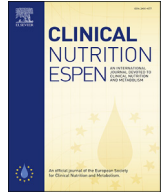




Contents lists available at ScienceDirect

Clinical Nutrition ESPEN

journal homepage: <http://www.clinicalnutritionespen.com>

Original article

Status of nutrition care process implementation in hospitals in Jeddah, Saudi Arabia

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ARTICLE INFO

Article history:

Received 27 August 2019

Accepted 15 February 2020

Keywords:

Dietetic

Implementation

Nutrition assessment

SUMMARY

Background and aims: The Nutrition Care Process (NCP) and Nutrition Care Process Terminology (NCPT) are currently implemented by dietetics practitioners worldwide, with various advantages, including ensuring consistency and clarity of dietetics-related healthcare records and the possibility to collect and analyse patient outcomes; however, how Saudi dietitians experience the implementation process is poorly understood. The aim of this study was to explore the experiences of Saudi dietitians of NCP implementation in hospitals in Jeddah.

Methods: In this quantitative, cross-sectional study, 56 dietitians were recruited from six principal hospitals in Jeddah. A questionnaire was used to collect data on the characteristics of the dietitians and hospital-related clinical nutrition care performance, the perception and opinions of dietitians towards the NCP, and the status of NCP implementation.

Results: Almost all dietitians (98%) were aware of the NCP; however, only 27% had received NCP training. Most dietitians (73%) reported that their department currently follows the NCP, while only 26% reported using the standardized NCP, including International Classification of Functioning, Disability & Health – Dietetics (ICF-D)-WHO and International Dietetic & Nutrition Terminology (IDNT) – USA, with 63% following the hospital's own NCP. Reported reasons for hospitals not following the NCP included insufficient dietitians, lack of experience, or conflict with the hospital's nutrition care system. A majority of dietitians reported no perceived barriers to applying the NCP; however, 23% reported NCP documentation as a challenge.

Conclusions: The majority of dietitians are aware of the NCP and feel confident to practice; however, the NCP model is not currently implemented in Jeddah hospitals as standard. On-going education, a training program, and an implementation plan should be prioritised.

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1. Introduction

The health care professions consider the implementation of healthcare models, with standardized processes and terminologies, as a necessity that increases the effectiveness and efficiency of healthcare systems [1]. The dietetic discipline has developed the

Nutrition Care Process (NCP) as an organized framework to standardize the provision of high-quality nutrition care [2,3]. The NCP was developed by the Academy of Nutrition and Dietetics (formally the American Dietetic Association) in 2003 to ensure the reliability and quality of care for each patient/client or groups of patients/clients and the predictability of patient/client outcomes [2].

The NCP model and associated terminology (NCPT) are also used to improve application of evidence-based guidelines, critical thinking, and ensure more focused documentation of dietetic care, as well as to support communication about dietetics and increase acknowledgment of the value of dietetic care by other healthcare

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<https://doi.org/10.1016/j.clnesp.2020.02.007>

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professionals [4]. In addition, the NCP is used as a didactic education tool and to support research by providing a common language that allows dietetics practitioners to generate quantitative and qualitative data that can be measured, analysed, and interpreted, to evaluate nutrition care practice [3–5]. The NCP model consists of four steps: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation. Each of these steps is interconnected and consecutive. The monitoring/evaluation step determines progress in resolving the diagnosis [6].

Several professional associations, including the International Confederation of Dietetic Associations (ICDA) [7], the European Federation of the Associations of Dietitians (EFAD) [8], and the Academy of Nutrition and Dietetics from the USA [3], recommended using the NCP model. In addition, many different countries, including Australia, Canada, and various European countries such as the UK, Austria, Germany, The Netherlands, and Switzerland are currently implementing the NCP/NCPT and, thus far, versions of the NCPT have been translated into eleven languages and dialects [9,10].

Many dietetics practitioners from the United States, Australia, and Sweden have reported a number of significant benefits to the implementation of the NCP/NCPT [11–13]; however, even though the clinical nutrition department at King Abdulaziz University, the principal program for registered dietitians in Jeddah, has produced dietitians who were taught the NCP/NCPT during their undergrad education, we were unable to identify any studies evaluating the implementation status of the NCP in Saudi Arabia or any Arab countries, including Gulf countries, particularly regarding the willingness and confidence of dietitians to apply the NCP and NCPT, as well as the support and training required for their implementation. Research concerning the knowledge and application of the NCP to hospital dietetic practice has primarily been conducted in Western countries. Furthermore, to date there is no clear plan or recommendation from the Saudi Commission for Health Specialties to develop a Saudi NCP, to adopt any of the international standards in Saudi Arabian hospitals. Therefore, the aims of this study were to explore the current implementation status of the NCP and the knowledge, perceptions, and opinions of dietitians about NCP implementation in hospitals in Jeddah, Saudi Arabia.

