

Ascertainment of Nutrition Care Process (NCP) Implementation and Use of NCP Terminologies (NCPT) among Hospital Dietitians in the Philippines

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ABSTRACT

Background and Objective. The Nutrition Care Process (NCP) is a systematic method used by dietitians to provide high-quality nutrition care resulting in good patient outcomes. This study aimed to assess the NCP implementation and use of NCP Terminologies (NCPT) among hospital dietitians in the Philippines. Specifically, the study aimed at assessing the knowledge, perception, and practices on NCP and use of NCPT and correlate them with the dietitians' education, and professional and employment profile; and explain the barriers and facilitators of the practice of NCP and use of NCPT among hospital dietitians in the Philippines.

Methods. The knowledge, perception, and practices (KPP) on NCP and NCPT of the dietitians employed in the Philippine Department of Health's licensed level 3 hospitals were determined using a validated questionnaire. Significant factors associated with the KPP were also determined. The barriers and facilitators of the practice of NCP and NCPT were determined using focus group discussion and key informant interviews of chief clinical dietitians and hospital administrators, respectively.

Results. The study revealed that majority of the participants had a high level of knowledge on NCP and NCPT, positively perceived its implementation, and more than half of them implement NCP and NCPT in the hospitals. The participants' knowledge on NCP and NCPT was significantly associated with research involvement and active

membership in a professional organization. While the practice of NCP and NCPT was significantly associated with having NCP-related trainings, frequency of trainings, and active membership in a professional organization. The barriers to NCP implementation were insufficient resources; lack of orientation, trainings, and support; organizational and administrative constraints; pandemic constraints; insufficient time; and lack of confidence to conduct NCP. While the facilitators of implementation were collaboration, dedication, and commitment of the healthcare team; institutionalization of NCP laws and policies; budget allocation for NCP-related activities; monitoring and consistency of NCP implementation; and work schedule.

Conclusion. The findings suggest that the implementation of NCP and NCPT in the Philippines needs further support from the institution, professional organizations, and policy makers by developing strategies to cope with the barriers, and strengthen the facilitators and factors associated with practice.

Keywords: *nutrition care process, implementation, nutrition care process terminology, dietitian, knowledge, perception, and practice (KPP) questionnaire*



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INTRODUCTION

The Academy of Nutrition and Dietetics (AND) (before the American Dietetic Association), created in 2002 the Nutrition Care Process (NCP) as a way to improve the consistency and quality of individualized care for patients, clients, or residents and the predictability of patient, client, or resident outcomes.¹ The goal of NCP is to standardize a process that provides a framework for the registered dietitians to customize care, taking into account the client's needs and values, and using the best evidence available to make decisions.²

Figure 1 depicts the Nutrition Care Process Model (NCPM) describing the workflow of NCP, which includes four distinct and interrelated steps namely: nutrition assessment and reassessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation.³ The word nutrition precedes each step to make NCP unique and specific to dietetics professionals.

The NCPM intends to guide registered dietitians in providing high-quality nutrition care. Provision of high-quality nutrition care means that the registered dietitians are doing the right thing at the right time, in the right way, for the right person, and achieving the best possible outcomes.⁴

