

Assessment of therapeutic nutritional knowledge of Jordanian nurses

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To cite this article:

Naseem M. Al-Shwaiyat, Areej B. Sinjillawi, Abdallah S. Al-Rethaiaa, Alaa-Eldin A. Fahmy, Riyadh M. Al-Saraireh, Mohammad M. Aqel, Sabal M. Al-Hajjaj and Alaa S. Al-Sbou. Assessment of Therapeutic Nutritional Knowledge of Jordanian Nurses. *International Journal of Nutrition and Food Sciences*. Vol. 2, No. 3, 2013, pp. 142-148. doi: 10.11648/j.ijnfs.20130203.18

Abstract: Nurses have a great contact with hospitalized patients and play an important role in their nutritional management. The current research is a cross-sectional survey, carried out in Al-Hussein Hospital, King Hussein Medical Center, Amman, Jordan, to study the level of therapeutic nutritional knowledge of Jordanian nurses. Two hundred and fifty registered nurses were invited to participate in this study; all of them were Jordanian of the Arabian ethnicity and were selected by simple random sampling method. Of those, two hundred nurses agreed to participate giving a response rate 80%. Data were collected by self-reported questionnaire of 31-items which its validity and reliability were established. We found that the mean correct-response rate for therapeutic nutritional knowledge of Jordanian nurses was suboptimal (58.8%). Moreover, the therapeutic nutritional knowledge related to diabetes (71.6%) was relatively higher than those related to obesity (59.0%) and cardiovascular diseases (54.9%). Woman nurses scored significantly higher correct-response rate for cardiovascular diseases-related therapeutic nutritional knowledge than men (56.6% vs. 51.9%). Twenty out of 31 questions were answered correctly by more than 50% of the nurses. The findings suggest an urgent need to improve the curricula of undergraduate nursing courses regarding the nutrition issues and to promote postgraduate continuing educational programs concerning therapeutic nutrition.

Keywords: Assessment, Therapeutic, Nutritional Knowledge, Nurses, Jordan

1. Introduction

The trend to reduce the cost of hospital care reforms the health care providers' responsibilities to be broader in order to minimize the actual number of providers working with each client[1]. The dietitian is the nutrition expert in the health care team. However, dietitian is not available all the time to answer the patient's dietary enquiries[2]. Moreover, hospitalized patients are usually less motivated to follow nutritional advices. Their ability to learn about the proper diet may be affected by pain, anxiety or medications[3]. Nurses play an important role in nutrition management for their patients. They have the greatest contact with patients and are often available as a nutritional education resource in the absence of the dietitian[4]. Therefore, nurses are in an ideal position to provide nutritional knowledge and sustain

the patient's motivation[5]. Although nurses are not supposed to take the position of the dietitian when patients are at high risk for nutritional problems, they are expected to be aware about the principles of nutrition which enable them to deal with patients at low or mild risk for nutritional problems[2].

Several studies were conducted to investigate the level of nutritional knowledge of nurses in different countries. Suboptimal levels of nutritional knowledge for nurses were reported in Korea and Australia[6-7]. However, higher levels of nutritional knowledge were reported for nurses in the United States and Scotland[8-10]. In contrast, low level of nutritional knowledge was reported for nurses in South Africa[11]. In our literature search, we did not find any report regarding the level of nutritional knowledge of Jordanian nurses. The current work was conducted to study

the level of nutritional knowledge of Jordanian nurses. Keeping in mind that the Jordanian health sectors do not provide nursing staff with continuing educational programs about therapeutic nutrition, we expect to find a low level of nutritional knowledge among Jordanian nurses.

2. Methods

2.1. Design and Participants

The study is a cross-sectional survey, conducted during January, 2011 in Al-Hussein Hospital, King Hussein Medical Center, Amman, Jordan which is the largest multidisciplinary medical institution in Jordan. Two hundred and fifty registered nurses were invited to participate in this study; all of them are Jordanian of the Arabian ethnicity and were selected by simple random sampling method. Of those, two hundred nurses agreed to participate according to Helsinki Declaration giving 80% response rate. The study protocol was approved by the committee of human research ethics in the Jordanian Royal Medical Services.

2.2. Questionnaire

A self-reported questionnaire was designed to study the therapeutic nutritional knowledge of nurses. It was adopted from items used in previous studies[6-8]. Data were collected using the Arabic version of an adopted questionnaire. Translation and back-translation were carried out by linguistic professionals according to Chen and Boore[12]. The questionnaire was distributed to the participants in their workplace by the researchers. Nurses were informed about the study and were given instructions on how to fill out the questionnaire completely and truthfully.

