Original

Exploring Perspective of On-call Dietitian Residency Program among Healthcare Personnel in a Government Tertiary Hospital: A Pilot Qualitative Study

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ABSTRACT *Background and purpose.* In Malaysia, on-call service has been well established and as exists as part of arrangements to provide appropriate service cover across the national tertiary government hospital especially by the profession of medical doctors, pharmacists, and nurses. Dietitian residency on-call program has been beginning nationwide government hospital in 2013. Therefore, the main objective of the study is to explore the different perspective of on-call dietetic program among different health care providers based on a largest government tertiary hospital setting ranked by bed capacity in southern zone of Malaysia, Johor. *Methods.* Seven healthcare personnel participated in a semi-structured focus group. The participants invited were come from various general practices in different department with different gender, profession, and clinical experience. Key questions examined these individuals' perspective about on-call dietetic program. *Result.* This study identified four main categories that catalytic for the better understanding of On-call Dietitian Residency Program among healthcare providers. There were four categories: (1) Perception On-call Dietitian Residency Program among Healthcare Personnel; (2) Redefining On-call Dietitian Residency Program; (3) Identified challenges from On-call Dietitian Residency Program and (4) Various concerns in ward during on-call shift. *Conclusion.* Participants expressed positive comments about the 4-hour on-call weekend cover.

Key Words: on-call service, on-call Dietitian, focus groups, tertiary hospital

INTRODUCTION

'On-call' is a term defined as being available to work outside one's normal working hours. Employees who work on-call are expected to be available at any time of day including weekend, to carry out their working duties (1,2). It is widely used by many different healthcare professions.

In Malaysia, on-call service has been well established and as exists as part of arrangements to provide appropriate service cover across the national tertiary government hospital especially by the profession of medical doctors, pharmacists, and nurses (3). Given wide range of areas, which could potentially require support in a tertiary government hospital, Dietitian residency on-call program has been began nationwide government hospital in 2013. Such system has not yet introduced or practiced in private sector of any countries, including Malaysia. Up to the date, no literature review or any study has published regard the Dietitian residency on-call program.

Overall, the residency on-call program was designed to offer a supportive environment in which the resident is held accountable for pursuing optimal outcomes of direct patient care from therapeutic diet, enteral formula and nutrition care process monitoring aspect. During late evenings of Friday, weekends, and holidays, the clinical dietetics service may not be available to assess. The on-call resident is then assigned to provide such services. Medical Nutrition Therapy information consultation includes recommending enteral formula, assessing adverse enteral formula events, recommending specific enteral or diet therapeutic administration, screening for drug and nutrition interactions, recommending regime for enteral formula, and identifying difficulty oral intake. The resident also responds to emergency diet related requests submitted to the Dietetic department after business hours and on holidays and evaluates or even attending out-patient or in-patients' basis. Residents also participate in food service-related responses, and their support is crucial when the wrong diet received or wrong diet ordering event occurred. Sometimes, any unexpected event from outsourced or centralized food service system might require communication between food service dietitian and clinical dietitian. The on-call dietitian resident is the first to respond to all patient related emergencies.

The traditional working hours for hospital dietitians are between 08:00 and 17:00, Monday to Friday. At weekends, there are minimal clinical dietetics and food service services although dietitian is ready to standby throughout the day if there is urgency to be handled. This set-up leaves periods of time during the weekends where there are no hospital dietitians on site. After Dietitian residency on-call program started nationwide, on-call resident is expected to deliver additional 4-hour shifts beginning at 0830 every Saturday. During an on-call shift, residents are expected to fulfill any required rotation duties before leaving the hospital by no later than 1230. Due to shortage of man force, this on-call program is initiated at government hospital with more than 6 permanent Dietitian residents.

On-call resident services are provided

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throughout the year, regardless of program activities. Through this mechanism, clinical services are provided by onsite dietitian resident every day. If residents are not present to provide the services, head of clinical service are assigned to on-call shifts. In turn, the dietetic department provides equivalent time off once the number of on-call duty hour exceeded 8 hours. Each resident is assigned an equal number of shifts.

It may be impractical for an institution to have clinical Dietitian available 24 hours a day, but having an on-call resident monitor selected patients like refeeding syndrome, swallowing difficulty is crucial ideally. This model resembles the medical house-staff cross-cover model. The resident provides the requested service during the on-call shift which may contributes to a continuity of high-level care in long run.

Up to now, service commitments are often met in the form of rotations or blocks devoted to a practice area. Some hospital meets this requirement or criteria may benefit through such longitudinal patient care experiences. This design is commonly used in the medical, pharmacy or primary care setting, where the focus is on managing chronic or acute diseases and promoting continuity of care. These same models often hold true for dietetic practitioners with direct patient care responsibilities. However, many dietetic departments, particularly in the 300 bed above tertiary care setting, struggle to provide a high level of care directly to each patient around the clock. It became the main issue of current on-call service, mainly of each tertiary government hospital.

Therefore, the main objective of the study is to explore the different perspective of on-call dietetic program among different health care providers based on a largest government tertiary hospital setting ranked by bed capacity in southern zone of Malaysia, Johor. The benefit of this study is four-fold; first of all, this is the first study to report the experience of dietetic residency on-call program. Secondly, it revealed the weakness and strengths in current implementation model, as it may vary from other similar medical profession for example, pharmacy, medical or laboratory officers. Thirdly, the data may reflect the necessary of on-call program in Malaysia government tertiary hospital setting. Fourth, the suggestion collected may aid the policy maker in avoidance of any unintended consequences as several studies confirmed the association between longer work hours and fatigue-related injuries in residents (4,5).