2. Materials and methods

2.1. Study design

This cross-sectional design study was conducted between January and March 2019. The study was approved by the Unit of the Biomedical Ethics Research Committee at King Abdulaziz University (Jeddah, Saudi Arabia) (Reference No. 113–18). All participants gave written informed consent.

2.2. Participants and recruitment

Data were collected from the principal hospitals ($n = 6$) in Jeddah city under the Ministry of Health. The number of dietitians in each hospital was obtained from the Nutrition Administration, Directorate of Health Affairs, Jeddah. Questionnaires were delivered to the head of the Clinical Nutrition Department of each hospital, appropriate to the reported number of dietitians, and each dietitian requested to complete a questionnaire. Information regarding the aim, importance, and confidentiality of the collected data was given in a written form at the beginning of the questionnaire. In addition, information about the NCP model was explained to the heads of department over the phone by one of the co-authors as well as to the dietitians when the questionnaires were distributed. In total, 58

questionnaires were delivered, and 56 responses were collected, with a total response rate of 96.5%.

2.3. Study questionnaire

The study questionnaire was adapted from Kim and Baek [14], with some modifications. For pilot testing, the survey was shared with two PhD holders in Clinical Nutrition and two clinical dietitians. The survey was subsequently revised based on their responses. Briefly, changes made to the pilot survey included adding few questions and revising response options. Following these modifications, the final pilot tested questionnaire comprised three sections with a total of 19 questions and took approximately 10 min to complete (see [Appendix for the questionnaire](#)).

Section one (ten questions) was used to collect the characteristics of the clinical dietitians and hospital information related to clinical nutrition care performance, including sex, age, educational level, profession, country of education, years of employment, number of beds, number of referrals to dietitians per week, number of patients screened per week, and number of patients who visited the clinic per week. The second section (eight questions) assessed the perception and opinion of dietitians towards the NCP. Questions in this section asked dietitians: if they were aware of the NCP; how they had heard about the NCP; whether they had ever received any training about the NCP and, if not, what type of NCP training they would prefer; and if there were any agreements for NCP training in their hospital. In addition, two questions were asked about the opinion of dietitians toward NCP implementation challenges; the first asked what they consider to be the challenges of applying the NCP, and the second asked if they thought their hospital should follow the NCP rules. In the third section (three questions), attitudes to NCP implementation in the hospitals was explored. Dietitians were asked if their department followed the NCP rules, which NCP they used in their hospital, where the NCP was applied (all wards or some wards), and how they rate their NCP application level, from fair to excellent.

2.4. Statistical analysis

Data were analysed using SPSS software (Version 23.0; IBM Corp., Armonk, NY, USA.) and are described using frequency statistics.

3. Results

3.1. Characteristics of the dietitians

Table 1 shows the characteristics of the clinical dietitians and hospital data related to clinical nutrition care performance. The most frequently reported characteristics among dietitians were as follows: female (96%), aged < 30 years (71%), educated to Bachelor's degree level (79%), an entry level dietitian (88%), and mostly educated in Saudi Arabia (79%), with 3–5 years of previous employment (48%). Most respondents reported that they worked in 200–500 bed hospitals (66%) and received 21–50 referrals (36%), screened 21–50 patients (57%), and had 21–50 patients visit the clinics (59%), per week.