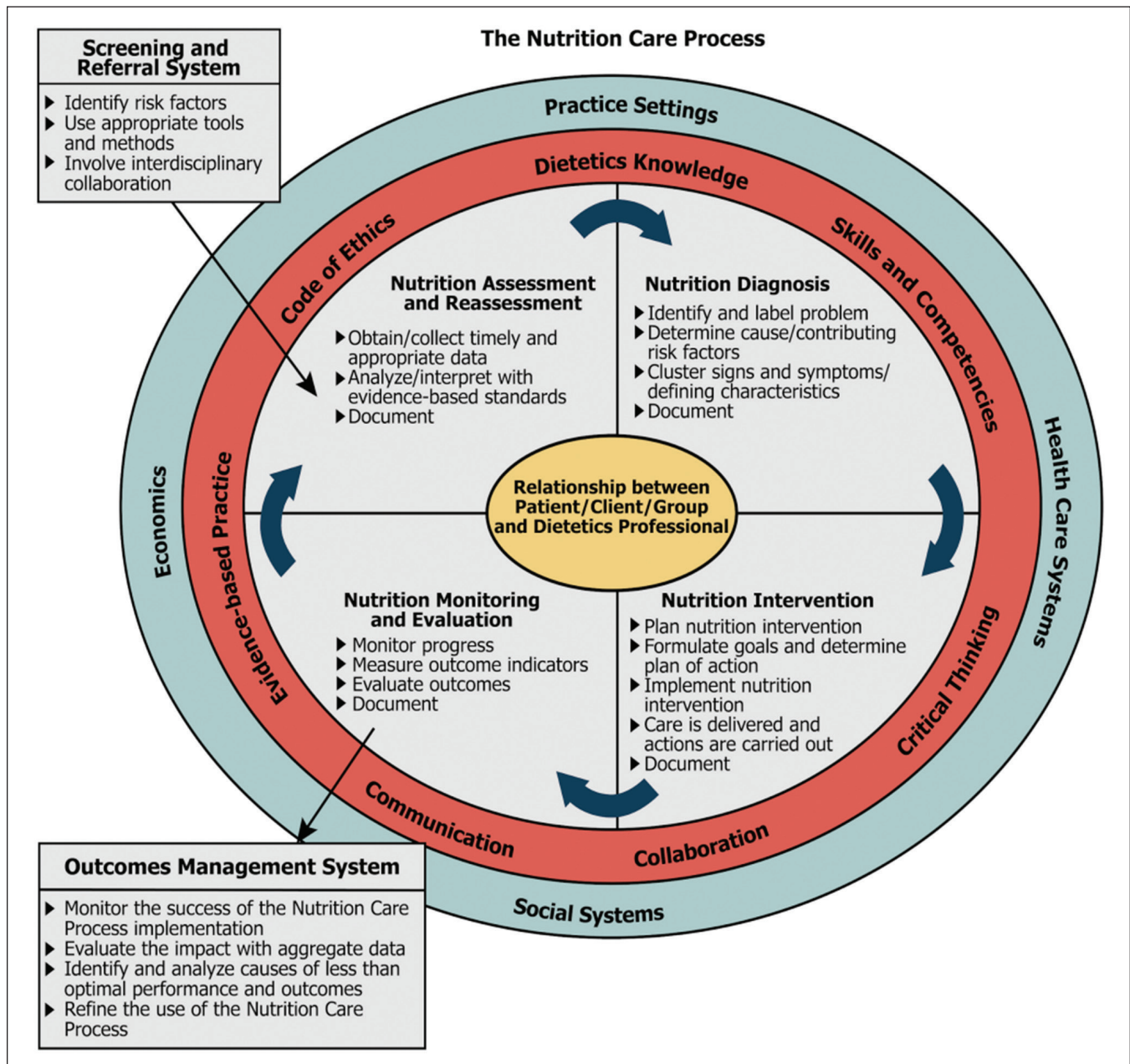


Figure 1. The Nutrition Care Process Model as adapted from the Nutrition Care Process and Model Part I (2008).¹⁴

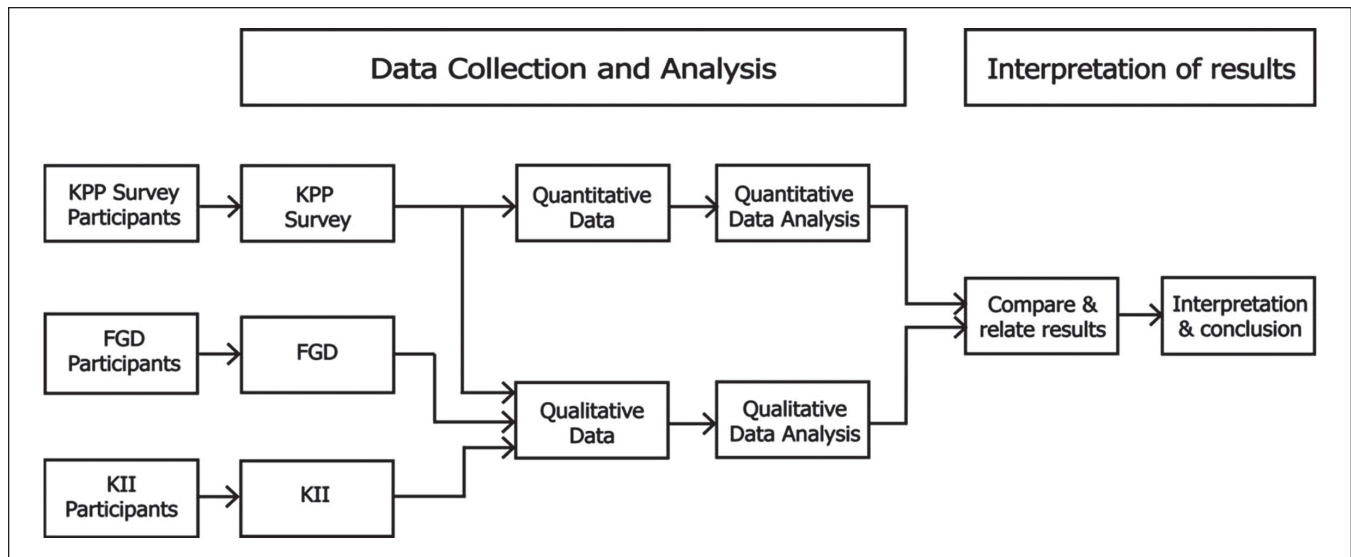


Figure 2. Schematic diagram of the study utilizing the convergent parallel mixed-methods research design.

Further, in 2008, the AND developed the International Dietetics and Nutrition Terminology (IDNT), now the Nutrition Care Process Terminology (NCPT) used alongside NCP in achieving consistent and comprehensive nutrition care.^{5,6} NCPT is a hierarchically organized system that provides a standardized nutrition diagnostic terminology to define nutrition problems.^{3,7}

The implementation of NCP and use of NCPT promote good patient outcomes through adherence to evidence-based nutrition practice. Therefore, it is imperative that hospital dietitians implement NCP and use standardized language such as NCPT. However, there are several factors that influence NCP implementation and adherence on evidence-based practice. These include number of staff dietitians, conflict with the hospital's nutrition care system,⁸ education and training of dietitians, work experience, and professional association involvement.⁹

Over the years, many existing studies have acknowledged the link between NCP and positive patient outcomes.^{6,10-12} In the Philippines, the country's Department of Health (DOH) recognizes NCP as a vital process through the Administrative Order No. 2019-0033: Guidelines for the Implementation of Nutrition Care Process in Hospitals ratified last August 28, 2019. The order states that all hospitals shall implement NCP regardless of the level (1, 2, 3), ownership (government and private), and service capability (general and specialty).¹³

Hence, this study aimed to assess the NCP implementation and use of NCPT among hospital dietitians in the Philippines. Specifically, the study aimed at assessing the knowledge, perception, and practices on NCP and use of NCPT, and correlate them with the dietitians' education, professional and employment profile; and explain the barriers and facilitators of the practice of NCP and use of NCPT among hospital dietitians in the Philippines.

MATERIALS AND METHODS

This study utilized a convergent parallel mixed-methods design (Figure 2), which concurrently conducts the qualitative and quantitative elements in the same phase of the research process.¹⁵ A validated knowledge, perception, and practice (KPP) survey questionnaire was used to obtain both qualitative and quantitative data, while focus group discussion (FGD) and key informant interview (KII) were used to gather qualitative data on the barriers and facilitators of NCP and NCPT implementation.

All procedures undertaken in this study were approved by the Research Institute for Health Sciences Ethics Review Committee (RIHS ERC), University of the East Ramon Magsaysay Memorial Medical Center, Inc with RIHS ERC Code: 0919/E/2020/147.