MATERIALS AND METHODS

Study Design: For this study we used phenomenological approach qualitative method (6). Between 1st October 2020 and 30 October 2020, we conducted focus group interviews in order to explore understanding of On-call Dietitian Residency Program among Healthcare Personnel based on a largest government tertiary hospital setting ranked by bed capacity in southern zone of Malaysia, Johor. The study protocol was reviewed and approved by the Medical Research and Ethics Committee, Malaysia (NMRR-19–3818-52373). All respondents provided written informed consent. All methods were performed in accordance with the relevant national and international guidelines and regulations. No compensation was provided for study participation. The interview was facilitated by the experience moderator (Pn. Fatimah Othman) and assisted by the assistant moderator (Pn. Afifah Binti Abd Rahim and Pn. Faulina Binti Khamisan). All participants received written information, including a statement that participation was voluntary and the results of the study would be anonymous.

Participants: Two medical officers, one pediatrician, two practice nurses and two resident dietitians (subsequently referred to as HPs) participated in a focus group interviews. The participants invited were come from various general practices in different department with different gender, profession, and clinical experience. An over-recruitment of one or two participants is to pursue in case there were ‘no-shows’. The participants were briefed about the study purpose one week before the focus group discussion held. The characteristics of the focus group participants are presented in Table 1.

Study Sites: In this qualitative study, the data collection was conducted at Hospital Sultanah Aminah, in setting that would be comfortable for participants. Focus groups interview were held at a mix language between English and Bahasa Melayu.

Procedure: FGs were led by experienced moderators an assistant moderator (observer), who takes notes during the discussions and make sure the moderator does not overlook any participants trying to add comments. Note takers were present during the session. The focus group (FG) lasted between 90 and 120 minutes audiotaped with permission of the participants. Food was provided at the end of the session. All text was translated to English and transcribed. Translation integrity was verified by a native-language speaker and FG moderators reviewed transcripts for accuracy.

Interview guide (Semi-Structured Questionnaire): A semi-structured question guide (Appendix 1.0) was developed by the research team, aiming to identify different perspective of on-call dietetic program among different health care personnel based on the five categories of questions and probes developed by Krueger and Casey (7). Firstly, a warm-up opening (“tell us your name) and introductory questions (Are you aware of the on-call services provided by Dietetic Service?)(How do you feel if there are 4-Hour On-call Dietitian Residency Program or in vice versa?) which allowed participants to get acquainted and feel connected, and to start the discussion of the topic. Transition questions (How urgent do you need response from a Dietitian should be?) (How well do you know about the variety of enteral formula?) (How far can you commit to the extended services [on-call dietetic residency program?) were used to move into respectively by profession. Key questions addressed the primary concerns of the study (Which is more beneficial during on-call shift? Nutrition status monitoring or responding to new referral); (In practice, do you initiate feeding’s prescription yourself over the weekend? How frequent? What is the reference used?); (Do you verify the suitability of therapeutic diet during weekend?); (What is the challenge(s) on implementing the on-call dietetic residency program?); (What do you feel about the on-call dietetic residency program in short and long term?) The key questions were led to the focus on

the purpose of this study, what may or may not influence the demand of dietetic residency during weekend or public holiday. Finally, participants were asked to share ideas (Can you suggest us a few appropriate ways of implementation on-call dietitian residency program?) concerning appropriate implementation on-call residency program to counter issue related to on-call residency program in tertiary hospital. A pilot focus group was conducted to determine the appropriateness of questions for eliciting responses to the target issues, and for the optimal length of focus groups. Data from the pilot focus group were not included in the analysis

Data analysis: The interviews were audio taped and transcribed verbatim. The text units were coded; we categorised statements based on the introductory questions, using a systematic text condensation inspired by Corbin and Strauss (8). In addition, the transcripts were entered into NVivo 9 and reviewed line-by-line for categories (main categories) and ideas (subcategories) (9).The basic idea was to explore the understanding of On-call Dietitian Residency Program brought up in discussion by the participants. We identified and discussed the text units that summarised the discussions to ensure consensus and that all data were appropriately categorised. We then identified four main categories that catalytic for the better understanding of On-call Dietitian Residency Program among healthcare providers. There were four categories: (1) Perception On-call Dietitian Residency Program among Healthcare Personnel; (2) Redefining On-call Dietitian Residency Program; (3) Identified challenges from On-call Dietitian Residency Program and (4) Various concerns in ward during on-call shift. These four categories were discussed and agreed upon by the authors.

Table 1. Category by panel involved in focus group session

	Panel						
	1	2	3	4	5	6	7
Demographic							
Age	40	28	29	42	45	27	35
Gender	Female	Female	Female	Male	Female	Female	Male
Occupation	Pediatrician	Dietitian	Staff Nurse	Physician	Senior Staff Nurse	Dietitian	Senior Medical Officer
First category: Perception On-call Dietitian Residency Program among Healthcare Personnel							
First subcategory	Y	—	—	—	Y	—	Y
Second subcategory	Y	—	Y	Y	Y	Y	—
Third subcategory	Y	Y	—	Y	—	—	Y
Second category: Redefining On-call Dietitian Residency Program							
First subcategory	Y	—	—	—	Y	Y	Y
Second subcategory	—	—	—	Y	Y	—	Y
Third subcategory	—	Y	—	Y	Y	—	Y
Fourth subcategory	Y	—	Y	Y	Y	—	Y
Fifth subcategory	Y	—	Y	Y	—	—	Y
Third category: Identifying the challenges							
First subcategory	—	Y	—	—	—	Y	—
Fourth category: Various concerns in ward during on-call shift							
First subcategory	Y	—	Y	—		—	—
Second subcategory	—	—	Y	—	Y	—	—
Third subcategory	—	—	Y	—	Y	—	Y
Fourth subcategory	Y	—	—	Y	Y	—	—
Fifth subcategory	—	—	Y	—	Y	—	Y

Note. Y : discussed in focus group

RESULTS

The perspectives discussed were highly consistent across different healthcare personnel. Therefore, the results are summarized according to the four major categories to express the purpose of this study (see Tables 2, 3, 4 and 5).

