

A Pilot Study On Innovative And Interactive Nutrition Education Materials For Pediatric Cancer Patients And Their Caretakers – Development, Relevance and Application.

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Abstract: Nutrition education programs have shown positive impact on the health of children and significant changes can be attributed with parental participation. Though nutrition education is provided, there is a need to improve nutrition education materials that is innovative and interactive to bring about a positive response in children with cancer. This study is thus an approach to develop new and interactive nutrition education tools that can have a positive effect in improving knowledge about nutrition among cancer patients and their caretakers. Methods: Innovative and interactive nutrition education tools like educational video, board game, and slideshow for patients and recipe booklet, slideshow, role play skit with flashcards and group discussion protocol for caretakers with questionnaires for each tool was developed. All tools and questionnaires developed were validated for content by two practicing pediatric dietitians. The same was evaluated and rated on average based on their acceptance, relevance and application in a clinic setup by 25 pediatric dietitians in Mumbai. Response was evaluated using percentage method. Results: In the study, 92% and 100% liked tools and questionnaires respectively. The tools were found applicable in a clinic setup by 80% dietitians. Most of the dietitians rated the characteristics of the tools and questionnaires as above average (Good and Excellent). Effectiveness of the tools can be measured once tested. The development of interactive and innovative nutrition education tools to assure proper nutrition and knowledge might be helpful in bringing about healthy behavioral change in pediatric cancer patients and their caretakers. Further research to test these is thus a need of the hour to bring about a greater change and improve the health of pediatric cancer patients.

IndexTerms - Nutrition education, Pediatric cancer, Interactive communication methods.

I. INTRODUCTION

Childhood cancer comprises of 5.5% of total cancer cases in India and these numbers have increased over the past decade (Satyanarayana L, 2014). A good nutritional status helps these children cope with cancer therapy with a much better outcome (Doaldson. S, 1981). Moreover, malnutrition results in more complications, higher rates of relapse, and lower survival rates (Lange. B.J, 2005; Butturini.A.M, 2007; Reilly. J.J, 1994). Pediatric cancer patients are highly susceptible to malnutrition as they have an increased nutritional need with respect to the disease and its treatment (Han-Markey Y, 2000). At the same time, children have increased requirements of nutrients to achieve growth and neurodevelopment (Eys J. V, 1979; Rickard K.A, 1986). Thus, a proper nutritional plan is important to the overall cost, quality of life and how the treatment would respond for children with cancer (Bauer J, 2011).

Nutrition education programs have shown to have a positive impact on the health of children shown by many studies. Kim O.H. observed that when integrated health care program was implemented in elementary school students the participants showed improvement in nutrition knowledge and dietary habits along with increase in flexibility and endurance. Similarly, it was reported that when nutrition education program was implemented in primary school children, it had a positive change in serum lipid levels and also increased their health knowledge and physical activity and fitness levels. In the same study it was stated that the significant changed observed can be attributed to the parental participation in the program (Manios Y, 1999).

Nutrition intervention program also show an impact on population with chronic disease risk factors. In a Meta-analysis the effect of the National Cholesterol Education Program and dietary intervention programs on cardiovascular risk factors was evaluated. It was seen that dietary interventions significantly decreased plasma lipids and lipoprotein (Yu-Poth S, 1999). The findings of another study emphasize on the importance of health and nutrition education programs in health promotion and disease prevention among primary schools (Yannis M, 2002). Nutrition education program when given to diabetic patients showed effective results in rectifying dietary behavior problems and improving food exchange knowledge, and quality of diet, leading to an improvement in the clinical outcomes (Lim H. M, 2009).

Nutrition counseling has shown good results in regular populations. Similar results were also seen in cancer patients. In a long term follow up of a prospective randomized controlled trial in colorectal cancer reported evidence that adjuvant nutritional therapy provided in the form of nutritional counseling and education has a sustained effect on outcomes, nutritional intake and status, late radiotherapy toxicity and prognosis (Ravasco P, 2012). In another study a school based educational program was implemented to increase the awareness of breast cancer among adolescent girls. The program increased the awareness on breast cancer by 82% among the girls and also promoted intergeneration transmission of that knowledge to their female relatives (Soto-Perez-de-Celis E, 2017). In a review done on adherence-related issues in adolescents and young adults with cancer it was observed that the evidence base for adherence and strategies with cancer is lacking (Butow P, 2010). In another study nutritional issues and strategies that can benefit patients with cancer was reviewed and it was found that there is a need for early and ongoing nutrition interventions (Capra S, 2001).