Sampling Procedure and Study Participants

KPP Survey

The survey participants were selected through stratified random sampling. A total of 81 chief clinical dietitians were selected wherein 41 were from the National Capital Region (NCR) and 40 were from non-NCR. All participants are employed in a DOH licensed level 3 general, specialty, government, and private hospitals, listed in the Health Facilities Development Bureau (HFDB) as of December 2019. The basis of the two identified strata was that NCR situates the highest number of level 3 hospitals in the Philippines.^{16,17} The sample size was calculated using the Cochran's formula to estimate the population proportion. The initial sample size, $n = 386$, was based on the assumption that the proportion of knowledgeable hospital dietitians is 50% ($p = 0.5$), a margin of error of 5% ($e = 0.05$), and a confidence

level of $(1 - \alpha = 95\%)$. Given the population size to be $n = 116$, the adjusted sample size is 62. To consider the rejection rate at 30%, the final computed sample size was $n = 81$.

FGD and KII

The FGD and KII participants were selected using purposive sampling based on the criteria that the participants have the required knowledge and capability to answer questions related to the study and to achieve equal representation from the different regions of the country. Chief dietitians were the participants for the FGD as they have the perspective of both a dietitian and a supervisor, bridging the staff dietitians from the hospital administrators. While hospital administrators were the participants for the KII to analyze the perspective on NCP implementation from an administrative standpoint. For well-represented data, each region in the Philippines has one (1) FGD and one (1) KII participant.

KPP Survey Questionnaire Development

The KPP survey questionnaire was tested for validity using content validity test among five (5) expert panel in the field of nutrition and dietetics, and construct validity test among 47 hospital dietitians employed in DOH licensed hospitals. Content validity ratio (CVR) and factor analysis were used to determine the validity of the KPP items. The reliability and internal consistency of the questions were also determined using Kuder-Richardson (KR) 20 and Cronbach's alpha. A minimum of 0.99 CVR¹⁸ was used to determine the validity of the items. While for the reliability, a value of at least 0.70 KR-20 was considered desirable¹⁹ and a Cronbach's alpha value of >0.80 that indicates good internal consistency was considered. The resulting questionnaire has four (4) sections: (a) Respondent's Profile, 25 items; (b) Knowledge, 7 items; (c) Perception, 6 items; and (d) Practice, 9 items; intended to obtain data on the hospital and respondent's profile and to measure the participant's level of KPP on NCP implementation and the use of NCPT.

Data Collection Procedure

Prior to the conduct of the KPP survey, FGD and KII, approval from the hospital and the participants were obtained using formal request letter and informed consent, respectively. The KPP survey, FGD and KII were conducted via online means utilizing emails and Google form, Zoom meeting, and phone calls, respectively. The data collection was carried out from May to August 2021.

KPP Survey

Once the consent from the hospital and the KPP survey participants were obtained, copies of the KPP questionnaire were sent to the participants via email on Google form and pdf version.

The KPP questionnaire took approximately 30 minutes to complete. Of the 81 questionnaires delivered to 81 respective hospitals, 65 chief clinical dietitians (NCR: $n=28$; non-NCR:

$n=37$) accomplished the questionnaire, for a response rate of 80.2%. The obtained data were encoded and processed to determine the level of knowledge, perception, and practice of NCP and the use of NCPT.

FGD

Out of all the invited participants, one from each regions of the country, ten (10) chief dietitians (each representing one region in the Philippines), namely (1) Ilocos Region; (2) Cagayan Valley; (3) Cordillera Administrative Region (CAR); (4) Central Luzon; (5) NCR; (6) Cavite, Laguna, Batangas, Quezon (CALABARZON); (7) Bicol Region; (8) Central Visayas; (9) Davao Region; and (10) South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos City (SOCCSKSARGEN), agreed to join the FGD and answered the seven (7) open-ended questions on the barriers and facilitators of NCP implementation in the Philippine hospital setting. For documentation purposes, the whole discussion was audio and video recorded with the participants' consent. After the FGD, participants validated the returned transcript of conversation sent via email. Additionally, obtained forms and reports on NCP implementation after FGD ensured data saturation.

KII

A total of eight (8) hospital administrators out of the ten invited (each representing one region in the Philippines), namely (1) Ilocos Region; (2) Cagayan Valley; (3) CAR; (4) Central Luzon; (5) NCR; (6) Bicol Region; (7) Davao Region; and (8) SOCCSKSARGEN, answered seven (7) open-ended questions on the barriers and facilitators of NCP implementation in the hospitals during the KIIs. KIIs ran for 10–30 minutes. Answers to the questions were noted and recorded. Obtained forms and reports on NCP implementation after KII ensured data saturation.

Definition and Interpretation of KPP Data

Knowledge, perception, and practice levels were analyzed through the combined scores of the questionnaire. The knowledge items were evaluated using a scoring system. Correct responses were equivalent to a score point of one (1). Conversely, incorrect answers were equivalent to a score of zero (0). The perception and practice items were assessed using a five-point Likert Scale. Further interpretations were made based on the following criteria to determine the participants' level of KPP (Table 1).

Data Analysis

The quantitative data were analyzed using the Wald Chi-Squared Test, and the Gamma Test for association, with $p < 0.05$, to determine the significant relationship between the hospitals and the respondents' profiles with the result of the KPP assessment. Moreover, for the qualitative data, thematic analysis (TA) and data triangulation were used to analyze transcripts of the focus group discussion (FGD), key

Table 1. Definition and Interpretation of KPP Scores

Term	Definition
Knowledge [section B of questionnaire]	Definition: The respondent’s understanding of NCP implementation and the use of NCPT.
	<i>High Knowledge Score:</i> A score point with ≥80–100 % of the correct response.
	<i>Moderate Knowledge Score:</i> A score point with 50–79% of the correct response.
	<i>Low Knowledge Score:</i> A score point with <50% of the correct response.
Perception [section C of questionnaire]	Definition: The respondent’s emotional, motivational, perceptive, and cognitive beliefs on NCP implementation and the use of NCPT.
	<i>Positive Perception Score:</i> A score point with 4 (Agree) to 5 (Strongly Agree).
	<i>Neutral Perception Score:</i> A score point of 3 (Neutral or Not Sure).
	<i>Negative Perception Score:</i> A score point with 1 (Strongly Disagree) to 2 (Disagree).
Practice [section D of questionnaire]	Definition: The respondent’s observable actions on NCP implementation and the use of NCPT.
	<i>High Level of Practice:</i> A score point with 4 (Often) to 5 (Always).
	<i>Low Level of Practice:</i> A score point with 1 (Never), 2 (Rarely), to 3 (Sometimes).

informant interviews (KII), and collected forms to explain the barriers and facilitators of NCP implementation.