Table 2. Representative quotes for first category: Perception On-call Dietitian Residency Program among Healthcare Personnel

Do you aware of On-call Dietitian Residency Program started since 2013?	
“Tidak” *"No"*	1
“tidak perasan ada Dietitian Oncall ” *"Didn't notice there was an Oncall Dietitian"*	5
“Tidak tahu” *"Dont know"*	7
How do you feel if there are 4-Hour On-call Dietitian Residency Program or in vice versa?	
“jika ada Dietitian Oncall kerana tindakan terus dapat dijalankan terus” *"If there is a Dietitian Oncall the action can be taken quickly"*	5
“jika ada Dietitian Oncall pada hujung minggu adalah bagus” *"If there is an Oncall Dietitian on the weekend, that is great"*	1
“sekiranya ada Dietitian Oncall adalah baik untuk kes-kes yang tertentu” *"If there is a Dietitian Oncall is good for certain cases"*	1
“ia adalah idea yang baik jika ada Dietitian Oncall” *"It's a good idea to have an Oncall Dietitian"*	4
“Oleh jika ada Dietitian Oncall kami akan dapat selesaikan banyak perkara” *" if there is an Oncall Dietitian we will be able to solve many things"*	4
“Jadi jika ada Dietitian Oncall adalah lebih baik” *"So if there is an Oncall Dietitian, it is better"*	5
“oncall ini adalah baik untuk pesakit ” *"This oncall is good for patients"*	6
“Saya ada bertanya kepada kawan-kawan saya juga tiada masalah sekiranya tiada Dietitian Oncall” *"I have asked my friends that there is no problem if there is no Oncall Dietitian"*	3
“Short term wise it is good thing when Dr kew our service, it will be Medical nutrition therapy can be more emphasized and patient can get benefit from it”	6
“It will be better ada oncall dietitian because we have multiple problem di hospital”	1
“jika ada dietitian oncall bagusla” *"If there oncall dietitian, it is good "*	3
“it just that if there is oncall dietitian during weekend it could be better”	1
At this moment in time, do you need On-call Dietitian to handle urgent referrals?	
“kami tidak rujuk Dietitian secara ‘non- planned’ pada hujung minggu” *"We do not consult Dietitians by 'non-planned' basis on weekends"*	7
“urgency wise tidak menjadi isu kepada kami” "Urgency wise is not an issue for us"	7
“Saya rasa tidak terlalu urgent untuk rujuk kepada Dietitian ” *"I don't think it's too urgent to consult a Dietitian"*	1
“Kita tidak harapkan Dietitian dapat datang dan manage pada masa tersebut tapi kita akan rujuk dietitian hari esok untuk sort the feeding” *"We do not expect the dietitian to come and manage at that time but we will consult the dietitian tomorrow to sort the feeding"*	4
“Tidak urgent sangat” *"Not very urgent"*	1
“Jika saya lihat wad yang saya jaga, belum lagi memerlukan kita kena berada di tempat itu untuk oncall” "If I look at the ward I'm in charge of, it doesn't require us to be there to oncall"	2
“For me until now. I don’t see a case that require dietitian attention urgently or immediately”	7

Regular font styles: Original script
Italic font styles: Translated script
Number: Panel involved

First category: Perception On-call Dietitian Residency Program among Healthcare Personnel.

For first category, we identified three subcategories: (1) Do you aware of On-call Dietitian Residency Program started since 2013?,(2) How do you feel if there are 4-Hour On-call Dietitian Residency Program or in vice versa?, and (3) At this moment in time, do you need On-call Dietitian to handle urgent referrals? (see Table 2) .

First subcategory: Do you aware of On-call Dietitian Residency Program started since 2013?

Three out of five participants except two in-house Dietitians clearly speculated that they did not aware and did not know of such On-call Dietitian Residency Program existed.

Second subcategory: How do you feel if there are 4-Hour On-call Dietitian Residency Program or in vice versa?

'Good idea', 'it could be better' were consistently speculated in nearly all participants to describe how they feel about the initiated 4-Hour On-call Dietitian Residency Program in a tertiary hospital setting. Participants clearly attributed this program enable quick action can be taken to resolve multiple issues or handling specific referrals especially in a tertiary government hospital setting. Particularly, patients' outcome will be benefited from medical nutrition services. However, a participant also mentioned that they did not meet any problems without aware of this initiated program by far based on their experience despite she also agreed that it was 'fantastic idea' of such effort implemented.

Third subcategory: At this moment in time, do you need On-call Dietitian to handle urgent referrals?

It was agreed that most of participants did not required On-call Dietitian to handle urgent referrals as 'not so urgent' and 'not a problem', was consistently noted. A Participants clearly attributed their department would refer the case to in-house Dietitians in the next working day.

Second category: Redefining On-call Dietitian Residency

For second category, we identified five subcategories: (1) What is the role of On-call Dietitian?,(2) What is urgent referral required attention of On-call Dietitian?, (3) What is tangible way to handle urgent referrals?, (4) Suggestion to improve On-call Dietitian Residency Program(see Table 3).

First subcategory: What is the role of On-call Dietitian?

Participants commented the role of On-call Dietitian should emphasis on 'optimising', 'adjusting' therapeutic and enteral regime in following-up referrals particularly. A participant also expressed a notion that by communicating with On-call Dietitian, this allowed their department to obtain sufficient quantity of required enteral product even during weekend. Besides, a participant also expressed that monitoring the suitability of therapeutic diet in ward basis and checking the raw materials during receiving process were part of the crucial task of On-call Dietitian in hospital setting.

