



The Impact of Fellowship in Dietetics on Clinical Practice

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Abstract

Medical nutrition therapy (MNT) in pediatric cancer treatment is essential. The Nutrition Department and the International Outreach Program at St. Jude Children's Research Hospital in Memphis, TN have worked together from 2005 to 2013 to develop and implement a training program for international dietitians working with pediatric oncology patients. During that time, St. Jude hosted 15 dietitians from various countries for this 3-week-long program. The curriculum provided experience in nutrition risk screening, nutrition care process, nutrition for cancer prevention, palliative care, and exposure to nutrition support. Monthly online meetings were established through the Cure4Kids website to continue collaboration and training. Learning outcomes were developed, and the impact of the program was evaluated based on changes made by former fellows in clinical practice, research, management, and food service upon return to their country. In addition, the program was evaluated based on recognition by the medical team, professional growth/networking, and personal growth. The survey return rate was 100%: responses revealed that 80% of participants continued working in pediatric oncology, 67% participated in monthly meetings, 47% collaborated on research, 100% advanced their competency in clinical practice, 93% broadened their competency in research, 67% became increasingly competent in management, 60% implemented changes in food service, 100% were recognized for participating in the program, and 100 and 93% noted that participation in the fellowship program helped their professional and personal growth, respectively. The psychological impact of the training on healthcare providers was as important as the impact of the program on patient care.

Keywords Nutrition · Pediatric oncology · Program evaluation · Global nutrition

Introduction

The gap between the survival rates of children with cancer in high-income countries (HIC) compared to low-income countries (LIC) continues to grow [1]. While in HIC, the survival rate for pediatric cancer is above 75%; in many LIC, it is strikingly lower [2]. There are many reasons for this disparity including unavailability of essential medication [3], lack of medical doctors with advanced specialization, lack of properly trained nursing staff [4], and many others. Another significant contributor to this gap is the poor nutritional status of children before diagnosis and during treatment. Nutritional care of children with cancer requires advanced knowledge in medical nutrition therapy (MNT) and specialized clinical training.

Nutritional care includes screening for conditions affecting nutritional status, nutritional assessment, establishment of nutritional diagnosis, MNT, and education. MNT includes modification of diet, dietary supplements, appetite stimulants, enteral nutrition, and parenteral nutrition.

The education requirements of dietitians vary widely between countries. Within the United States of America (USA), in order to become a registered dietitian (RD), a student has to complete the accredited Didactic Program in Dietetics (DPD) as an undergraduate, get accepted into an accredited dietetic internship, complete a minimum of 1200 supervised practice hours, and successfully pass the Registered Dietitian Examination [5]. Opportunities for advanced education also exist ranging from Master of Science (MS) to Doctor of Philosophy (PhD) and the newly established Clinical Doctorate (DCN). Advanced certification programs are also available including Board Certified Specialist in Pediatric Nutrition and Oncology Nutrition, which are available through the Commission on Dietetic Registration (CDR), and Certified Nutrition Support Clinician, available through American Society for Parenteral and Enteral Nutrition

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(ASPEN). Educational opportunities for international dietitians vary by location. While some countries do not have any educational opportunities leading to a degree in nutrition, in other countries, nutrition or dietetics is a specialization under a nursing degree. On the other hand, some countries follow similar educational pathways to become a dietitian as those established in the USA and a college level degree in nutrition or dietetics exists, but despite this, there are still only a handful of dietitians working in this narrow field of expertise and advanced training is lacking. In many hospitals in LIC, there are no dietitians available, and nurses or medical doctors rather than dietitians provide nutrition care for pediatric oncology patients [6].

The impact of nursing education on patient outcomes has been well studied and documented [7]. Improved nursing education is associated with improved patient outcomes, including reduced mortality rates [7]. Lower nurse patient ratios are also associated with improved patient outcomes [8]. Similar studies have yet to be done regarding the impact of dietitian to patient ratio on reduced mortality rates and patient outcome and improved training of medical staff in MNT and patient outcome.

There are educational opportunities for the clinical training of medical doctors from LIC, but only a few opportunities exist for other members of the multidisciplinary team. For clinical dietitians from LIC, those opportunities are almost nonexistent. Because of this need for advanced training of clinical dietitians, the Clinical Nutrition Department (CND) and the International Outreach Program (IOP) at St. Jude Children's Research Hospital (SJCRH), Memphis, Tennessee have worked together from 2005 to 2013 to develop and implement a training program for international dietitians working in pediatric oncology. Since then, SJCRH has hosted 15 dietitians from countries like Mexico, Brazil, Czech Republic, Turkey, Russia, the UK, and Guatemala. The purpose of the program was to share information and foster cooperation between dietitians, other healthcare professionals from different countries and backgrounds, and USA-based dietitians working in pediatric oncology.