3.2. Dietitians perception toward NCP

The responses of dietitians regarding their perception toward NCP is presented in **Table 2**. Almost all dietitians reported that they knew what the NCP is (98%), with the majority learning about it during their under- or post-graduate degrees (64%). Despite the high level of awareness of the NCP, only 27% of the dietitians had

Table 1
Dietitian and hospital characteristics (n = 56).

	n	%
Sex		
Male	2	3.6
Female	54	96.4
Age (years)		
≤30	40	71.4
31–40	15	26.8
≥41	1	1.8
Educational level		
Bachelor's	44	78.6
Master's	12	21.4
PhD	0	0.0
Profession		
Dietitian (entry level)	49	87.5
Senior dietitian	7	12.5
Consultant	0	0.0
Country of education*		
Saudi Arabia	44	78.5
Canada	0	0.0
USA	6	10.7
UK	3	5.4
Germany	0	0.0
Australia	3	5.4
Sweden	0	0.0
France	0	0.0
Years of employment		
<2	15	26.8
3–5	27	48.2
6–10	12	21.4
11–20	1	1.8
21–30	1	1.8
≥31	0	0.0
Number of hospital beds		
<50	0	0.0
50–100	4	7.1
100–200	2	3.6
200–500	37	66.1
>500	13	23.2
Referrals per week		
0–5	9	16.1
6–10	12	21.4
11–20	15	26.8
21–50	20	35.7
Number of patients screened per week		
0–5	3	5.4
6–10	6	10.7
11–20	15	26.8
21–50	32	57.1
Number of patients visiting the clinic per week		
0–5	2	3.6
6–10	11	19.6
11–20	10	17.9
21–50	33	58.9

n (%), data presented as number and percentage. *Countries in which the NCP is implemented and that are targets for Saudi dietitians to get their education.

received NCP training. Among those who had yet to receive NCP training (73%), the majority expressed a preference for short-term training sessions (67%). Only 11% of dietitians reported that their hospitals had contracts for NCP training, with 43% unaware of the NCP policy of their employers. Regarding the self-perception of dietitians of their performance, 60% reported that their NCP application was very good or excellent, whereas the remaining 40% thought they had good or fair application.

3.3. NCP implementation

Almost three-quarters (73%) of dietitians reported that their department did follow the NCP rules (Table 3), with the majority (63%) implementing the hospital's own NCP policy. The remaining respondents were evenly divided between applying the NCPs from

Table 2
Perception of dietitians towards the NCP (n = 56).

	n	%
Do you know what the NCP is?		
Yes	55	98.2
No	1	1.8
If yes: How did you hear about the NCP?		
International or national workshop	3	5.4
Books/journals	3	5.4
During your under or post graduate degrees	36	64.3
Through colleagues and specialties in nutrition	13	23.2
Other	1	1.7
Have you ever received any training about the NCP?		
Yes	15	26.8
No	41	73.2
If no, what NCP training would you prefer? (n = 40)		
Long term workshop	5	12.5
Short term workshop	26	65.0
Online sessions	9	22.5
Are there any agreements for NCP training in your hospital?		
Yes	6	10.7
No	26	46.4
I do not know	24	42.9
In general, what is your level of NCP application?		
Excellent	18	35.3
Very good	13	25.5
Good	18	35.3
Fair	2	3.9
Not sure	0	0.0

n (%) = data are presented as number and percentage.

International Classification of Functioning, Disability & Health – Dietetics (ICF-D)-WHO (13%) or International Dietetic & Nutrition Terminology (IDNT) - USA (13%), and not using the NCP (13%). Although the majority of dietitians reported that the NCP was applied in all hospital wards (60%), more than a third (40%) reported that usage was variable and only implemented in some wards.

3.4. Dietitians' opinions about the challenges of NCP implementation

The overwhelming majority of dietitians believed that their hospital should follow the NCP (94%), with 38% perceiving no challenges to its implementation. Fifty-three percent of respondents did perceive challenges, including ADIME (assessment, diagnosis, intervention, monitoring and evaluation) documentation (23%), choosing reference (9%), monitoring/evaluation (9%), nutritional diagnosis (7%), and conducting the assessment (5%). Regarding factors that may be preventing current NCP implementation in their department, 41% reported that there were not enough dietitians, 36% reported a lack of experience, and 23% stated that there was a potential conflict with the hospital's nutrition care system (Table 4).

4. Discussion

In this study, we investigated the current status of NCP implementation in six principal hospitals in Jeddah city, using questionnaire data collected from 56 practicing dietitians. Evaluating the current status of NCP implementation and the views of the dietitians toward NCP implementation will provide important baseline data to assess the dietetic field in Saudi Arabia as it moves towards adopting, implementing, and embedding the NCP, to align with leading international practice.