Second subcategory: What is urgent referral required attention of On-call Dietitian?

In term of urgent referral, participants especially physician agreed that there was times where urgent attention from On-call dietitian might required especially patient admitted and diagnosed with 'Myocardia Infarct (MI)', patient experienced with 'electrolyte Imbalance' and 'diarrhea' or even 'intubated patient' with complication of 'sepsis' and 'cardiogenic shock'. A participant also highlighted adult with chronic diabetes can also be considered as critical to be handled as there required longer duration of counseling which emphasised on behavior change.

Third subcategory: What is tangible way to handle urgent referrals?

Participants described being 'more responsive', 'easily contactable via phone' were more tangible to handle urgent referrals. Nearly all participants appeared be somewhat agreement to these suggestion by nodding their head. One participant stressed on the 'practicality of passive On-call' rather 'waiting in hospital to handle any referrals required immediate attention'. Yet, one of the participants representing from in-house Dietitians speculated that 'passive On-call have always been put into the practice of hospital'. 'The respective ward has their in-house Dietitians in charge's personal phone number', so 'they can contact their ward's Dietitians anytime in fact'.

Fourth subcategory: Suggestion to improve On-call Dietitian Residency Program

Firstly, 'review follow-up referral in ward frequently', particularly 'patients initiated parenteral nutrition therapy'. Secondly, assigned duty of On-call Dietitian from dietetic and food service department to be exact 'in inspecting the suitability of therapeutic diet received by admitted patients in ward'. Thirdly, 'leaving phone number of On-call dietitian' in every unit of ward. Fourth, 'On-call Dietitian assigned to be duty if there were long public holiday'. Yet, it was noted that it was not always possible to ensure task given to be fulfilled within 4-Hour, sometimes, 'problem or immediate effort might be needed right after 4-Hour of duty'. Thus, '0800 - 1700 of On-call Dietitian Residency Program was suggested to be more realistic and practicality' especially in government tertiary hospital.

Third category: Identifying the challenges

For third category, we identified one subcategories: (1) What are the challenges faced by On-call Dietitian?, (see Table 4).

First subcategory: What are the challenges faced by On-call Dietitian?

A major challenge to On-call Dietitian was explicit workload. Both in-house dietitian recognised that 'it is impossible to cover every ward in a government tertiary hospital by On-call Dietitian'. The other participants being less responsive but somehow appear to be agreed with the notion. One also said: "So it's like the objective of On-call is still not cleared, sharp and immeasurable. … 'It is like wasting time if we as On-call Dietitian is not clear with the task to be carry out'. At the end, the goals are not met but 'affected the quality of patient care' and 'physicians, staff nurses will be affected at the

same time if mistake happened'. Another in-house dietitian said that, 'When she was occupied, she would preferably 'only to offer follow-up or dietetic service to her own patients in her ward in-charged' as she echoed that 'counseling is a long process' and 'it involves not just dietary modification but also behavior change'. This explained why there are 'not many participants involved in this FGs did not aware of such On-call program initiated since 2013'. Lastly, for those married, 'it is even difficult when she has to figure out where to send their children'. Until the present, one mentioned that she still 'can commit to the On-call program as the frequency and duration of On-call service is not high and long'. Another in-house dietitian as participant involved remained silent and less responsive in comparison to their peers when refer to commitment.

Table 3. Representative quotes for second category: Redefining On-call Dietitian Residency Program

What is the role of On-call Dietitian?	
"jika ada apa-apa masalah yang berkaitan dengan perubahan diet atau susu pesakit pada hujung minggu" *"If there are any problems related to changes in the patient's diet or oral nutrient formula over the weekend"*	5
"mulakan special feeding kepada pesakit tertentu seperti pesakit Chylothorax" *"Initiate special feeding to certain patients such as Chylothorax patients"*	1
"Agak menyusahkan jika pesakit tidak serasi, jadi jika perlu tunggu hingga ke hari Ahad kesian kepada pesakit. " *"It's quite difficult if the patient is in difficulty, so have to wait until Sunday, feel sorry for the patient"*	5
"beliau akan fine tuning keperluan pesakit seperti tambah keperluan protein dengan menambah myotein" *"He will fine tuning the patient's needs such by adding myotein"*	7
"Dietitian amat membantu untuk optimise feeding pesakit " *"Dietitian is very helpful to optimize patient feeding"*	7
"Kita perlukan Dietitian untuk adjust feeding" *"We need a Dietitian to adjust feeding"*	1
"Oleh itu, saya akan menjalankan rawatan susulan untuk pesakit saya sahaja ketika oncall" *"Therefore, I will conduct follow -up treatment for my patients only during oncall"*	6
"kami juga menjalankan perkhidmatan sajian seperti pemantauan ketepatan diet teraputik dan pemeriksaan penerimaan bahan mentah" *"We also run catering services such as monitoring the accuracy of therapeutic diets and checking the receiving process of raw materials"*	6
"at least kalu kita dah spoken dengan dietitian, dia dah benarkan untuk kami dapat bekalan susu sebanyak ni sehingga hari bekerja" *"At least if we have spoken to the dietitian, he or she allowed us to get the sufficient formula supply for until next working day"*	3
What is urgent referral required attention of On-call Dietitian?	
"Terutama jika kami ada pesakit Miocardiac Infarct (MI) yang masuk wad dan tidak tahu apa diet yang sesuai " "Especially if we have Miocardiac Infarct (MI) patients who are in the ward and do not know what the appropriate diet"	4
"jika pesakit diarhea kita tidak tahu susu apa yang sesuai untuk diberikan kepada pesakit" *"If the patient has diarrhea we do not know what formula is suitable to give to the patient"*	5
"Kami perlu lihat 'electrolyte Imbalance' , ada sesetengah pesakit yang tidak sesuai menggunakan susu biasa" "We need to look at 'electrolyte imbalance', there are some patients who are not suitable to use regular formula"	5
"pesakit yang 'intubated' mengalami masalah-masalah tertentu seperti…..lose, demam, cardiogenic shock atau sepsis. Berkemungkinan, kami memerlukan saranan daripada Dietitian" *'Intubated' patients experience certain problems such as…..loose stool, fever, cardiogenic shock or sepsis. Most likely, we need advice from the Dietitian "*	4
"untuk pesakit dewasa adalah sangat sukar. Jadi mereka mungkin memerlukan lebih kaunseling diet terutama kepada pesakit diabetes" *"For adult patients it is very difficult. So they may need longer duration of diet counseling, especially for diabetics"*	7
What is tangible way to handle urgent referrals?	
"pada saya tiada masalah sekiranya Dietitian response dalam masa 24 jam" *"I have no problem if the Dietitian responds within 24 hours"*	4
"Saya rasa Dietitian tidak perlu ada, sekiranya Dietitian mudah untuk dihubungi" *"I don't think Dietitian shoud be there during weekend, if the Dietitian is easy to contact"*	8
"Dietitian tidak perlu tunggu di hospital sahaja tunggu kes jadi seperti Pasive Oncall. Jika tidak, tidak perlulah datang ke hospital" *"Dietitians do not have to wait in the hospital, just waiting case through Passive Oncall. If there no cases, there is no need to come to the hospital "*	8
"Senang untuk kita hubungi. Macam doctor Passive Call" *"It's easier for us to call for help. Like a doctor Passive Call "*	8
"senang untuk kita hubungi jika ada apa-apa masalah" *"easier for us to contact if there are any problems"*	5