The questionnaire was structured in two sections. The first section asked about the demographic characteristics (gender, age group, educational level, and years of experience). The second section of the questionnaire included the therapeutic nutritional knowledge questions (31 items). Validity and reliability were established for the instrument. Face validity was assessed using a focus group from the target population to ensure understanding and cultural appropriateness of the questions. The focus group revealed that three items should be modified to reflect cultural differences. Reliability was measured for the 31 items questionnaire and the Cronbach's alpha coefficient value was 0.709. The questionnaire asked about nutritional knowledge related to diabetes (5 items), obesity (9 items) and cardiovascular diseases (17 items). Sixteen items had 3 choices to answer from, while the remaining 15 questions had 6 choices. Bias caused by guessing was minimized by including a "don't know" category in each question's choices. The correct-response for each question was scored as (1), while incorrect and "don't know" answers were given (0). Thus, the total score was 31 points distributed as 5, 9 and 17 for diabetes, obesity and cardiovascular diseases respectively. These scores were used to calculate the correct-response rate for therapeutic

nutritional knowledge of nurses.

2.3. Data Analysis

The demographic characteristics of the participants and their response for each question choices were assessed and expressed as numbers and percentages. The correct-response rates for the therapeutic nutritional knowledge were assessed and expressed as means and standard deviations. Comparison for means of correct-response rates was performed using Student's *t*-test. Differences were considered statistically significant at *p* value < 0.05. The Statistical Package for Social Sciences (SPSS version 17, Inc., Chicago, IL, USA) was used for data analysis.

3. Results

3.1. Nurses' Characteristics

Two hundred nurses participated in the current study; 37% of them were men (Table 1). Those with an Associate degree formed 26%, while the remaining had a Bachelor's degree. About half of the participants (49%) aged 20-25 years, while 51% aged 26 years or more. Finally, nurses with 1-5 years of experience represented 64.5% of the studied sample, while the remaining had 6 years of experience or more.

3.2. Therapeutic Nutritional Knowledge

Results showed that the mean correct-response rate for therapeutic nutritional knowledge of Jordanian nurses was 58.8% (Table 1). Moreover, the therapeutic nutritional knowledge related to diabetes (71.6%) was relatively higher than those related to obesity (59.0%) and cardiovascular diseases (54.9%). Woman nurses scored significantly higher correct-response rate for therapeutic nutritional knowledge related to cardiovascular diseases than men (56.6% vs. 51.9%).

Twenty out of 31 questions were answered correctly by more than 50% of the nurses. Ten of these questions were answered correctly by more than 75% of the sample (Tables 2, 3 and 4). The highest correct-response rate was obtained when 91% of nurses agreed with the recommendation of a high fiber diet for obesity. In contrast, the lowest correct-response rate was recorded when only 10% of nurses chose that decreasing total fat intake as a first recommended diet therapy for obese 45 year-old adult with blood cholesterol level of 239 mg/dl. About 70% of nurses knew that diabetic patients can eat fruits and should restrict animal fat and carbohydrates intake. Interestingly, only 38% of nurses knew that high fat intake is more responsible for obesity than high sugar intake. On the other hand, the majority of the participants agreed with the importance of reducing carbohydrate (88.5%) and animal fat (74%) to lose body weight. Most of the nurses linked between hypertension and obesity (90%), and recommended low sodium diet for hypertensive patients (84%). High percentages of participants believed that cardiovascular diseases' patients should limit their intake of saturated fat (87%), trans fat (50%), and caffeinated beverages (88%).

Although 69% of nurses agreed that high blood cholesterol increases the incidence of heart disease, only 12.5% selected correctly the maximum level of dietary cholesterol recommended in low-cholesterol diet.