Overall, the results of this study indicate that most of the dietitians questioned in Jeddah hospitals were females, younger than 30 years old, and had been practicing for 3–5 years. This

Table 3
NCP implementation in hospitals (n = 56).

	n	%
Does your department follow the NCP rules? (n = 56)		
Yes	41	73.2
No	15	26.8
Which NCP have you used in your hospital? (n = 56)		
International Classification of Functioning, Disability & Health – Dietetics (ICF-D)-WHO	7	12.5
International Dietetic & Nutrition Terminology (IDNT) - USA	7	12.5
Using nutrition care process of our hospital	35	62.5
Not using NCP	7	12.5
If yes, Where is the NCP applied? (n = 41)		
All hospital wards	35	85.4
Some hospital wards	6	14.6

n (%) = data are presented as number and percentage.

Table 4
Dietitian's opinion about NCP (n = 56).

	n	%
Do you think that your hospital should follow the rules of NCP? (n = 56)		
Yes	52	92.9
No	4	7.1
What do you think the main challenges of applying the NCP are? (n = 55)		
Choosing the reference	5	8.9
Conducting the assessment	3	5.4
Nutritional diagnosis	4	7.2
Monitoring/evaluation	5	8.9
ADIME Documentation	12	23.2
No challenges	21	37.5
I am not using the NCP	5	8.9
What do you think the reasons for not following the NCP? (n = 22)		
Not enough experience	8	36.4
Conflict with the hospital nutrition care system	5	22.7
Increase the work hours	0	0.0
Difficulty in documentation	0	0.0
Not enough dietitians	9	40.9

n (%) = data are presented as number and percentage.

demographic reflects the young dietetic profession in Jeddah city, as, until 2018 Jeddah city had only one clinical nutrition department at King Abdulaziz University, which only processed female entry level dietitians. The majority of dietitians who participated in the study received their education in Saudi Arabia; however, some had trained in the USA or UK, where NCP models have already been integrated into the education systems [6], which may explain the reported use of the (ICF-D)-WHO and IDNT-USA in some Jeddah hospitals. Nevertheless, whether those dietitians received NCP training while studying abroad cannot be elucidated from the data collected by our questionnaire and requires further investigation.

Almost all the dietitians reported that they knew about the NCP, with the majority receiving information during their BSc courses in Nutrition, as the clinical nutrition department at King Abdulaziz University is adopting the American dietetic system in their teaching practice, with a number of teaching staff holding American dietetic licenses or having gained their Master or Ph.D. qualifications in the USA. In addition, approximately 60% of the dietitians rated their NCP performance level as very good to excellent, with 26% following standardized NCP practice (either (ICF-D)-WHO or IDNT-USA), 63% using the nutrition care system of the hospital, and 13% not following NCP practice. Regarding sites of implementation, 85% applied the NCP in all hospital wards, while 15% of respondents applied the NCP in some wards. This reported diversity in the type of NCP and its application in hospitals in Jeddah could result in different care practices between hospitals. For example, the NCP has been demonstrated to improve documentation of dietetic care and patient outcomes [15], as recorded patient information is

standardized, leading to more concise notes that improve accuracy and clarity in communication between healthcare providers [13]. Furthermore, improved continuity of care for patients seen by more than one dietitian over time has been reported, because the standardized methods and language of NCP system notes are easier to interpret if the patient transfers to another dietitian or hospital [16].

Only 27% of the dietitians reported that they had received NCP training, with the majority reporting that there was either no NCP training agreement in their hospital or they did not know of any. The insufficient NCP training opportunities reported in the Jeddah hospitals included in this study are likely to be representative of wider dietitian practice in the rest of the country and may indicate a major barrier to effective NCP implementation in Saudi Arabia. NCP hospital training and workshops could be used as a first step to raise awareness of the importance of following international, standardized NCP practice [15]. A study by Porter et al. suggested that training must be on-going to embed the concepts into hospital dietetic practice. Thus, it is important to develop an NCP implementation package, including training, as a continuous driver for change [17].

One positive outcome of the study questionnaire was the strong feeling among dietitians that the NCP should be implemented in their hospital (94%), with the largest percentage (38%) identifying no foreseeable challenges to its application. This could be because the dietitians have not trained in NCP, or they might see the NCP as a positive model, in which case it could be reported with optimism.

Among the challenges that were identified, the ADIME documentation was most commonly reported as the greatest, possibly due to the new feature (nutrition diagnosis, the second step) of dietitian care, which requires training and workshops to learn to write 'Problem/Etiology/Signs/Symptoms' (PES) statements.