“Kami tiada masalah sekiranya doktor HO/MO bertanya melalui telefon” *"We have no problem if the HO/MO doctor asks over the phone"*	2
“Sebenarnya untuk pengetahuan doktor, kita dah jalankan pasif oncall. Jika ada masalah mereka akan berhubung dengan Dietitian tanpa mengira waktu” *"Actually, for everyone’s information, we have run passive oncall long ago. If there is a problem they will contact the Dietitian regardless of the time"*	2
Suggestion to improve On-call Dietitian Residency Program	
“Jika cuti hujung minggu yang panjang seperti ada hari Cuti Kelepasan Am, Dietitian boleh datang pada waktu pagi” *"If the weekend is extended from Public Holiday, the Dietitian better come to duty in the weekend’s morning"*	8
“Bagi saya, apa yang urgent adalah Dietitian perlu selalu follow up/regular review pesakit kerana kami ada NST yang memerlukan input daripada Dietitian” *"For me, what urgent is the Dietitian should always follow up/regular review of patients because we NST (Nutrition Support Team) that requires inputs from the Dietitian"*	4
“Mesti ada sorang yang bertanggungjawab mungkin seperti pegawai catering yang mengingatkan jururawat untuk periksa diet yang betul diterima oleh pesakit” *"There must be someone in charge maybe like a catering officer who reminds nurses to check the correct diet received by patients"*	7
“Sepatutnya, ada pegawai yang bertanggung jawab. Mungkin dari Pegawai dari bahagian Sajian atau Dietitian” *“Supposedly, there are officers in charge. Maybe from an Officer from the Catering or Dietitian ”*	1
“I rasa dietitian oncall the whole day is better dari oncall selama 4 jam, sebab kadang-kadang dalam masa 4 jam tersebut tiada masalah, tapi bila dah balik ada problem” *"I think dietitian oncall the whole day is better than oncall for 4 hours, because sometimes within 4 hours there is no problem, but after 4pm there is a problem"*	1
“jika ada dietitian oncall bagusla, tapi kena inform wad sebab selama ni, tak tau ada passive call” *"If there is a oncall dietitian, that is great but have to inform the ward because so far, I don't know if there is a passive call"*	3
“Cadangan untuk tinggalkan no telefon untuk dihubungi jika ada kes urgent yang dirujuk dari doktor” *"Suggestion to leave a phone number to be contacted if there is an urgent case referred from a doctor"*	3
“contohnya tinggalkan no telefon. At least kalau tak dapat datang, at least dapat berkomunikasi” *"For example, leave a phone number. At least if can't come to assist, at least we can communicate"*	5

Regular font styles: Original script. Italic font styles: Translated script. Number: Panel involved

Table 4. Representative quotes for third category: Identifying challenges of On-call Dietitian Residency Program

What are the challenges faced by On-call Dietitian?	
“Jadi tidak terasa sangat kerana kita akan ikut giliran 2 bulan sekali. Dari segi komitmen oleh kerana tidak terlaku kerap pada saya tiada masalah” *"So it does not feel any discomfort because we will rotate once every 2 months. In terms of commitment, it doesn't happen any difficulties to me"*	2
“Tetapi sekiranya seorang dietitian perlu menjalankan perkhidmatan klinikal untuk 1 hospital, tetapi hanya untuk 4 jam, pada saya adalah sukar kerana tidak dapat cover pesakit untuk satu hospital ” *"But if only one dietitian has to run clinical services for one hospital with only allowed 4 hours, for me it is difficult because we cannot cover patients for one hospital in that amount of time"*	2
“Oleh itu, saya akan menjalankan rawatan susulan untuk pesakit saya sahaja ketika oncall ” *"Therefore, I will conduct follow -up treatment for my patients only when oncall"*	6
“jika nak oncall, kena tahu objektif oncall” … Bagi saya, jika objektif tidak menepati, tak dapat diukur, ditakuti, akan membuang masa macam tu je” *"If you want to oncall, you need to know the objective of oncall"... For me, if the objective does not meet, cannot be measured, it will waste time like that"*	2
“kebajikan pekerja akan terjejas, objektif tak nampak, workload bertambah. … Contohnya jika ada yang ada family, dia perlu kena fikir nak hantar anak kemana jika tiada pengasuh” *"welfare of Employee will be affected, objectives are not seen, workload will increase. ... For example, if someone has a family, he needs to think about where to send the child if there is no babysitter”*	2
“satu dietitian kena cover semua wad dlm hospital dan tiada penyelesaian yang bagus, kita akan overload dengan kerja” *"One dietitian has to cover all the wards in the hospital and if there is no good solution, we will be overloaded with work"*	6
“Contohnya counselling, it’s a long process, kita perlu mendapatkan diet history dan adjust from there as it is behaviour change” *"For example counseling, it's a long process, we need to get a diet history and adjust from there as it is about behavior change"*	6
“So if you have so many patient and you have to settle the entire ward, you can imagine the quality of the outcome of the patient. It won’t as good as if when we have better pace to manage the patient. And if the work quality isn’t good our other team such as physician, staff nurse will be affected at the same time. Not just the dietetic service”	6