Table 1. The demographic characteristics of nurses and their correct-response rates for therapeutic nutritional knowledge

Variables	Nurses N (%)	Diabetes Mean (SD)	Obesity Mean (SD)	Cardiovascular diseases Mean (SD)	Total Mean (SD)
All Participants	200 (100%)	71.6 (24.3)	59.0 (16.7)	54.9 (15.5)	58.8 (13.2)
Gender					
Men	74 (37%)	72.2 (25.4)	56.8 (18.1)	51.9 (17.5)	56.6 (14.5)
Women	126 (63%)	71.3 (23.7)	60.3 (15.7)	56.6 (14.0)	60.0 (12.3)
<i>p</i> value		0.802	0.146	0.04*	0.074
Age Group					
20-25 years	98 (49%)	71.8 (21.5)	59.6 (15.6)	55.0 (14.6)	59.1 (11.9)
≥ 26 years	102 (51%)	71.4 (26.8)	58.4 (17.7)	54.7 (16.4)	58.4 (14.4)
<i>p</i> value		0.893	0.598	0.867	0.733
Education Level					
Associate degree	52 (26%)	69.6 (24.3)	58.1 (16.4)	55.8 (14.2)	58.7 (12.3)
Bachelor's degree	148 (74%)	72.3 (24.3)	59.3 (16.8)	54.5 (16.0)	58.8 (13.2)
<i>p</i> value		0.494	0.659	0.622	0.963
Years of Experience					
1-5 years	129 (64.5%)	71.3 (24.2)	58.7 (17.7)	54.4 (16.4)	58.3 (14.1)
≥ 6 years	71 (35.5%)	72.1 (24.5)	59.6 (14.7)	55.8 (14.0)	59.5 (11.5)
<i>p</i> value		0.825	0.696	0.543	0.548

* Means are significantly different at *p* value < 0.05 by Student's *t*-test.

Table 2. Nurses' response for diabetes-related therapeutic nutritional knowledge questions

Questions Asked	Answer Levels	Nurses' Response	
		N	%
1. Fruits should not be consumed by the diabetic patients.	A. Agree	54	27
	B. Disagree*	143	71.5
	C. Don't know	3	1.5
2. Only carbohydrates have to be restricted for the diabetic patients.	A. Agree	44	22
	B. Disagree*	140	70
	C. Don't know	16	8
3. Animal fat should be restricted for diabetic patients.	A. Agree*	137	68.5
	B. Disagree	51	25.5
	C. Don't know	12	6
4. The product which should not be used for patients with hypoglycemia is:	A. Candy	11	5.5
	B. Orange juice	4	2
	C. Sugar-free carbonated beverages*	141	70.5
	D. Skim milk	17	8.5
	E. Chocolate	7	3.5
	F. Don't know	20	10
5. What is the recommended diet for diabetic patients?	A. Standard American diet	6	3
	B. Balanced diet*	155	77.5
	C. A high carbohydrate diet	3	1.5
	D. A high fat diet	4	2
	E. A high protein diet	25	12.5
	F. Don't know	7	3.5

* The correct answer.

Table 3. Nurses' response for obesity-related therapeutic nutritional knowledge questions

Questions Asked	Answer Levels	Nurses' Response	
		N	%
1. High sugar intake is more responsible for causing obesity than high fat intake.	A. Agree	115	57.5
	B. Disagree*	76	38
	C. Don't know	9	4.5
2. A high fiber diet is recommended for obesity.	A. Agree*	182	91
	B. Disagree	13	6.5
	C. Don't know	5	2.5
3. Carbohydrate intake should be reduced to lose body weight.	A. Agree*	177	88.5
	B. Disagree	19	9.5
	C. Don't know	4	2

4. Animal fat should be removed from meal to lose body weight.	A. Agree*	148	74
	B. Disagree	41	20.5
	C. Don't know	11	5.5
5. Android (upper body) obesity has more complications such as hypertension and diabetes than gynoid (lower body) obesity.	A. Agree*	145	72.5
	B. Disagree	23	11.5
	C. Don't know	32	16
6. An obese 45 year-old adult has blood cholesterol level of 239 mg/dl. Which of the following dietary therapy is the first recommended?	A. Decrease monounsaturated fat intake	18	9
	B. Decrease polyunsaturated fat intake	45	22.5
	C. Decrease total fat intake*	20	10
	D. Decrease total cholesterol intake	46	23
	E. Decrease carbohydrate intake	1	0.5
	F. Don't know	70	35
7. Which disorder is not related to the android obesity?	A. Diabetes	19	9.5
	B. Hyperlipidemia	16	8
	C. Hypertension	10	5
	D. Kidney failure*	83	41.5
	E. Myocardial infraction	24	12
	F. Don't know	48	24
8. The food which contains the highest amount of carbohydrate is:	A. Chicken	6	3
	B. Cheese	3	1.5
	C. Potato*	161	80.5
	D. Peanut butter	12	6
	E. Milk	4	2
	F. Don't know	14	7
9. The food which contains the highest amount of fat is:	A. Low fat milk*	70	35
	B. Orange juice	6	3
	C. Corn	30	15
	D. Honey	4	2
	E. Soy sauce	74	37
	F. Don't know	16	8

* The correct answer.