Methodology

General learning outcomes for the program were developed and included the following: (1) After participation in the program, the dietitian will be able to perform nutrition focused assessment of the pediatric oncology patient, (2) identify side effects of therapy affecting nutrition, (3) design and deliver effective nutrition intervention, and (4) recognize long-term side effects of therapy affecting nutrition and growth parameters of cancer survivals.

Dietitians interested in partaking in the fellowship were required to apply through the Cure4Kids website, and then their application was reviewed by an IOP committee and either recommended for admission or rejected. Scholarships

were available to partially or fully support airfare, lodging, and meals during the duration of the training stay. The length of the fellowship varied from 2 to 4 weeks. Fellows trained with dietitians from the Clinical Nutrition Department at SJCRH. Training included rotations in inpatient and outpatient leukemia service, inpatient and outpatient solid tumor service, and neurooncology. A rotation in hematopoietic stem cell transplant (HSCT) service was optional since most participants were from hospitals where HSCT was not performed. The food service rotation was also optional for fellows. Many dietitians working in LIC work closely with the hospital food service or work in a department where food service is combined with the clinical nutrition department. The curriculum provided experience in nutrition risk screening and all aspects of the nutrition care process, nutrition for cancer prevention and palliative care, and exposure to nutrition support. Continuation of the program after dietitians return to their home countries was accomplished via monthly meetings and involvement in the International Pediatric Oncology Nutrition Group (IPONG) on Cure4Kids (www.cure4kids.org). This provided an opportunity to discuss efforts to improve nutritional management of children with cancer in their home country and brainstorm ideas for implementing standards and processes relevant to each institution. The monthly meeting on Cure4Kids eventually became part of a newly establish group, the International Pediatric Oncology Nutrition Group (IPONG).

To evaluate the effectiveness of the program, we developed a survey which was distributed to all former participants in the program via e-mail that had a return rate of 100%. The survey contained 23 general questions and 22 outcome measure questions. The outcome measure questions were divided into six sections: clinical practice, research, management, food service, recognition by medical team, professional growth/networking, and personal growth. The style of the questions was yes/no, multiple choice, or free text. Quantitative evaluation of the survey was done using percentages. The qualitative parts (open-ended questions) were not evaluated, but selected answers are listed below each question.

Results

The results of selected general questions are described in Table 1. The results from selected outcome measure questions are listed in Table 2.

The results describing changes participating dietitians made in their clinical practice after return to their home country are described in Table 3. In addition, selected comments made by participants are as follows: "I think it improved my clinical practice by using all the updated information that SJCRH provided me with and because of that I improved daily patient dietary intervention"; "Discussion of clinical

Table 1 General questions

Question	Yes (%)	No (%)
Working in pediatric oncology at the time of participation	13 (87)	2 (13)
Working in pediatric oncology now	12 (80)	3 (20)
Was this fellowship fully financially supported by SJCRH?	10 (67)	5 (33)
Did you partially use your funds to pay for this fellowship?	4 (27)	11 (73)
Did your hospital/organization partially pay for you to participate in this fellowship?	3 (20)	12 (80)
Did you have to take vacation time to participate?	5 (33)	10 (67)
Did you take an unpaid leave from your hospital?	0 (0)	15 (100)
Did you take paid leave from your hospital?	12 (80)	3 (20)
Did you rotate in food service?	14 (93)	1 (7)
Are you participating in Cure4Kids meeting under IPONG?	10 (67)	5 (33)

cases allowed me to improve my clinical treatment”; “Offering quality care to our patients and warmth”; “This fellowship program enhanced my self-confidence about my job, changed my nutritional assessment techniques and the way I communicate with patients. The other important point I learned is respectful communication between team members. I took an example from respectful communication between rounding team members”; “The main change I made is in electronic entries and assessment of each patient”; “I started to use dietary modifications and interventions I learned in SJCHR and I started to use clinical practice guidelines as well as some nutrition support guidelines”; “After my visit in SJCRH we started to follow patients everyday through a form that contains weight, clinical exam, diet, medication etc., just like they do it in SJCRH, for in and out patients. That’s helped us a lot. We started looking at nutrition care to decide the need for neutropenic diet, changed neutropenic diet a little and the bone marrow diet, we changed some patient education. Also dietary intervention improved a lot, we use more oral supplements and enteral diet now”; “Now patients are monitored better and I have a new enthusiasm for my role as dietitian. I have gave feedback to the medical team and dietitians