These studies show the positive impact of nutrition education on health and this can be implemented for pediatric cancer patients. Though nutrition education is provided, there is a need to improve nutrition education materials that is innovative and

interactive so as to bring about a similar response in children with cancer as well. This study is thus an approach to develop new and interactive nutrition education tools that can have a positive effect in improving knowledge about nutrition among cancer patients and their caretakers.

II. METHODOLOGY

2.1 Development of Interactive Nutrition Education Tools

Nutrition education is defined as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being; nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels (Contento I.R, 2011).” Nutrition education for children should (a) Address the requirements of the children; (b) be appropriate to program goals; (c) have knowledge of what the children know and can do; (d) be culturally appropriate; (e) be taught in a way that all children can interpret and understand (Dixey R, 1999; Friel S, 1999; Perez-Rodrigo C, 1997). Studies on nutrition education for children with cancer are few and most of them state that nutrition education improves the quality of life for the patient and their family through the treatment process (Johanna D, 1986).

It also stated that there is an urgent need to implement such education programs (Adamowicz K, 2015). Owing to this, there is a need for nutrition education program for cancer patients as well their caretakers, as they are responsible for maintaining the patient's health outside the hospital/clinic setup.

The following tools were developed:

1. **For Pediatric Cancer Patients:** A Board Game (Vernacular), an Educational Video and a Slideshow Presentation.
2. **For Caretakers:** A Group Discussion Protocol (Vernacular), a Slideshow Presentation, a Recipe Booklet, and a Street Play with Flashcards.
3. **Vernacular Questionnaires:** To test efficacy, acceptance and relevance of the nutrition education materials –in English, Hindi and Marathi

2.2. Content Validation of Tools

The nutrition education materials and questionnaires developed for pediatric cancer patients and their caretakers was validated for content by two practicing pediatric dietitians in Mumbai.

2.3. Testing Relevance and Application of Tools

All the tools developed (Questionnaires and Nutrition education materials for pediatric cancer patients and their caretakers) were tested for relevance of content and application in a clinical setup by 25 pediatric dietitians practicing in Mumbai. All the tools (English) were sent to the dietitians via email along with google forms. The google forms consisted of two rating scales, one for the nutrition education materials and one for the questionnaires. A 5-point Likert scale was used for rating the characteristics of tools with scores ranging from 1-5 where 1 was Very Poor and 5 was Excellent. Characteristics like Appeal, Simple to understand, Convenient to use, and Appropriate in terms of content was rated for nutrition education materials while Simple to understand, Convenient to use and Justifiable was rated for questionnaires. All the tools were rated on an average.

2.4. Statistical Analysis

Statistical analysis was performed using mean \pm standard deviation (SD) and percentage method.

III. Results and Discussions

3.1. Development of Nutrition Education Tools

3.1.1. Board Game (For Patients)

Games including Board Games have been used India and other Countries as an improve children's attitudes and habits about food (Powers A, 2005). A number of other studies also showed that a game has an effective improvement in children's nutritional knowledge (Udipi S.A, 1993; Amaro S, 2006). An interactive, easy to understand, helping in making meaningful decisions, less time consuming and most of all engaging all participants are some of the characteristics a board game should have (Kai H, 2013). Thus, the following topics were included in the board game in order to improve knowledge about neutropenic diets in pediatric cancer patients:

1. Neutropenic diet - Benefits of following a neutropenic diet guidelines during treatment course.
2. Foods that can be eaten - Foods that are allowed to consume when following a neutropenic diet
3. Foods that should not be eaten - Foods that are restricted/avoided when following a neutropenic diet
4. Explanation and Justifications - Effect of following a neutropenic diet

Tool description:

- Keeping the topics in mind, an interactive and child friendly board game that can be played by 4-5 players with tokens and dice was developed in English, Hindi and Marathi to cater to children with language barriers as well. The Hindi translation of the board game is depicted in Figure 1.