RESULTS

The study assessed the NCP implementation and use of NCPT among hospital dietitians in the Philippines. Hospitals and dietitians’ profile were determined using a validated KPP questionnaire. The dietitians’ characteristics were correlated with the knowledge, perception, and practices on NCP implementation and use of NCPT. Barriers and facilitators to NCP implementation and use of NCPT were also explained using the results of the FGD and the KII of chief dietitians and hospital administrators, respectively.

Profile of Selected DOH Licensed Level 3 Hospitals

The 65 hospitals that participated in this study were composed of 92.3% general hospitals and 7.7% specialty hospitals. Government-owned hospitals were 52.3%, while 47.7% were privately-owned hospitals. The hospital bed capacity has a range of 50–1,334 beds with a mean and standard deviation (SD) of 357.3 ± 262.84. Meanwhile, the number of hospital dietitians has a range of 1–32 with a mean of 7.0 ± 5.23 SD.

Additionally, the majority of the hospitals’ Dietary Section/Unit/Department were classified as the Nutrition

and Dietetics Service/Department (NDS or NDD) (47.7%), while hospitals with Clinical, Therapeutic, and Food Service units had the lowest percentage (4.6%). Moreover, hospitals with only Therapeutic units (13.8%) were higher than hospitals with only Clinical units (7.7%). Reportedly, most of the Dietary Department were hospital-owned (89.2%), and only 1.5% were outsourced.

Profile of the Participants

Table 2 shows that the participants’ age ranged from 22–62 years old, with an average of 36.8 years old, and the majority were females (92.3%). The number of participants who were still single (53.8%) was higher than those who were married (43.1%).

Moreover, 83.1% of the participants had a bachelor’s degree, and 16.9% had a master’s degree. The present position or rank of the participants with the highest number was staff dietitians under the clinical section (56.9%), while the least were head clinical or therapeutic dietitians (10.8%). Additionally, the highest number of participants were employed within 2–5 years (29.2%), while the lowest was less than 2 years in service (6.2%).

Furthermore, 40 participants (61.5%) out of 65 had NCP-related training; 34.71% had 1–2 trainings per year, while 37.46% had 3–4 trainings per year, with an average of 48.9 of the total training hours. In addition, only 9 participants (13.9%) out of 65 had research involvement, and 80.8% of the 9 participants had one (1) research involvement, mostly non-clinical research (65.8%). Also, 56 participants (86.2%) out of 65 were members of professional organizations in nutrition and dietetics; 98.4% of the 56 participants were active members, while only 1.6% had inactive membership.

KPP of the Participants on NCP Implementation and use of NCPT

Table 3 presents the KPP of the participants on NCP and NCPT. Ninety-two-point-three percent (92.3%) of participants had a high knowledge of NCP and NCPT, while only 7.7% had moderate knowledge. Meanwhile, 84.6% of the participants positively perceived NCP implementation and use of NCPT, while only 4.6% had negative perceptions. Furthermore, more than half (60.0%) of the participants had a high level of NCP practice and use of NCPT, while 40% had a low level of NCP practice and use of NCP.

Correlation of the Participants’ Characteristics with the KPP on NCP implementation and use of NCPT

The relationship between the respondent’s characteristics and the KPP on NCP implementation and use of NCPT is shown in Tables 4, 5 and 6.

Table 4 shows that most of the participants, in all characteristics, had a high level of knowledge on NCP implementation and use of NCPT regardless of the level of education, present position/rank, numbers of years employed as a dietitian, with NCP-related trainings in the last five

Table 2. Profile of the Participants in Selected DOH Licensed Level 3 Hospitals in the Philippines, n=65

Characteristics		Category	Numerical Summary
Age (year)	Mean (SD)		36.8 (10.62)
	Range		22–62
Sex, n (%)	Male		5 (7.7%)
	Female		60 (92.3%)
Civil Status, n (%)	Single		35 (53.8%)
	Live-in		1 (1.5%)
	Married		28 (43.1%)
	Separated		1 (1.5%)
Level of Education, n (%)	Bachelor's Degree		54 (83.1%)
	Master's Degree		11 (16.9%)
Present Position/Rank, n (%)	Chief Dietitian		13 (20.0%)
	Head Clinical or Therapeutic Dietitian		7 (10.8%)
	Staff Dietitian under Clinical Section		37 (56.9%)
	Staff Dietitian under Therapeutic Section		8 (12.3%)
Number of years employed as Dietitian, n (%)	Less than 2 years		4 (6.2%)
	2 to 5 years		19 (29.2%)
	6 to 10 years		13 (20.0%)
	11 to 20 years		16 (24.6%)
	21 to 30 years		7 (10.8%)
	30 years or more		6 (9.2%)
Trainings, n (%)	Number of respondents with NCP-related trainings in the last 5 years		40 (61.5%)
	Attended 1–2 trainings per year		19 (34.71%)
	Attended 3–4 trainings per year		21 (37.46%)
	Total number of training hours		48.9
Research, n (%)	Number of respondents with research involvement		9 (13.9%)
	1 research involvement		7 (80.8%)
	2 research involvement		1 (9.6%)
	3 research involvement		1 (9.6%)
Involvement in Professional Organization, n (%)	Total number of respondents with organization		56 (86.2%)
	Number of respondents with active membership		55 (98.4%)
	Number of respondents with inactive membership		1 (1.6%)

n is based on the sample frequency counts; *SD* is Standard Deviation

years, frequency of yearly training, research involvement, membership in a professional organization, and nature of membership. However, only research involvement ($p=0.00$) and nature of membership in a professional organization ($p=0.000$) were significantly associated with the participants' knowledge on NCP and NCPT. It can be seen in the table