working in pediatric oncology in the UK in regards to the monitoring, assessment and provision of dietary input at SJCRH. We have used the recommended requirements for TPN. I have explained to our international parents the current thinking around neutropenic dietary guidelines”; “In fact with respect to clinical practice I have found many similarities regarding patient care, nutritional and dietary requirements comparing our service with the SJCRH. The main difference is the financial resources, because here in Brazil we don’t have the necessary financial resources”; and “I could clarify doubts about the use of some specific diets or food and the nutrition management of transplant patients, I’ve got more evidence and justification for changes and decisions I make.”

Research in low-income countries is usually not a priority. Eleven participants in the fellowship during the time of the survey were already involved in research, four participants were collaborating with IPONG or SIOP, and three were interested in participating in the research but not yet involved. Participants reported: “This fellowship has allowed me to get involved in research in my hospital as well as IPONG,” “Participation in the program encouraged me to initiate research,” “I have engaged in research to improve education

Table 2 Outcome measure questions

Question	Yes (%)	No (%)	Partially (%)
Have you become more competent in your clinical practice after participation in the fellowship?	15 (100)	0 (0)	
Have you become more competent in research after participation in the fellowship?	13 (93)	1 (7)	
Are you in a management position?	5 (33)	8 (58)	2 (13)
Have you become more competent in management/leadership in your hospital after participation in the fellowship (even if you are not in a management position)?	10 (67)	5 (33)	
Have you made any changes in food service in your hospital?	9 (60)	6 (40)	
Did participation in the fellowship help to increase your recognition by the multidisciplinary team?	15 (100)	0 (0)	
Did participation in the fellowship help your professional growth?	15 (100)	0 (0)	
Did participation in the fellowship help your personal growth?	14 (93)	1 (7)	

Table 3 Changes in clinical practice, food service, professional growth, personal growth

	No. of answers
Clinical practice	
How participation in this fellowship changed your clinical practice?	
Changes or modification of patient assessment	4
Changes or modification of dietary intervention	10
Changes or modification of patient education	3
Using resources provided by SJCRH (clinical practice guidelines, diets, nutrition support guidelines, ...)	11
Food service	
What changes in food service have you made?	
Changes or modifications of diet	3
Changes or modification in food selection	4
Changes or modification in food safety	6
Changes or modifications in management of food service	3
Modification in patient menu	5
Other changes	1
Not applicable	4
Professional growth	
How participation in this fellowship helped your professional growth?	
Meeting professionals in my area of expertise	9
Professional mentoring	6
Professional guidance (being able to ask questions about management of patients to other specialist from SJCRH or from IPONG group.	4
Active involvement in professional groups such as IPONG and Nutrition PODC	6
Increase in job responsibilities in my hospital	7
Increase in salary (pay raise)	1
Coauthored or authored a publication or abstract	5
Involvement in research	8
Oral presentation in a conference	10
Other	2
Personal growth	
How has participation in this fellowship helped your personal growth?	
Increased self-worth	9
Increased motivation	11
Exposure to new culture	11
Other	1

for our patients and to analyze how our country is comparing to other countries,” “I began to feel more interested in research” “I received a ‘shot in the arm,’ I become more interested in researching things which was shown to me about studies in developing countries,” “I started to participate in IPONG meetings, got involved in research through the group and with SJCRH, got to go to conferences, presented studies made with the group, and started working on research with our own nutrition team at my hospital. I learned a lot about research on my visit to SJCRH,” and “Stimulated my interest to get involved a lot. Just need to make /find the time to do this.”