Table 4. Nurses' response for cardiovascular diseases-related therapeutic nutritional knowledge questions

Questions Asked	Answer Levels	Nurses' Response	
		N	%
1. There is a close relationship between hypertension and obesity.	A. Agree*	180	90
	B. Disagree	16	8
	C. Don't know	4	2
2. For the treatment of hypertension, a low sodium diet is routinely recommended.	A. Agree*	168	84
	B. Disagree	20	10
	C. Don't know	12	6
3. What kind of mineral is likely to be deficient for the patients who are on diuretics?	A. Sodium	49	24.5
	B. Potassium*	132	66
	C. Calcium	4	2
	D. Magnesium	1	0.5
	E. Iodine	5	2.5
	F. Don't know	9	4.5
4. The mineral which decreases the risk of hypertension is:	A. Sodium	37	18.5
	B. Calcium*	49	24.5
	C. Iron	17	8.5
	D. Copper	4	2
	E. Zinc	27	13.5
	F. Don't know	66	33
	5. A lower intake of saturated fat decreases the risk of coronary artery disease.	A. Agree*	174
B. Disagree		17	8.5
C. Don't know		9	4.5
6. High blood cholesterol increases the incidence of heart disease.	A. Agree*	138	69
	B. Disagree	12	6
	C. Don't know	5	2.5
7. The trans fats such as margarine are recommended for cardiovascular disease.	A. Agree	84	42
	B. Disagree*	100	50
	C. Don't know	16	8
8. Omega-3 fatty acids such as fish oil help to reduce hyperlipidemia.	A. Agree*	156	78
	B. Disagree	19	9.5
	C. Don't know	25	12.5
9. Caffeinated beverages are harmful for myocardial	A. Agree*	176	88

infraction.	B. Disagree	15	7.5
	C. Don't know	9	4.5
10. Low fat milk is good for replacing whole milk, when trying to reduce total fat intake.	A. Agree*	161	80.5
	B. Disagree	29	14.5
	C. Don't know	10	5
	A. Meat-saturated fatty acids	9	4.5
	B. Mayonnaise-polyunsaturated fatty acids*	21	10.5
11. Which of the following food is not a major source of the described fatty acids?	C. Olive oil-monounsaturated fatty acids	24	12
	D. Egg-saturated fatty acids	17	8.5
	E. Peanut-monounsaturated fatty acids	9	4.5
	F. Don't know	120	60
	A. Palm oil*	39	19.5
	B. Olive oil	32	16
12. Which of the following vegetable oils contain the highest amount of saturated fat?	C. Corn oil	21	10.5
	D. Soybean oil	32	16
	E. Sunflower oil	16	8
	F. Don't know	60	30
	A. Replace iso-calories of unsaturated by saturated fatty acids*	62	31
	B. Consume complex carbohydrates as the majority of daily caloric intake	22	11
13. The dietary therapy which is not recommended for preventing coronary artery disease is:	C. Reduce food high in cholesterol	27	13.5
	D. Decrease total fat intake	16	8
	E. Increase fruits and non-starch vegetables	17	8.5
	F. Don't know	56	28
	A. Meat	25	12.5
	B. Egg	8	4
14. Which of the following foods is not a source of cholesterol?	C. Margarine*	30	15
	D. Milk	9	4.5
	E. Fish	107	53.5
	F. Don't know	21	10.5
	A. 100	30	15
	B. 200	47	23.5
15. Intake of less than () mg of cholesterol is recommended for low-cholesterol diet.	C. 300*	25	12.5
	D. 400	4	2
	E. 500	7	3.5
	F. Don't know	87	43.5
	A. Meat	18	9
	B. Sausage	8	4
16. The food which is not restricted for people with hyperlipidemia is:	C. Chicken breast*	101	50.5
	D. Shrimp	21	10.5
	E. Milk	11	5.5
	F. Don't know	41	20.5
	A. Replace pie by roll cake between meals*	108	54
	B. Remove the chicken skin	17	8.5
	C. Replace mayonnaise by soy sauce as salad dressing	17	8.5
17. The incorrect way to lower fat intake is:	D. Replace whole milk by low-fat or skim milk	9	4.5
	E. Replace one whole egg by two egg whites	16	8
	F. Don't know	33	16.5

* The correct answer.