Table 3. KPP of the Participants on NCP Implementation and Use of NCPT in the Philippines, n=65

	Categories	n (%)	95% CI
Knowledge	High (80–100%)	60 (92.3%)	(85.0, 99.0)
	Moderate (50–79%)	5 (7.7%)	(1.0, 15.0)
Perception	Positive	55 (84.6%)	(77.8, 94.0)
	Neutral	7 (10.8%)	(3.0, 16.3)
	Negative	3 (4.6%)	(0.0, 10.7)
Practice	High	39 (60.0%)	(52.1, 73.4)
	Low	26 (40.0%)	(26.6, 47.9)

**n* is based on the sample frequency counts; % and Confidence Interval (CI) are adjusted with sampling weights

that although majority of the participants had no research involvement, all the participants with research involvement had a high level of knowledge on NCP and NCPT. Moreover, majority of the participants had active membership in a professional organization and had a high level of knowledge.

The level of education ($p=0.859$), present position/rank ($p=0.331$), number of years employed as dietitians ($p=0.063$), having NCP-related training ($p=0.321$), frequency of yearly training ($p=0.581$), and membership in professional organization ($p=0.255$) had no significant association with the participants' knowledge.

Meanwhile, although majority of the participants had positive perception on NCP implementation and use of NCPT in all characteristics, no significant associations were found between perception and the level of education, present position/rank, number of years employed as a dietitian, having NCP-related trainings in the last five years, frequency of yearly trainings, research involvement, organization membership, and nature of membership.

Table 4. Correlation of the Participants' Characteristics with the Knowledge on NCP and NCPT in the Philippines, n=65

Characteristics	Indicators	Knowledge			
		High	Moderate	p-value	Interpretation
Level of Education, n (%)	Bachelor's Degree	50 (92.6%)	4 (7.4%)	0.859*	No significant association
	Master's Degree	10 (90.9%)	1 (9.1%)		
Present Position/Rank, n (%)	Chief Dietitian	11 (84.6%)	2 (15.4%)	0.331 ^a	No significant association
	Head Clinical or Therapeutic Dietitian	7 (100.0%)	-		
	Staff Dietitian under Clinical Section	34 (91.9%)	3 (8.1%)		
	Staff Dietitian under Therapeutic Section	8 (100.0%)	-		
Number of years employed as Dietitian, n (%)	Less than 2 years	3 (75.0%)	1 (25.0%)	0.063 ^a	No significant association
	2 to 5 years	15 (78.9%)	4 (21.1%)		
	6 to 10 years	13 (100.0%)	-		
	11 to 20 years	16 (100.0%)	-		
	21 to 30 years	7 (100.0%)	-		
	30 years or more	6 (100.0%)	-		
Received NCP-related trainings in the last 5 years, n (%)	Yes	38 (95.0%)	2 (5.0%)	0.321*	No significant association
	No	22 (88.0%)	3 (12.0%)		
Frequency of Yearly Training, n (%)	0 trainings attended	22 (88.0%)	3 (12.0%)	0.581*	No significant association
	Attended 1-2 trainings per year	18 (94.7%)	1 (5.3%)		
	Attended 3-4 trainings per year	20 (95.2%)	1 (4.8%)		
Research Involvement, n (%)	Yes	9 (100.0%)	-	0.000 ^a	Significant association
	No	51 (91.1%)	5 (8.9%)		
Organization Membership, n (%)	Yes	53 (94.6%)	3 (5.4%)	0.255*	No significant association
	No	7 (77.8%)	2 (22.2%)		
Nature of Membership in Organization, n (%)	Active	52 (94.5%)	3 (5.5%)	0.000 ^a	Significant association
	Inactive	1 (100.0%)	-		

*Wald chi-squared test; **based on t-statistic; ^abased-on Gamma test for association

Table 5. Correlation of the Participants' Characteristics with the Perception on NCP and NCPT in the Philippines, n=65

Characteristics	Indicators	Perception				
		Positive	Neutral	Negative	p-value	Interpretation
Level of Education, n (%)	Bachelor's Degree	46 (85.2%)	6 (11.1%)	2 (3.7%)	0.414 ^a	No significant association
	Master's Degree	9 (81.8%)	11 (9.1%)	1 (9.1%)		
Present Position/Rank, n (%)	Chief Dietitian	10 (76.9%)	1 (7.7%)	2 (15.4%)	0.303 ^a	No significant association
	Head Clinical or Therapeutic Dietitian	7 (100.0%)	-	-		
	Staff Dietitian under Clinical Section	35 (94.6%)	2 (5.4%)	-		
	Staff Dietitian under Therapeutic Section	3 (37.5%)	4 (50.0%)	1 (12.5%)		
Number of years employed as Dietitian, n (%)	Less than 2 years	4 (100.0%)	-	-	0.214 ^a	No significant association
	2 to 5 years	13 (68.4%)	4 (21.1%)	2 (10.5%)		
	6 to 10 years	11 (84.6%)	2 (15.4%)	-		
	11 to 20 years	15 (93.8%)	1 (6.3%)	-		
	21 to 30 years	6 (85.7%)	-	1 (14.3%)		
	30 years or more	6 (100.0%)	-	-		
Received NCP-related trainings in the last 5 years, n (%)	Yes	34 (85.0%)	3 (7.5%)	3 (7.5%)	0.334*	No significant association
	No	21 (84.0%)	4 (16.0%)	-		
Frequency of Yearly Training, n (%)	0 trainings attended	21 (84.0%)	4 (16.0%)	-	0.271 ^a	No significant association
	Attended 1-2 trainings per year	17 (89.5%)	-	2 (10.5%)		
	Attended 3-4 trainings per year	17 (81.0%)	3 (14.3%)	1 (4.8%)		
Research Involvement, n (%)	Yes	8 (88.9%)	1 (11.1%)	-	0.512 ^a	No significant association
	No	47 (83.9%)	6 (10.7%)	3 (5.4%)		
Organization Membership, n (%)	Yes	48 (85.7%)	5 (8.9%)	3 (5.4%)	0.391 ^a	No significant association
	No	7 (77.8%)	2 (22.2%)	-		
Nature of Membership in Organization, n (%)	Active	48 (87.3%)	4 (7.3%)	3 (5.5%)	0.069 ^a	No significant association
	Inactive	-	1 (100.0%)	-		