Regular font styles: Original script. Italic font styles: Translated script. Number: Panel involved

Table 5. Representative quotes for fourth category: **Various concerns in ward during On-call shift**

How well do you know about the indication of therapeutic diet?	
"Saya rasa bagi jabatan Paediatrik, banyak doctor atau jururawat tidak tahu diet yang sesuai" *"I think for the Pediatrics department, many doctors or nurses do not know the appropriate diet"*	1
"Kami tidak pandai lagi kirakan kalori" *"We are not good at counting calories"*	1
"Saya rasa ramai yang tidak tahu. Kebanyakan jururawat hanya tahu pengetahuan asas sahaja" *"I think many people do not know. Most nurses only know the basics"*	3
How well do you know about the indication of enteral formula?	
"Saya rasa 3 formula yang saya setakat tahu" "I think 3 formulas that I so far know"	3
"Saya rasa 4. Saya faham jenis susu untuk kegunaan apa" *"I think 4. I understand what kind of these formula used for"*	5
"kita akan lihat cara bancuhan pada tin atau paket dan kotak. Lihat berapa ml air" *"We will look at the label of the formula for dilution. See how many ml of water"*	5
"Kadang-kadang doktor akan bagi arahan RTF mengikut jumlah sukatan air" *"Sometimes the doctor will give RTF (Ryle's Tube Feeding) instructions according to the amount of water"*	3
Do you verify the suitability of therapeutic diet?	
"Tiada yang mengesahkan diet teraputik yang betul diterima kepada pesakit " *"No one verify the accuracy of therapeutic diet received by patients"*	5
"jika betul-betul periksa jenis diet, tiada pegawai yang mengesahkan kerana PPK (Pembantu Prrawatan Kesihatan) yang akan pesan diet pesakit berdasarkan BHT pesakit" *"If really check the accuracy of therapeutic diet, no such proper officer will confirm because the PPK (Ward assistant) will order the patient's diet based on the patient's Bed Head Ticket (BHT)"*	3
"Saya tidak rasa jururawat atau doktor akan sempat untuk lihat diet terima dengan beban tugas di wad yang banyak" *"I don't think nurses or doctors will have time to check the accuracy of therapeutic in ward level with the workload"*	7
Do you verify the drug-nutrients interactions?	
"Jika di Wad Kardiologi, jika pesakit ada bertanya baru jururawat akan terangkan" *"If in the Cardiology Ward, if the patient asks, the nurse will explain"*	5
"Saya rasa jururawat sedar kepentingan interaksi ubatan dengan diet. Seperti contoh pesakit yang mempunyai masalah thyroid mempunyai 'Ryles Tube Feeding' perlu ambil thyroxin 1mg dengan perut kosong" *"I think nurses are aware of the importance of the interaction of medicine with diet. For example, patients with thyroid problems with 'Ryles Tube Feeding' need to take 1mg thyroxine on an empty stomach"*	4
"Hanya 'compliance' daripada pesakit akan ikut atau tidak. Tapi kebiasaanya, mereka akan mengikut arahan" *"Only depend on 'compliance' from patients, whether to follow or not. But usually, they will follow the instructions"*	1

Regular font styles: Original script. Italic font styles: Translated script. Number: Panel involved

Fourth category: Various concerns in ward during on-call shift

For fourth category, we identified five subcategories: (1) How well do you know about the indication of therapeutic diet?,(2) How well do you know about the indication of enteral formula?, (3) Do you verify the suitability of therapeutic diet?, (4) Do you verify the drug-nutrients interactions?(see Table 5).

First subcategory: How well do you know about the indication of therapeutic diet?

Nurses and medical officer participants suggested that they might be 'not good in calorie counting' and 'insufficient knowledge of therapeutic diet indication'. However, one staff nurse participant highlighted that she only knew the 'basis knowledge of therapeutic diet'.

Second subcategory: How well do you know about the indication of enteral formula?

Senior staff nurse participant remarked that she only 'knew about 4 enteral formulas' especially those often used in her ward in-charged. She stated that she 'followed the fluid indication by medical officer in regime dilution' if the admitted patients have not yet optimised by in-house dietitians during weekend. In comparison to her peers, junior staff nurse participant 'knew about 3 enteral formulas' up till the present, she would rather 'refer to the product labeling to dilute the formula' on those referrals not yet seen by in-house dietitians particularly during weekend.

Third subcategory: Do you verify the suitability

of therapeutic diet?

Three participants demonstrated with affirmative attitudes that 'there was no one or officer to verify the diet received by admitted patients. A senior medical officer expressed that 'it was not possible for medical doctors or nurses to carry out this duty as there were multiple concerns in ward'.

Fourth subcategory: Do you verify the drug-nutrients interactions?