4. Discussion

Our results revealed that nurses exhibited a suboptimal level of therapeutic nutritional knowledge (mean = 58.8%). This finding is consistent with the results of similar studies carried out in Korea and Australia. A 42-items survey conducted by Park *et al.* showed that the mean nutritional knowledge of 506 Korean nurses was 58.4%[6]. Similarly, in a 48-items survey conducted among 103 Australian nurses, Schaller and James found that the mean nutritional knowledge was 60.2%[7]. On the other hand, higher levels of nutritional knowledge were reported for nurses in the

United States and Scotland. Warber and colleagues, using a 55-items survey, found that the mean score of nutritional knowledge among 68 nurse practitioners in New England region was 66%[8]. A similar level of nutritional knowledge (65%) was reported by Crogan *et al.* who used a 50-items survey among 44 nurses working in nursing homes in Washington[9]. Hankey and colleagues evaluated nutritional knowledge and beliefs about obesity of 509 Scottish nurses by asking them 13 questions. They reported the correct-response rate for each question individually; from which we calculated the mean correct response-rate for all questions which was 79.6%[10]. In contrast, lower levels of nutritional knowledge were reported for nurses in South

Africa by Kgaphola *et al.* who carried out a 40-items survey among 99 nurses and found that the mean correct-response rate was 35%[11]. In the current research, Jordanian nurses exhibited a high level of diabetes-related therapeutic nutritional knowledge, and a suboptimal level of their knowledge related to obesity and cardiovascular diseases. Similarly, Park *et al.* reported higher levels of therapeutic nutritional knowledge related to diabetes (67.59%) than those related to obesity (53.76%) and cardiovascular diseases (57.66%)[6].

Scientific literatures provide a controversial debate about the effect of nurses' demographic characteristics on their nutritional knowledge. In our study, the educational level of nurses had no influence on their nutritional knowledge. Contrarily, a significant direct correlation was documented between the above two parameters by Park *et al.* and Crogan *et al.*[6,9]. Surprisingly, this correlation was reported to be significantly inverse by Schaller and James[7]. Our results agreed with those of Crogan *et al.*[9] that there was no significant correlation between years of experience and nutritional knowledge. On the other hand, Park *et al.* and Schaller and James revealed that nutritional knowledge elevated significantly with years of experience[6-7]. Age groups and nutritional knowledge showed no significant correlation in the present study. In contrast, Schaller and James found a significant higher nutritional knowledge among older nurses[7].

The American Dietetic Association recommended nutritional education to be an essential component of the curricula for health care professionals[1]. Continuing educational programs regarding nutrition after graduation are in the same level of importance to update nurses' nutritional knowledge[13-14]. Recently, a Danish team investigated the impact of a training program on the nurses' nutritional knowledge and the patients' outcomes of nutritional care. They found that the program enhanced nurses' awareness of nutritional assessment and management. In addition, the patients' knowledge of appropriate food choices from the menu increased; suggesting that the nutritional intake of the patients had improved[15-16]. Nevertheless, most of the Jordanian nursing programs for undergraduate include only one course related to nutrition in health and illness (according to their Websites). Moreover, there are limited continuing educational programs regarding nutrition offered to nurses by public, private or military health sectors in Jordan (according to their Websites).

Nutritional care is considered as an integral part of the primary care provided to hospitalized patients. Therefore, an effective communication and cooperation among professionals involved in the patients' medical care are important for successful nutritional management. Nutritional education at the bedside of patients offered by both dietitian and nurse is more efficient than that done by dietitian alone[2]. Since nurses spend more time with hospitalized patients than other health care professionals, they are able to observe patients' eating patterns, identify

potential nutritional problems and provide some dietary advices. When necessary, nurses could request a dietitian's intervention to ensure a comprehensive nutritional management[17].

Finally, the current work was limited by recruiting the participants from only one Jordanian hospital. Participations of nurses from several hospitals across Jordan may provide a more representative study sample. However, being the first attempt, not only in Jordan but also in Middle Eastern countries, to study the level of therapeutic nutritional knowledge of nurses could show the importance of this study.

5. Conclusions

The current study was conducted to assess the therapeutic nutritional knowledge of Jordanian nurses. Our results revealed that Jordanian nurses had a suboptimal level of therapeutic nutritional knowledge. This emphasizes the necessity of both improving the curricula of undergraduate nursing courses regarding the nutrition issues and establishing postgraduate continuing educational programs about therapeutic nutrition. The important concern in this area is that nurses that do not have adequate nutritional knowledge are giving advice to their patients that often times is incorrect which is a greater problem. Therefore, educational programs would be helpful in promoting nurses' active involvement in nutritional management for hospitalized patients. We hope that this study constitutes the first step for developing nutritional management practice in Jordanian hospitals.