Many participants in the fellowship also reported increased involvement in management. From the 15 participants, two reported modifications in job description, six reported changes or modification in clinical or other responsibilities, and two reported increased involvement in management. Some of their answers regarding involvement in management were as follows: “I received tools for writing clinical and administrative guidelines for the department,” “I have more responsibilities now, get invited to teach more classes, have more interns to supervise, more credibility with doctors and the multidisciplinary team,” and “I have been recognized to have an

excellent opportunity to broaden my knowledge and skills set at SJCRH. My manager resigned and I have been made acting clinical lead in her absence.” The results describing changes participating dietitians made in food service after return to their home country are described in Table 3. In addition, selected free text expressing changes in food service included the following: “Unfortunately I have not been able to make improvements in the area and the food service process because we still don’t have funds to improve it the way we would like to”; “We changed our food safety guidelines”; “I think the food service is better managed in my country because we stress the importance of fresh and highly nutritious foods for patients”; “I adjusted the menu in the hospital to improve patient satisfaction”; “We improved the presentation of food”; “We made changes in orders so we don’t waste food”; “Patients now receive a more adequate menu”; “We now provide healthy food to lessen the side effects of chemotherapy”; “Now we allow patients to choose more of what they want to eat, pay more attention to arterial pressure every day to decide if they can eat high sodium food, and have included more choices on the menu. We also changed the neutropenic diet a little depending on diagnosis”; “We have implemented the neutropenic diet for patients”; and “We modified our low bacteria diet and tried to improve product acceptability and patient compliance”.

Multidisciplinary rounds are not common practice in many hospitals in low-income countries; therefore, our study involved questions regarding recognition and involvement with the multidisciplinary team. One participant answered that she/he started attending multidisciplinary rounds, eight participants reported improvement in communication with other members of the multidisciplinary team, nine participants reported improved communication with medical doctors, five reported increased acceptance by the multidisciplinary team, and seven reported increased professional respect by management. In their own words, participants reported: “After participation in the fellowship I made a presentation for the department of Pediatric Oncology about my experience in SJCRH. I proposed changes in the assessment of patients, changes in the management of Parenteral Nutrition and also proposed for Enteral Nutrition to be indicated by the dietitians,” “I experience more support in discussions of special cases from the interdisciplinary team,” “The communication with other members of the multidisciplinary team got better,” “The fellowship helped me to understand more about the role of each professional in patient care and to be more certain that we can’t work alone, we have to be a team,” and “More respect and credibility from doctors, called to teach more classes to dietitians and doctors, management recognition and respect, easier to get management to pay for conferences.”

The results describing the professional growth of dietitians after participating in the fellowship are described in Table 3. Free texts expressing changes in professional growth are as follows: “It opened a door for me to give lectures on pediatric oncology nutrition”; “The fellowship motivated me to start a

PhD program in nutrition as well as to initiate and publish research”; “Allowed me to develop many lectures on the topic of the nutritional management of patients with cancer”; “This fellowship helped me to meet professionals in my area”; “I had to leave the hospital after I came back, because my residency ended but I was recognized by all my coworkers for my commitment and courage and I received an invitation to attend a master’s program and new job”; “Become more experienced in clinical cases”; “I had the opportunity to compare the level of clinical nutrition support services in different hospitals”; “I got to meet and gain guidance from great professionals in my area of expertise, got involved in IPONG and Nutrition PODC, had an abstract sent and published with IPONG and presented orally in SIOP Hong Kong 2013 and I am now working on a paper to publish with Nutrition PODC members as well as ongoing educational research”; and “The period of the fellowship I did in SJCRH, although short, was a very worthwhile experience. In addition to knowing the practice of the nutritional service, it was possible to have access to theoretical, and clinical nutritional guidelines as well as follow lectures. Therefore, it was possible to gain knowledge and share experiences with professionals in my field.”

The results describing personal growth of dietitians after participating in the fellowship are described in Table 3. Free texts expressing changes in personal growth are as follows: “Participation in the fellowship allowed me to motivate myself to improve my daily work and to be constantly updated to keep my knowledge in pediatric oncology nutrition current”; “Gave me more confidence to participate in the multidisciplinary team in our hospital”; “Self confidence in my work, during lectures and inspiration for my future work”; “When I arrived in Mexico I felt motivated to make changes and improve the quality of my work and I want to continue learning about nutrition and childhood cancer”; “I realized that I am capable to go in search of what I want. I become more thankful for what I have”; “I am more self-assured professionally, I got very motivated to assist patients, study and do research in pediatric oncology as well as BMT. I grew a lot personally after spending 3 weeks in a different country being exposed to a new culture, this experience also improved my English significantly, especially medical terminology”; “The most wonderful experience ever in my working career. I gained so much from this experience and I can’t thank the very warm, professionals and expert team at SJCRH enough. I felt so welcome and I constantly report rave reviews to my colleagues, friends, and family as to the vast experience I gained in SJCRH in all the for mentioned ways. I still can’t believe I had the opportunity to be exposed to this incredibly brilliant fellowship. I am so grateful to the team. I grew in confidence, ability and mostly—although it’s been very busy since being back in my job due to my recent management promotion—My desire to get involved in writing articles and research. Articles and research was always an area that intimidated me—whereas

with the friendly support of the team at SJCRH I would really enjoy starting to get involved in this area”; and “By seeing how others work I was motivated to do things better in our hospital and I would like to do some type of work/project together on an international level. But I also noticed that the work dietitians are doing is quite complex and good.”