Interestingly, participants demonstrated 'staff nurses and medical officers were aware of drug-nutrients interactions. For example, medical officer participant highlighted that 'he often reminded Ryle's Tube Feeding patients diagnosed with thyroid required to administer thyroxin 1 mg with empty stomach'. However, one participant stated the 'compliance drug-nutrients interactions related advice required to be addressed by patients themselves, whether they would want to follow or not'.

DISCUSSION

This FG study is the pilot study to qualitatively explore the perspective of On-call Dietitian residency program among healthcare personnel in a Malaysia government tertiary hospital. Prior to this research, there is no protocol or clear objectives of how to implement this On-call Dietitian program. Therefore, it was all started without early planning or well-structured protocol by Ministry of Health to discuss the term and impact in detail. For the beneficial of patient outcomes, this On-call service program running by in-house dietitians has been put into practice for almost 6 years. Therefore, this study is to summarise the perspective among healthcare personnel involved in government tertiary hospital, where authors would keen to look for perception among healthcare personnel, a tangible protocol to underline the structure of the program, challenges, as well as other concerns raised.

Looking in more detail at the first category, it was found that awareness of On-call Dietitian Residency Program is poor. Again, nearly all staff nurse, medical officer and physician participants agreed that they did not require On-call Dietitian to handle urgent referrals up to this point. In this context, author would wish to highlight that the program is still considered at early infancy stage, therefore, there were no database to support the needs of On-call Dietitian to handle urgent referrals. In fact, dietitians have been historically working in adult acute services for few decades (10). In facing the large number of referrals in daily routine, dietitians have to be selective and decide which patients need the most urgent dietetic intervention and prioritise their referrals accordingly. Therefore, it was believed that healthcare personnel may work hand in hand to define the urgency referrals according to contribution of dietitian in daily acute services.

In spite of all these, majority of them gave positive responses on this initiated effort and supported the fact that it would provide beneficial outcome to patients at the end. Concordant with the similar findings of previous On-call studies among neurology physician in a Spanish general hospital, author believes the similar positive outcome would be replicated in this program under long run particularly in improving the quality of attention to the patient, reducing the duration of admission and improving the nutrition status of patients (11). Since nutrition status impacts significantly on health-related outcomes, effectiveness of medical treatments, and cost of care (12).

In hospital, admitted patients often miss multiple meals owing to being kept on "nothing by mouth" instructions for medical tests and procedures. Sometimes, there were kept on NBM due misleading instruction. Some begin to lose muscle mass at a rate of 0.5% of total body muscle mass per day, which can lead to malnourished very quickly (13). Therefore, participants still highlighted that the role of On-call dietitian should focus on 'initiation', 'adjusting', 'opmitising' feeding regime especially in follow up referral. The statement is concordance with the evidenced found by Eckert and Cahill in their CMAJ article, an effective strategy for preventing malnutrition is to involve the dietitian early, within 24 hours of hospital admission (14). Nevertheless, he or she needs to ensure respective ward in different departments obtain sufficient oral nutrition supplement beverage to feed patients. Ideally, randomly checking patients' therapeutic diet is considered essential from the conversation of participants. Study found inaccurate of meals provided to patients on in a tertiary public hospital can be as high as 25-52% (15).

So far, there were no studies to define 'urgent referral' in scope of dietitians. A latest study carried out to identify predictors and different medical conditions for dietitian referrals in Austrian hospital settings (16). Results indicated that involvement of dietitian urgently needs to be improved. In fact, there were no significant predictors rather than malnutrition to indicate dietitian referral in this study. Therefore, this FDs provided a good insight that patient experienced with diarrhea, electrolyte imbalance, intubating, sepsis, cardiogenic shock, or uncontrolled diabetes could be the predictors for the attention of On-call dietitian.

To handle urgent referral, nearly all participants agreed 24-Hour passive On-call were a better option rather than 4-Hour On-call program held during one of the weekends. Besides, 'easily contactable' was another term emphasised by 3 participants in the FGDs. However, these suggestions could be most likely the participants aware the number of On-call dietitian was merely one man how. Unlike On-call studies from UK hospital pharmacy services, allied health considered medicines advice is an integral part of the pharmacy on-call service (17). Nearly 80% of them provided training prior being on-call with existing standards for documentation of medicines advice.

Similarly, to the above discussion, participants attributed that broadcasting the 4-Hour On-call services is the immediate action that need to be taken. As the impact of such program could hardly be alert if there was no promotion being carried out. Besides, leaving phone number of in-charged On-call dietitians as respective ward is essential. This service is utterly critically to be arranged or

might consider to be extending during long public holiday as Malaysia is multiracial country. In spite participants realized there is one On-called dietitian on duty, up to this point, inspection of therapeutic diet served in ward can't be overlooked. Author suggested a random spot checking can be held to ward where there are referrals need to be handled at that time.

FGs conducted revealed that other professions support the idea of 24-Hour On-call rather 4-Hour due to beneficial of patient's outcome and better work flow and communication. However, resident dietitian involved in this program attributed that those she might be overload with work load. She mentioned that it creates negative impacts herself and her family life. While on-call work scheduling may not come with human costs, On-call employees must plan their lives and the lives of their families around a call schedule. Previous study concluded workers who extend their duty in late afternoon and evening shifts has been related to increased stress for both workers and their families (2). It is thus not surprising that researchers have found that on-call work patterns can have a major influence on employees' lifestyles and their interactions with family members and friends (18). However, the health effects of on-call work, where workers are called to work either between regular hours or during set on-call periods has not merited as much attention.

Another challenge needs to be addressed is the unclear objectives and the lack of complete standard of procedures at the present. Dietitian participants echoed there was lack of such complete documentation. Therefore, the immeasurable work quality does not highlight the impact of service but aggravate existing outcome of work quality. Worst, other allied health that works close with us might be affected as well. These often oblige employee's willingness to restrict their on-call activities.