Acknowledgements

The authors would like to thank Mr. Moutaz Al-Abdallah for linguistic revision and all nurses who participated in this study. Al-Shwaiyat N., Al-Rethaiaa A. and Fahmy A. designed the research protocol, performed the statistical analysis and wrote the manuscript. Sinjillawi A., Al-Saraireh R., Aqel M., Al-Hajjaj S. and Al-Sbou A. collected the raw data and contributed to the manuscript. Al-Shwaiyat N. supervised all steps of this study.

References

- [1] American Dietetic Association (1998) Position of The American Dietetic Association: Nutrition education for health care professionals. *Journal of the American Dietetic Association*, 98(3): 343-346.
- [2] Dudek, S.G. (2010) *Nutrition Essentials for Nursing Practice*, 6th edition, Lippincott Williams & Wilkins, Philadelphia, PA.
- [3] Kowanko, I. (1997) The role of the nurse in food service: A literature review and recommendations. *International Journal of Nursing Practice*, 3(2): 73-78.

- [4] Hopper, D. and Barker, M.E. (1995) Dietary advice, nutritional knowledge and attitudes towards nutrition in primary health care. *Journal of Human Nutrition and Dietetics*, 8(4): 279–286.
- [5] Nowak, M., Harrison, S. & Hutton, L. (2007) Nutrition-related knowledge, beliefs and practices of Australian nursing staff. *Nutrition & Dietetics*, 64(2): 121–126.
- [6] Park, K.A., Cho, W.I., Song, K.J., Lee, Y.S., Sung, I.S. and Choi-Kwon, S.M. (2011) Assessment of nurses' nutritional knowledge regarding therapeutic diet regimens. *Nurse Education Today*, 31(2): 192–197.
- [7] Schaller, C. and James, E.L. (2005) The nutritional knowledge of Australian nurses. *Nurse Education Today*, 25(5): 405–412.
- [8] Warber, J.I., Warber, J.P. and Simone, K.A. (2000) Assessment of general nutrition knowledge of nurse practitioners in New England. *Journal of the American Dietetic Association*, 100(3): 368–370.
- [9] Crogan, N.L., Shultz, J.A. and Massey, L.K. (2001), "Nutrition Knowledge of Nurses in Long-Term Care Facilities", *The Journal of Continuing Education in Nursing*, 32(4): 171–176.
- [10] Hankey, C.R., Eley, S., Leslie, W.S., Hunter, C.M. and Lean, M.E.J. (2004) Eating habits, beliefs, attitudes and knowledge among health professionals regarding the links between obesity, nutrition and health. *Public Health Nutrition*, 7(2): 337–343.
- [11] Kgaphola, M.S., Wodarski, L.A. and Garrison, M.E.B. (1997) Nutrition knowledge of clinic nurses in Lebowa, South Africa: implications for nutrition services delivery. *Journal of Human Nutrition and Dietetics*, 10(5): 295–303.
- [12] Chen, H.Y. and Boore, J.R.P. (2010) Translation and back-translation in qualitative nursing research: methodological review. *Journal of Clinical Nursing*, 19(1-2): 234–239.
- [13] Cadman, L. and Wiles, R. (1996) Nutrition advice in primary care: evaluation of practice nurse nutrition training programmes. *Journal of Human Nutrition and Dietetics*, 9(2): 147–156.
- [14] Kennelly, S., Kennedy, N.P., Rughoobur, G.F., Slattery, C.G. and Sugrue S. (2010) An evaluation of a community dietetics intervention on the management of malnutrition for healthcare professionals. *Journal of Human Nutrition and Dietetics*, 23 (6): 567–574.
- [15] Bjerrum, M., Tewes, M. and Pedersen, P. (2012) Nurses' self-reported knowledge about and attitude to nutrition – before and after a training programme. *Scandinavian Journal of Caring Sciences*, 26 (1): 81–89.
- [16] Pedersen, P.U., Tewes, M. and Bjerrum, M. (2012) Implementing nutritional guidelines – the effect of systematic training for nurse nutrition practitioners. *Scandinavian Journal of Caring Sciences*, 26 (1): 178–185.
- [17] Kim, H. and Choue, R. (2009) Nurses' positive attitudes to nutritional management but limited knowledge of nutritional assessment in Korea. *International Nursing Review*, 56(3): 333–339.