Additionally, some dietitians reported that the low number of dietitians, lack of experience, and conflict with the hospital nutrition care system were reasons their department was not currently following the NCP. Previous studies have reported that primary barriers were: participants lack of NCP knowledge, the perception among dietitians that the NCP was not applicable in all dietetic care contexts, time limits, and no current use of the NCP in routine clinical practice [18,19].

Overall, the views of the study participants indicated that they were knowledgeable, familiar, and confident with NCP, suggesting that an implementation plan could be successful; however, support, direction, training, and resources need to be identified to assist the NCP implementation process. According to Leggat and Dwyer [20], to make changes to nutrition care in a hospital, there needs to be a focus on improving hospital performance, strongly emphasising the need for "good people management" and the

impact that this can have on culture change. Hence, it is important to raise awareness and understanding among staff, to generate interest and an urgency to change practice. This should be supported by and driven by managers [21]. This emphasis is consistent with themes regarding building strong relationships, working as part of a team, and begins to touch upon considering the climate, to facilitate a change process or innovation, as previously described [21,22]. Therefore, a leading agency in Saudi Arabia is required to drive NCP implementation, to ensure all hospitals follow international standards, or there is a risk of inconsistency in nutrition care processes that could affect dietetic patient care and squander data that could be used for research and development.

In addition, the increasing body of evidence surrounding NCP implementation that this study adds to, highlights the need for monitoring and assessment, not just in Saudi Arabia, but worldwide, to identify common factors affecting the application of standardized language among dietitians, and to share strategies for improvement. International collaborations are needed to empower dietitians to be able to deliver standardized nutrition care that can be communicated with other dietitians around the world, to advance dietetic practice internationally. Using a common standardized language and terminology that takes into account differences in dietetics practice between countries, is essential to evaluate clinical outcomes consistently, compare results, and merge data.

To our knowledge, this study is the first to assess NCP implementation in hospitals in Saudi Arabia. The results of this study could be used as the basis for a large-scale study among the main governmental and private hospitals, as well as private clinics, in Saudi Arabia. However, our study has limitations. First, the adapted questionnaire was modified, and a pilot test carried out, but it was not validated. Therefore, we suggest that future studies should perform validation and incorporate more detailed questioning regarding barriers and resistance to applying the NCP in hospitals in Saudi Arabia, as well as the dietitians' opinion regarding the current situation and how it could be improved. Second, no written definition of the 'NCP' term and model was provided in the questionnaire. Therefore, there is some possibility that respondents may have interpreted the NCP and its implementation in different ways. Future studies, therefore, need to ensure they clearly define the 'NCP' model and term to their participants within the questionnaire.

Future researches need to focus on social pressure, facilitators, and strategies for overcoming barriers may enhance the intention of dietitians to use the NCP, as well as their behaviour. Future studies should also consider a qualitative approach, as dietitians may have different opinions regarding specific issues not included in our quantitative questionnaire.

5. Conclusions

In conclusion, implementation of the NCP in Jeddah hospitals remains at an early stage, despite awareness of dietitians of its importance. The NCP practice varies among dietitians and hospitals, and there is a need to standardize the practice for better patient dietetic treatment. Further studies are required, using a focus group method to collect more in-depth information, with the aim of understanding all the issues that could delay or challenge use of the standardized NCP to help optimise an effective implementation strategy.

Sources of support

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

Authorship contributions

All authors made significant contributions in conducting the study. Conceptualization: A.A.A. and A.M.A.; methodology and study tool: A.A.A. and A.M.A.; A.K.J., and R.M.M.; data collection: M.N.A., N.A.A., A.K.J., and R.M.M.; data entry and analysis: A.A.A., M.N.A. and N.A.A.; writing-original draft preparation: A.A.A., M.N.A. and N.A.A.; writing-review and editing: A.M.A., A.K.J., and R.M.M.; supervision (academic & hospital): A.A.A., A.M.A., R.M.M. and A.K.J.; project administration: A.A.A. All authors reviewed and approved the final version of the manuscript.

Declaration of Competing Interest

The author has not disclaimers to declare and no conflict of interest.

Acknowledgements

We would like to thank all our participants for their time and contribution in this study. Moreover, we would like to thank Dr. Noor Hakim (Department of Clinical Nutrition, Faculty of Applied Medical Sciences, King Abdulaziz University) for her assist during the questionnaire preparation.