The current body of literature on nurses' nutritional knowledge regarding therapeutic diet regimens revealed that most of them had limited knowledge about low-cholesterol diets and sources of water-soluble fiber, fatty acids and the specific food items (19). The study addressed that there is an urgent need to update the contents of nutrition education for nurses. This FDs explicit similar context where nurses and medical officer participants suggested that they might 'not good in calorie counting' and 'insufficient knowledge of therapeutic diet indication'.

However, HCPs have reported being inadequately equipped, in terms of knowledge and resources, to manage malnutrition due to lack of nutritional training (20). Studies reported time constraints have been noted as barriers. These finding was coherence to our finding whereby non-dietetic participants in this FGs reported there were lack of knowledge in oral nutrition supplement. Limited evidence indicated the impact on patients' outcome, however, the inappropriate ONS usage should be resolved or avoided at all cost.

An observational study published in 2016 demonstrated therapeutic meals of 67 patients occurred 19.9% of errors out of total 347 meals. A large proportion of these errors were critical (64.8%) (21). These data illustrated participants in FDs high lighten the critical of checking therapeutic meals at the point of ward level. Participant also agreed the checking process required a certain level of diet knowledge. Thus, dietitian or food service dietitian is the best candidate to ensure prescription of these diets able to adequately meet their nutritional requirements.

Drugs can interact with nutritional compounds, and their pharmacokinetics can be affected by a patient's nutritional status (22). These effects can be clinically positive or negative and vary in significance. Senior staff nurse and medical doctor in this FGs sound affirmative where they were confidence that most nurses and medical officers aware of this interaction significantly affect patients' outcome.

In conclusion, this study has provided a commentary on the dietitian on-call service and an in-depth look at what an on-call service can provide based on the real life experience in a Johor government tertiary hospital. It has found that the participants expressed positive comments about the 4-hour on-call weekend cover. However, to look into much more representative result, a multi-centered qualitative research is necessity to address the role of On-call dietitian.

In order to enhance the quality of on-call service, author would like highlight a few criteria. Firstly, it was necessary to considered developing competence guideline of on-call duties under national allied health act. Under the proposed bill, it should assist in determining scope of practice of on-call dietitian and establish systems to ensure no-one practices outside his/her scope of practice. Secondly, On-call referral should be developed. These were largely due to inappropriate referrals. Dietitian should not expect other disciplines to have an in-depth understanding of the effectiveness of medical nutrition interventions in varying circumstances. Therefore, by developing on-call referral, it not only offers excellent opportunities to educate others on the role of on-call dietitian but achieve beneficial effect to patients suffering varying illness condition. Lastly, emergency duty protocols need to be developed. This written protocol should help provide a safe framework for basic practice, enabling on-call clinical dietitian to make clinical decisions within the scope of their own knowledge and experience. From this study, despite the majority of hospitals having a written emergency duty protocol, these offered guidance on service provision rather than guidance on patient care. This type of protocol would therefore not assist inexperienced on-call dietitians in making decisions and implementing appropriate treatments for specific conditions. Professional groups should be working to developing on-call clinical guidelines among profession of dietitian which will help them with decision making in the on-call situation.

Strengths and Limitations. Concerning single center study, the general result may not represent the actual experience in other part of Malaysia. In spite of language concordance was not achieved, the moderators are familiar with the respective communities; therefore, it has no influence to the follow up questions. Further, participants in this study contributed almost equally throughout the session due to longer and comfortable session was

allowed. Finally, the present study used qualitative design with open-ended questions to encourage discussion in the group sessions. We used this method to obtain an in-depth understanding of each individual HP's perception toward the program.

ACKNOWLEDGEMENTS

The authors would like to thank the Director General of Health Malaysia for his approval to conduct this study. We would like to acknowledge the continued support and devotion from Head of Dietetic Profession (Pn.Basmawati Baharom) and Head of Dietetic and Food Service department of Hospital Sultanah Aminah (Pn. Zarina Samsudin) for their support and advice throughout the study. Thanks to all field respondents who have participated in the study. Our sincere appreciation is extended to Pn.Fatimah Othman who facilitates the interview, our field assistant moderator: Pn. Afifah bte Rahim, Faulina bte Khamisan who assists the interview session and not to forget all the staffs in dietetic departments of Hospital Sultanah Aminah for contributing their time in assisting for the interview.

AUTHORS' CONTRIBUTION

Semi-Structured Questionnaire was developed by the members (Kong Jian Pei, Fatimah bte Othman, Norshariza Jamhuri, Basmawati Baharomfrom, Dr Hamdan Bin Mohamad, Zarina bte Samsudin, Khalizah bte Jamli, Lina bte Isnin, Siti Farrah Zaidah Mohd Yazid, Kartini Abdul Karim, Hamidah Ahmad, Rozalina bte Idris, Norafidza Ashiquin Abd Patah Muhammad Faiz Abdul Aziz, En Muhamad Arif Abdullah) of Technical Committee of Dietetic Quality and Research Bureau, Ministry of Health, Malaysia (Teknikal Biro Kualiti dan Penyelidikan Profesion Pegawai Dietetik Kementerian Kesihatan Malaysia). The corresponding investigator involved in the design of the study, analysis and interpretation of the study. Pn.Fatimah Othman involved in the data collecting, facilitating and analysing of the study. Mr.Kong Jian Pei participated in drafting, writing, and editing manuscript; Pn.Basmawati Baharom has reviewed and provided second opinion to the manuscript. All authors have involved in reviewing and approving the final version of the manuscript. All authors affirm that the content has not been published.

CONFLICT OF INTEREST

The authors declared no conflict of interest. This study was supported by Ministry of Health, Malaysia (number: NMRR-19–3818-52373).

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