*Wald chi-squared test; **based on t-statistic; ^abased-on Gamma test for association

Table 6. Correlation of the Participants' Characteristics with the Practice of NCP and NCPT in the Philippines, n=65

Characteristics	Indicators	Practice			
		High	Low	p-value	Interpretation
Level of Education, n (%)	Bachelor's Degree	32 (59.3%)	22 (40.7%)	0.787*	No significant association
	Master's Degree	7 (63.3%)	4 (36.4%)		
Present Position/Rank, n (%)	Chief Dietitian	4 (30.8%)	9 (69.2%)	0.213 ^a	No significant association
	Head Clinical or Therapeutic Dietitian	4 (57.1%)	3 (42.9%)		
	Staff Dietitian under Clinical Section	30 (81.1%)	7 (18.9%)		
	Staff Dietitian under Therapeutic Section	1 (12.5%)	7 (87.5%)		
Number of years employed as Dietitian, n (%)	Less than 2 years	4 (100.0%)	-	0.181 ^a	No significant association
	2 to 5 years	8 (42.1%)	11 (57.9%)		
	6 to 10 years	8 (61.5%)	5 (38.5%)		
	11 to 20 years	12 (75.0%)	4 (25.0%)		
	21 to 30 years	5 (71.4%)	2 (28.6%)		
	30 years or more	2 (33.3%)	4 (66.7%)		
Received NCP-related trainings in the last 5 years, n (%)	Yes	29 (72.5%)	11 (27.5%)	0.009*	Significant association
	No	10 (40.0%)	15 (60.0%)		
Frequency of Yearly Training, n (%)	0 trainings attended	10 (40.0%)	15 (60.0%)	0.021*	Significant association
	Attended 1-2 trainings per year	15 (78.9%)	4 (21.1%)		
	Attended 3-4 trainings per year	14 (66.7%)	7 (33.3%)		
Research Involvement, n (%)	Yes	4 (66.7%)	2 (33.3%)	0.839*	No significant association
	No	25 (73.5%)	9 (26.5%)		
Organization Membership, n (%)	Yes	37 (66.1%)	19 (33.9%)	0.278*	No significant association
	No	2 (22.2%)	7 (77.8%)		
Nature of Membership in Organization, n (%)	Active	37 (67.3%)	18 (32.7%)	0.000 ^a	Significant association
	Inactive	-	1 (100.0%)		

*Wald chi-squared test; **based on t-statistic; ^abased-on Gamma test for association

For the practice category, having NCP-related training in the last five years ($p=0.009$) and frequency of yearly training ($p=0.021$) showed significant association with the practice of NCP and use of NCPT. It can be noted that most participants who received NCP training (72.5%) in the last five years had a high level of NCP practice and use of NCPT, and most who did not receive NCP training (60.0%) had a low level of NCP practice and use of NCPT. This was also reflected in the frequency of yearly training. Most of the participants who had zero training had a low level of practice (60.0%) and most participants with 1 to 2 (78.9%) and 3 to 4 (66.7%) number of trainings acquired per year had a high level of NCP practice and use of NCPT.

Additionally, although membership in a professional organization did not show significant association with the practice of NCP and use of NCPT, being an active member in a professional organization showed significant association ($p=0.000$). Most participants with active membership had a high level of NCP practice and use of NCPT (67.3%).

On the other hand, the level of education ($p=0.787$), present position and rank ($p=0.213$), number of years employed as a dietitian ($p=0.181$), and research involvement ($p=0.839$) were not significantly associated with the practice of NCP and use of NCPT.

Barriers to NCP implementation

The thematic analysis on the barriers to NCP implementation resulted in the emergence of 20 unique codes organized into six (6) coherent themes namely: **theme 1** – resources; **theme 2** – orientation, training, and support; **theme 3** – organizational and administrative constraints; **theme 4** – pandemic constraints; **theme 5** – time; and **theme 6** – lack of confidence among hospital dietitians to conduct NCP. The participants have also been given separate codes to protect their anonymity. An example would be F1M55, where F (focus group) or K (key informant); 1 (chief dietitian) or 2 (hospital administrator); M (male) or F (female); and aged 55.

Under **theme 1**, the most frequently occurring codes were the absence of hospital bed scale ($n=7$, 41.2%). Bed scales are primarily used to accurately measure the weight of patients who are unable to get out of bed.²⁰ *The medical nutrition consultant specialist taught us the eyeball technique in getting the weight of critically ill patients in emergency and trauma care. It is helpful in those situations, but our concern is the accuracy of weight which is crucial in the computation of the total energy requirement of the patient*³ (F1F64).

Moreover, understaffed RNDs ($n=5$, 29.4%) and understaffed nurses ($n=1$, 5.8%) were also mentioned by the participants under **theme 1** linked with **theme 5** as barriers to NCP implementation. Understaffing resulted to time

constraints (n=1, 33.3%), additional workload (n=1, 33.3%), and burden in documenting (n=1, 33.3%) under **theme 5**. *'Due to understaffing, it is difficult to complete the process especially if there are more than five patient cases per dietitian in a day'* (F1F56). *'Since the documentation is hand-written it is not that easy to fill out the forms, which takes a lot of time to complete for the dietitians and nurses'* (F1F60).

Insufficient hospital budget (n=2, 11.8%) and insufficient patient cost per day (n=2, 11.8%) were also mentioned under **theme 1**. *'The hospital budget in the Philippine government hospitals also includes patient cost per day or the budgetary meal allowance for patients per day which is sometimes insufficient so there must be an immediate replenishment of used funds'* (K2F55).

