized by inconsistency and large variation.

With regard to knowledge, there were no difference in the scores between registered nurses and social and health service assistants. Social and health service helpers, however, differed from the two other groups in 9 out of 11 questions. Overall, the three groups showed a poor level of knowledge with large variations concerning nutrition and documentation, which is also what was found in other studies investigating the nutritional knowledge of nurses in nursing homes and hospitals [1,20,30,33]. Between 42% to 88% of the participants are not familiar with the locally recommended nutritional screening tools. Between 5% to 21% of the participants could not calculate BMI (Body Mass Index) and the interpretation of BMI is challenging for all three groups of healthcare professionals. All three groups stated that their education only to some degree provided a basis for making decisions and taking actions on nutrition related issues, which is supported

by another study that found that nurses reported lacking sufficient nutritional knowledge and skills to identify and treat undernourished older patients [32].

The setting in which nutritional care is delivered and documented was also an indicator for statistically significant differences in the healthcare professionals' responses. Those working in nursing homes indicated the highest level of knowledge, routines and attitudes when compared to healthcare professionals employed in home care/home nursing. Healthcare professionals from both settings, however, displayed poor levels of knowledge and routines regarding nutrition and documentation, in concordance with the above results. Approximately 13% of the participants working in home care/home nursing were familiar with and used the locally recommended nutritional screening tools, whereas approximately 40% of the participants working in nursing homes were familiar with and used the locally recommended nutritional screening tools. Up to 18.4% of healthcare professionals working in home care/home nursing could not calculate BMI (Body Mass Index), whereas only up to 7.7% of employees in nursing homes could not. Both participants working in home care/home nursing and nursing homes reported challenges with the interpretation of BMI, although participants working in home care/home nursing reported a statistically significantly higher degree of difficulties with the interpretation of BMI. Hasson et al. [34]. A study from 2008 reported similar results, as a larger percentage of healthcare professionals in home care/home nursing rated their knowledge as insufficient in a number of areas, including the nutritional area, when compared to healthcare professionals in nursing homes [34].

The majority of social and health service helpers and assistants are employed in nursing homes, whereas the majority of registered nurses are employed in home care/home nursing. It would seem to be reasonable to assume that differences between the two settings reflect the different representation of educational levels. However, since registered nurses have a higher education level than social and health service helpers and assistants it could be assumed that the level of knowledge, routines and attitudes would be higher in home care/home nursing and not in nursing homes as was found in this study. Several studies report that education and training are important to the quality of care and underpin the importance of the presence of healthcare professionals with a high level education regardless of the setting [35,36]. However, based on the results from this descriptive study, it can be suggested that organizations also should focus on qualifying, training and educating healthcare professionals, regardless of their educational level, meaning that organizational, cultural and management support are potentially equally as important as educational level with regard to delivering high quality of care.

In the linear regression analysis conducted in this study, it was hypothesized that a high score on attitudes and knowledge would be a predictor of high scores in routines. However, the analysis showed that a high degree of nutritional knowledge and attitudes did not directly determine nutritional routines and practices. This is in contrast to other studies that have investigated the association between nutritional knowledge and nutritional routines among nurses, doctors and dieticians in different settings. These studies suggested that a low degree of nutritional knowledge is a predictor of poor nutritional care and practices [19,20,37]. The results from the regression analysis support our previous suggestions for an organization, management and culture that articulates and prioritizes nutritional care and documentation. Evidence also suggests that no matter which healthcare professionals are employed or what their specific roles are, a truly effective workforce can only be generated by tackling of organizational structures and issues [38].

The present study has some limitations. Firstly, the study design has a predictive limitation, as it is not possible to assess any cause and effect relationship between the parameters investigated. Furthermore, it is purely a descriptive study aiming to map current conditions in a municipality in Denmark. Secondly, the findings in this study have not been verified with a review of the respondents' documentation practice e.g. use of screening tools and development of nutritional care plans. Thirdly, the questionnaire developed has an acceptable and good summarized Cronbach´s alfa score of 0.86. However, the knowledge subscale had a Cronbach´s alfa score of 0.56, which indicates poor internal consistency. We therefore recommend caution against using only the subscales and not the full questionnaire in another primary healthcare setting before the questionnaire have been adjusted and refined. Fourthly, the low response rate may, overall, reflect a low interest level in the topic or that the healthcare staff does not perceive it as relevant. However, one could anticipate that those healthcare professionals that participated in this study have a higher interest in nutrition and documentation than those who did not participate. An analysis of non-responders in Mowe et al. [19] study showed that the respondent group was more interested in nutrition and that they found it more relevant than the non-responders. This could support the assumption that nutritional care and documentation routines, level of knowledge and attitudes among the healthcare professionals in this municipality in fact are associated with greater variety and inconsistency than depicted in this study.

Qualitative studies elaborating on the discrepancies and differences registered in this study would be useful to conduct. An investigation of the knowledge, routines and attitudes of nutrition and documentation among registered nurses, social and health service assistants and social and health service helpers in nursing homes and home care/home nursing would give a more thorough and in-depth insight into these areas. It could then provide primary healthcare and managers/leaders with future recommendations containing specific strategies in order to increase the quality of nutritional care and documentation.

Conclusion

This is the first study to compare the routines, knowledge and attitudes regarding nutrition and documentation among registered nurses, social and health service assistants and social and health service helpers in nursing homes and home care/home nursing in a Danish municipality. This study shows that the level of nutritional knowledge and nutritional routines and documentation practices was poor in all three healthcare professional groups. The respondents showed large variations in knowledge and practices, hence complicating the transfer of accurate and relevant nutritional related data in the patients' healthcare record and risking that the continuity of care and treatment would be lacking as the quality of care decreases. Overall, all three groups of healthcare professionals indicated a somewhat positive attitude towards documentation and nutrition and regarded nutrition and documentation as a part of their area of responsibility, although there were discrepancies in the degree of responsibilities among the groups of healthcare professionals.

The regression analysis conducted in this study showed that a high degree of nutritional knowledge and attitudes did not determine nutritional routines. This information suggests that focus on increasing healthcare professionals nutritional knowledge may seem redundant if the organizations and management do not continuously articulate and prioritize nutritional care and documentation.

Ethical Approval Statement

Ethical approval was not sought at The National Committee on Health Research Ethics as this type of study are not obliged to be notified at the committee (http://www.nvk.dk/forsker/naar-du-anmelder/hvilke-projekter-skal-jeg-anmelde). The study however followed all ethical regulations and rules in accordance with the Danish National Committee on Health Research Ethics.

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