Discussion

This study is based on participant’s subjective self-assessment. To obtain more objective data, it would have been interesting to seek input from medical doctors or supervisors about the impact of the program on clinical care. Unfortunately, due to the significant time lapse, we were not able to obtain those data for this study but will include it in our future work.

This was a small program lasting only 8 years, but the impact of the program was significant. There are two areas of observed impact: impact on patient care and psychological impact.

The main purpose of the program was to prepare dietitians from LIC to improve patient care in their local hospital by providing education and resources from a HIC hospital. The biggest impact was observed in participants becoming more competent in their clinical practice and professional growth. All 15 participants (100%) become more competent and grew professionally, a vast majority (93%) also became more competent in research or initiated their involvement in research, 67% become more competent in management, and 60% of participants made changes in foodservice after their return to their country.

It was not the main purpose of the program nor was it anticipated to make psychological changes, but this impact was the most surprising and as important as the impact on patient care. Health professionals working with critically sick patients may experience “burn out syndrome.” This could be even more significant in hospitals with limited resources and in hospitals taking care of patients with catastrophic diagnosis and high mortality rates. There were three groups of psychological effects the program had: (1) motivation and improved “niceness” to patients and families, (2) improved acceptance by the interdisciplinary team and communication between team members, and (3) personal growth.

One of the signs of burn out syndrome is a lack of empathy, which can translate to being less caring and attentive to patients and their families [9–11]. As one dietitian reported, the fellowship changed her practice by “offering care to our patients and warmth,” another participant reported that the program “changed the way I communicate with patients,” and another participant reported “I received a shot in the arm.” Those changes are not necessarily changes in clinical practice but, nevertheless, significantly affect patient care, patient

satisfaction, and quality of life. This was the most surprising impact of the fellowship.

In some hospitals, due to various reasons, the communication between doctors and other team members is not ideal. Some of the reasons for this lack of communication may be the perceived or actual differences in social class, income, and education between medical doctors and other members of the multidisciplinary team, such as nurses and dietitians. Participation in this program helped participants gain the acceptance and respect of other team members, as well as helped participants (mainly dietitians) to feel more confident participating in such communication. Nine (60%) out of 15 dietitians reported that participation improved their communication with medical doctors, and eight (50%) reported that it improved their communication with other team members. Five (30%) reported increased acceptance, and seven (45%) reported increased respect by management. One dietitian reported “I learned respectful communication between team members”; another dietitian reported “I took an example from respectful communication between surrounding team members,” and “I have more credibility with doctors and the multidisciplinary team”; and another stated “(participation in fellowship) gave me more confidence to participate in a multidisciplinary team.” Improved communication between team members and increased confidence in communication was another surprising yet not anticipated impact of the fellowship.

Most of the participating dietitians have never visited nor participated in educational programs in another country. For many, it was exciting, scary, and definitely a leap of faith due to flying, being in a different environment, and language barriers. Motivation for improvement was the common motive: “Participation in the fellowship allowed me to motivate myself to improve my daily work”; “(Participation in the fellowship) changed my self-confidence about my job”; “I could clarify doubts I have more evidence and justification for changes and decisions I take”; “Stimulated my interest to get involved a lot”; and “Gave me inspiration for my future work.”

The job description and responsibilities of dietitians differ greatly between countries and hospitals. Therefore, for the clinical training to be effective, it has to be targeted to the individual needs of each dietitian. In turn, visiting dietitians can share their creativity in meeting the nutrition needs of pediatric oncology patients in LIC as well as processes and standards used in each country allowing for a more diverse education. In conclusion, international collaboration is feasible and enriches the professional and personal lives of participants from high and low-income countries. The psychological impact of the training is as important as the impact on patient care. The ultimate beneficiaries of this program are the patients and their families.

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Compliance with Ethical Standards

Conflict of Interest The author declares that she has no conflict of interest.

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