Under **theme 2**, lack of orientation among doctors and nurses (n=4, 40.0%) and lack of trainings (n=4, 40.0%) were mentioned repeatedly followed by lack of support from other healthcare team (n=1, 10.0%) and incomplete data in patient's chart (n=1, 10.0%). These were related to **theme 3**. The fast turnover of nurses and doctors (n=3, 50.0%) may indicate another retraining of the new nurses and residents for the implementation of NCP. *'In our hospital, the process is hindered due to the lack of orientation among doctors and nurses especially when there is a reshuffling of nurses or residents. In effect, the process that is supposed to be continuous becomes restrained'* (F1F60).

Additionally, the lack of communication among healthcare team (n=1, 16.7%), absence of established nutrition support team or committee (n=1, 16.7%), and the cost of nutrition care package (n=1, 16.7%) were also mentioned as barriers under **theme 3**.

In **theme 4**, the limited room visits and face-to-face consultation with patients (n=3, 60.0%) and hampered NCP implementation (n=2, 40.0%) were reported as barriers to NCP implementation: *'Due to the pandemic, direct patient contact became limited. We only conversed with the nurses to transfer the message to patients in order to prevent transmission of virus'* (F1F62).

Furthermore, in **theme 6**, the lack of confidence to introduce NCP (n=1, 50.0%) and lack of confidence to filling out forms (n=1, 50.0%) were mentioned as barriers. These are associated with the perceived lack of training under **theme 2**. *'Providing training or seminars will be helpful to boost the confidence of RNDs to implement standard NCP'* (F1F30).

Lastly, upon data triangulation, it was seen that there were different forms used by hospital dietitians for NCP. Most dietitians were utilizing the modified Subjective Global Assessment (SGA) nutritional assessment forms designed by the Philippine Society of Parenteral and Enteral Nutrition (PhilSPEN). There were few dietitians who were using original forms, created to suit the needs of the hospital. And others already adapted the NCP forms released by the DOH when A.O. No. 2019-0033 was promulgated last August 28, 2019. In this regard, it can also be noted that the varying lengths of the forms may affect the *time it takes to document NCP*.

Facilitators of NCP implementation

Facilitators of NCP implementation were determined using thematic analysis that resulted in the emergence of 29 unique codes organized into five (5) coherent themes namely: **theme 1** – collaboration, dedication, and commitment of the healthcare team; **theme 2** – institutionalization of NCP laws and policies; **theme 3** – budget allocation for NCP-related activities; **theme 4** – monitoring consistency of NCP implementation; and **theme 5** – work schedule.

In **theme 1**, the most frequently mentioned facilitator of NCP implementation was a collaborative multidisciplinary approach of the healthcare team (n=18, 34.6%). *'A collaborative approach initiated by the members of the healthcare team will help ensure that care is coordinated and that its team members and the patients are aware of all the goals and priorities of NCP'* (F1F56). This was followed by continuing attendance in lectures, trainings, seminars, or webinars (n=12, 23.1%). The participants strongly desired to attend training and seminars on NCP: *'Almost all our hospital dietitians wanted a hands-on training from DOH. The majority of the dietitians were already old and not trained to conduct clinical practices'* (F1F30). *'There must be a continuing attendance to seminars and trainings despite the pandemic'* (F1F60). Another mentioned facilitator was orientation and reorientation of the healthcare team on NCP (n=6, 11.5%). *'In our hospital, all employees undergo a General Orientation Program (GOP), may it be a medical service or nursing service employee. So, NCP should be part of the orientation due to the fast turnover of healthcare professionals. In that way, all new employees will be oriented about the process'* (F1F48). Other facilitators mentioned under **theme 1** were regular meetings with the healthcare team (n=6, 11.5%), commitment of the healthcare team (n=5, 9.6%), discovering and establishing linkages with external organizations (n=4, 7.7%), and participation in research (n=1, 1.9%).

In **theme 2**, issuance of hospital orders or memorandum for NCP implementation were mentioned by the participants 16 times (55.2%). *'The creation of a hospital order or memorandum usually starts with the medical center chief or medical director for proper agreement with the top management down to the concerned department'* (K2F59). Another mentioned facilitator was inclusion of NCP in the hospital policies and procedures manual (n=5, 17.2%). *'The process of creating hospital mandates, policies, and memorandum starts with the concerned department, then endorse or inform the top management, meeting with top management, and then release of hospital electronic approval'* (K2F54). Further, *'The issuance of hospital order, policies, or memorandum will strengthen the practice of NCP in the hospital and will recognize and uplift the confidence of dietitians'* (F1F60). Other mentioned facilitators under this theme were establishment of nutrition support team or nutrition committee (n=5, 17.2%), creation of online nutrition screening form (n=1, 3.4%), establishment of medical nutrition and wellness clinic (n=1, 3.4%), and creation of nutrition care package.

Meanwhile, the focus of *theme 3* was on hospital budget. The mentioned facilitators under this theme were: signing of the hospital administrators of the annual procurement plan (APP) (n=13, 45.0%) from the consolidated project procurement management plan (PPMP) of all departments; hiring of additional staff (n=6, 20.7%); procurement of hospital bed scale 3 (n=3, 10.3%); use of diet counseling tools and information, education and communication (IEC) materials (n=2, 6.9%); immediate replenishment of used funds (n=1, 3.4%); sending of staff to trainings (n=1, 3.4%); provision of computer and printer (n=1, 3.4%); procurement of complete body fat analyzer (n=1, 3.4%); and provision of equipment for trainings and seminars held in the hospital (n=1, 3.4%).

Furthermore, *theme 4* centered on sustaining the practice of NCP. Daily monitoring and evaluation of the members of the healthcare team; use of a key performance indicator (KPI) for staff monitoring; good documentation of accomplished reports; monthly presentation of case reports; and submission of quality improvement project were the mentioned facilitators of NCP practice. *'The daily monitoring and evaluation of the members of the healthcare team was necessary to check what needs to be done to improve the practice of NCP'* (F1F63).