Appendix

Evaluation of the Implementation of the Nutrition Care Process

You are being invited to take part in a research study. The purpose of this research project is to evaluate the implication of the Nutrition care process (NCP) among the dietetic directors and the dietitians who are working in Jeddah's hospitals under the umbrella of the Ministry of Health. Upon on results, recommendations will be made and communicated with the decision-making leaders in the field of dietetics to plan for strategic application of the NCP in the Saudi Arabia hospitals to increase the quality of the nutritional care for individuals and group. The result of this study may provide guidance to improve their knowledge of nutrition in the future. Your participation in this research study is voluntary. You may choose not to participate. If you do decide to participate in this research survey, you may withdraw at any time. The procedure involves filling out an online survey that is divided into 2 sections which will take approximately 10 min. Your responses will be confidential, and we do not collect identifying information such as your name, email address or IP address. All data is stored in a password protected electronic format. This research has been reviewed according to the National Committee of Bio. & Med. Ethics (Reference No. 113–18).

Section A: General information

1. What is your profession:
 - a. Dietitian
 - b. Senior dietitian (I)
 - c. Consultant
2. Age:
 - a. ≤ 30 years
 - b. 31–40
 - c. ≥ 41
3. Educational level:
 - a. Bachelor's
 - b. Master's
 - c. Ph.D

4. Gender:
 - a. Male
 - b. Female
 5. Which countries did you receive your education from: (Click all that apply)
 - a. Saudi Arabia
 - b. Canada
 - c. USA
 - d. UK
 - e. Germany
 - f. Australia
 - g. Sweden
 - h. France
 6. Years of employment:
 - a. Less than 2 years
 - b. 3–5 years
 - c. 6–10 years
 - d. 11–20 years
 - e. 21–30 years
 - f. 31+ years
 7. Number of beds in your hospital?
 - a. Less than 50
 - b. 50-100
 - c. 100-200
 - d. 200-500
 - e. More than 500
 8. How many doctor referrals you received per week? (including in and outpatients)
 - a. 0-5
 - b. 6-10
 - c. 11-20
 - d. 21-50
 9. How many patients you usually assess/screen per week in the wards?
 - a. 0-5
 - b. 6-10
 - c. 11-20
 - d. 21-50
 10. How many patients are usually visiting you in the clinic per week?
 - a. 0-5
 - b. 6-10
 - c. 11-20
 - d. 21-50
- a. Long term workshop
 - b. Short term workshop
 - c. Online sessions
3. Is there any deal between the training department in you hospital and any dietetic association/center for the training purpose?
 - a. Yes
 - b. No
 - c. I do not know
 4. In general, what is your level of the application of the NCP?
 - a. Excellent
 - b. Very good
 - c. Good
 - d. Fair
 - e. Not sure
 5. Does your hospital apply the NCP?
 - a. Yes
 - b. No
 6. Which NCP you used in your hospital?
 - a. International Classification of Functioning, Disability & Health – Dietetics (ICF-D)-WHO
 - b. International Dietetic & Nutrition Terminology (IDNT) - USA
 - c. Polish Society of Sciences & Polish National Food
 - d. Systematized Nomenclature of Medicine (SNOMED)- USA
 - e. Using our hospital nutrition care process

If yes, How was the application of the NCP:

- a. All hospital wards
 - b. Some hospital wards
7. Do you think that your hospital should follow the rules of NCP?
 - a. Yes
 - b. No
 8. What do you think the challenges of applying the NCP?
 - a. Choosing the reference
 - b. Conducting the assessment
 - c. Nutritional diagnose
 - d. Monitoring/evaluation
 - e. Documentation
 - f. No challenges
 - g. I am not using the NCP
 9. What do you think the reasons for not following the NCP in your department:
 - a. No enough experiences
 - b. Conflict with the hospital nutrition care system
 - c. Increase the work hours
 - d. Difficulty in documentation
 - e. No enough dietitians

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Section B: The knowledge, perception, application, and the opinion toward the Nutrition Care Process (NCP)

1. Do you know what is the NCP?
 - a. Yes
 - b. No

If yes: How did you heard about the NCP?

- a. International or national workshop
 - b. Books and journals
 - c. During your under or post graduate degrees
 - d. Through colleagues and specialties in Nutrition
 - e. Other
2. Have you ever received any training about the NCP?
 - a. Yes
 - b. No

If no, what NCP training do you prefer?

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