While for *theme 5*, it was revealed that a *'flexible daily work schedule'* (n=1, 50.0%) (F1F44) and *'work management'* (n=1, 50.0%) (F1F39) were the strategies of the hospital dietitians that would help in implementing NCP efficiently.

DISCUSSION

The present study assessed the NCP implementation and use of NCPT among hospital dietitians in the Philippines. NCP implementation and use of NCPT by the dietitians are vital in the provision of high-quality nutrition care that contributes to positive patient outcomes. The dietitians' knowledge, perception, and practices on NCP and NCPT were assessed, as well as the factors that may have contributed to their current knowledge, perception, and practices. The barriers and facilitators to NCP implementation and use of NCPT were also explained.

The KPP assessment done in this study revealed that majority of the participants had a high level of knowledge on NCP and NCPT and positively perceived its implementation. In addition, more than half of the participants had a high level of practice of NCP and use of NCPT. The possible factors that may have contributed to the result of the assessment were revealed by the correlation tests. Results showed that research involvement and being an active member in professional organization were significantly associated with the knowledge of the participants on NCP and NCPT. Being involve in research contributes to the knowledge gain of dietitians as research is the basis for education. It drives the core knowledge and competencies that dietitians are expected to understand and practice. Furthermore, it strengthens and

sustains the knowledge base of one's profession.²¹ Also, being a member of professional organization, more so an active member, helps the dietetic professional expand their knowledge on NCP and NCPT. Professional organization provides opportunities for professional development through access to trainings, research materials, and industry insights to help professionals grow in their respective field. Events and conferences conducted by professional organizations are also great opportunities for education on the best practices in their industry.²²

Meanwhile, no significant associations were found between the participants' characteristics and their perception on NCP and NCPT. This means that in this study, the perception of most participants was not significantly influenced by their level of education, present position/rank, number of years employed as a dietitian, having NCP-related trainings in the last five years, frequency of yearly trainings, research involvement, organization membership, and nature of membership.

The high level of practice of more than half of the participants on NCP and NCPT in this study was significantly influenced by their recent NCP-related trainings, frequency of yearly training, and nature of membership in professional organizations.

Training provides information and instruction to help learners attain knowledge and/or skill. It aims to improve the learner's competence, capacity, and performance. An effective training also helps learners apply this information to their workplace.²³ Studies have reported that nutrition training of health care staff significantly influenced nutrition care practice.^{24,25} Moreover, in a study about psychosocial factors and intention to use the nutrition care process among dietitians and dietetic interns, the authors concluded that implementation of the NCP to be successful will likely require the development of theoretical and practical training activities for both interns and experienced dietitians.²⁶

As mentioned earlier, professional organizations provide opportunities for trainings; hence, may influence the NCP practice and use of NCPT, especially to those who have active membership.

Additionally, the participants perceived barriers and facilitators to NCP practice and use of NCPT were explained thru FGD among chief clinical dietitians and KII among hospital administrators. Insufficient resources, lack of orientation, trainings and support, organizational and administrative constraints, pandemic constraints, insufficient time, and lack of confidence to conduct NCP were the top six barriers that were identified. These perceived barriers might be the reason why the remaining forty percent (Table 3) of the participants were not yet implementing NCP in their respective hospitals. On the other hand, the top five facilitators of implementation were collaboration, dedication, and commitment of the healthcare team; institutionalization of NCP laws and policies; budget allocation for NCP-related activities; monitoring and consistency of NCP

implementation; and work schedule. Most of these barriers and facilitators of implementation were also documented in several NCP studies.^{8,27-29} It was also documented that the occurrence of more NCP facilitators and fewer barriers was associated with higher NCP implementation.²⁸

Limitations of the Study

This study was limited to dietitians and hospital administrators employed in DOH licensed level 3 hospitals in the Philippines as of December 2019. The study was also conducted during the COVID-19 pandemic that hampers the NCP implementation in some hospitals.

CONCLUSION

In conclusion, based on the present findings, the knowledge on NCP and NCPT of the hospital dietitians in the Philippines was high, and was significantly influenced by their research involvement and active membership in a professional organization. Moreover, unlike knowledge, not most of the dietitians had a high level of NCP practice and use of NCPT. The high level of practice by some dietitians was significantly influenced by having NCP-related trainings, more frequent trainings, and active membership in a professional organization. The barriers to NCP implementation were insufficient resources, lack of orientation, trainings and support, organizational and administrative constraints, pandemic constraints, insufficient time, and lack of confidence to conduct NCP. While the facilitators were collaboration, dedication, and commitment of the healthcare team; institutionalization of NCP laws and policies; budget allocation for NCP-related activities; monitoring and consistency of NCP implementation; and work schedule.

These findings suggest that the implementation of NCP and NCPT in the Philippines needs further support from the institution, professional organizations, and policy makers by developing strategies to cope with the barriers, and strengthen the facilitators and factors associated with practice.

Recommendations

The assessment on the use of NCPT such as the terms and codes in the different domains of the NCP steps is recommended for future studies. It would greatly help the dietetic profession to uncover the barriers in the practice of standard documentation of NCP.

Also, the assessment of the perception and practice of NCP by the other members of the healthcare team, such as doctors and nurses, as well as their perceived barriers and facilitators of practice is recommended since one of the mentioned facilitators of NCP practice in this study was collaboration, dedication, and commitment of the healthcare team.

Further, since this study was conducted during the height of the COVID-19 pandemic – one of the mentioned barriers of NCP implementation, and just more than a year

after the Administrative Order No. 2019-0033: Guidelines for the Implementation of Nutrition Care Process in Hospitals was ratified, follow up studies in the future must be done to determine if there were improvements in the status of NCP implementation and use of NCPT. It is also recommended that same study be conducted in Level 1 and Level 2 hospitals to determine their NCP implementation status and purposes of comparison as well as to their possible facilitators and barriers.

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Disclaimer

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Statement of Authorship

All authors contributed to the conceptualization of the research proposal, formulation of research instrument, data collection and analysis, write up of manuscript, and approved the final version submitted.

Author Disclosure

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