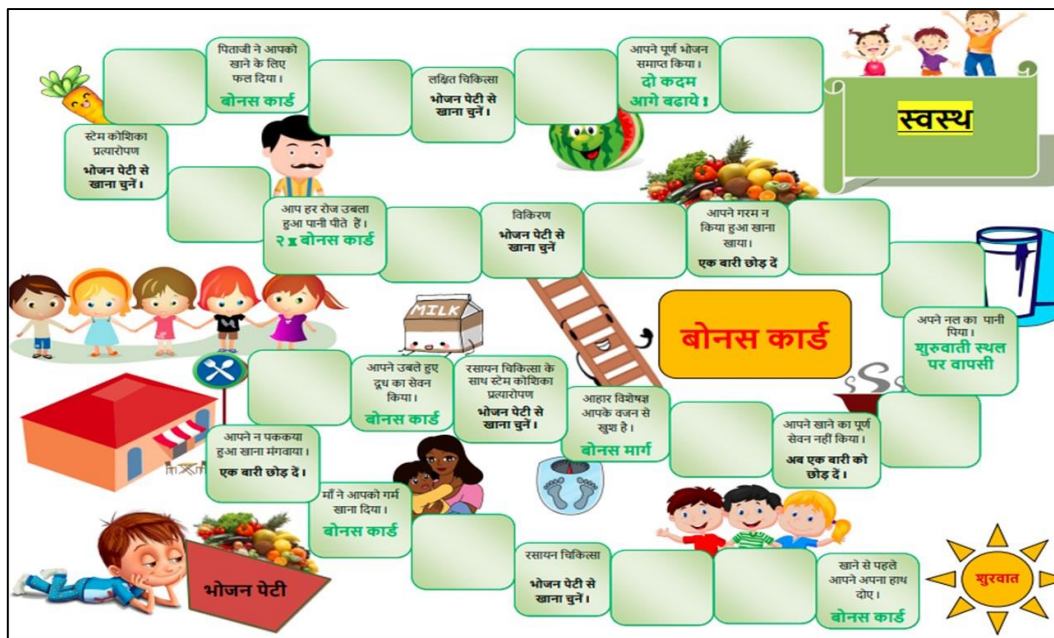


Figure 1: Board Game (Hindi)

- The board game includes different stops of treatments (Chemo-therapy/Radiation-therapy) that a patient undergoes on which they will be asked to pick up a card from Food Trunk.
- The card comprises of different foods (healthy or unhealthy) on which it will depend whether the patient can go further or skip a chance respectively to help them understand that healthy foods will aid in going through treatments while unhealthy foods might slow down the treatment and give a clear picture of which foods can be eaten/avoided while following neutropenic diet guidelines.
- The other stops on the game include different aspects of neutropenic diet. If they stop on one of the features of neutropenic diet they will get a bonus card which will determine who has won at the end of the game. This will help them understand Nutropenic diet guidelines well and the Bonus card will act as positive token on following correct guidelines.
- There is hygiene related neutropenic diet guidelines like “Drinking tap water” which will send the player to start to make patients understand that infections during the treatment course can either halt the treatment or send them back on the treatment where they started from.
- Positive words like “Recovery” were used at the end to let the patients feel that following a healthy and hygienic diet during treatment will help them move towards recovery and prevent future complications. Words that motivate play a crucial role in rehabilitation outcomes (Maclean N, 2002).

Games are known to be a good learning tool and promote learning activities in participants (Baid H, 2010; Kirikkaya E.B, 2010). In a study board game on eating healthy improved knowledge about nutrition, dietary behavior as well as BMI z-scores in children and adolescents in half a year (Viggiano A, 2015). In another study, an interactive game was shown be a useful toll in improving food variety in children with chronic food refusal (Gillis L, 2003). Though these studies were conducted on healthy children, an effect on children suffering from cancer can also be tested. Thus a board game can also prove effective in changing eating habits for pediatric cancer patients.

3.1.2. Educational Video (For Patients)

With the new era and change in technology, mass media has become one of the fastest methods to communicate knowledge among all people. Children are more familiar to the new techniques and are capable of understanding the same (Melanie A, 2010). Computer generated nutrition programs have helped improve life style of people and have helped in understanding nutrition to a next level (Johannes B, 1996). A study in the year 2012 defined 6 characteristics that help in selecting and developing videos in nutrition education. They include (1) use real scenarios; (2) provide short segments; (3) present simple, single messages; (4) convey a skill-in-action; (5) develop the videos so participants can relate to the settings; and (6) support participants' ability to conceptualize the information (Ramsay S.A, 2012). Keeping these characteristics in mind, the following topics were included in the educational video in order to improve knowledge about Food:

1. Concept of food groups - The five different food groups (Grains, Protein, Fruits, Vegetables and Dairy) were introduced.
2. My Plate concept - This includes the importance of MyPlate, introduction of the different food groups in their respected amounts in MyPlate and My Thali concept using the Indian food scenario.
3. Food Pyramid - The food pyramid and its significance were explained. Along with the food group, the concept of serving size and how one serving looks in an Indian scenario was spoken about. Each step of the food pyramid was explained. The topics covered were foods we need the most, foods we require the least, serving size of each food, which nutrient are the food rich sources of and importance of each food in making health better
4. Concept and sources of protein - The concept of protein was explained in detailed by addressing the benefits of consuming protein rich foods as well as the repercussions when they are not consumed enough. Vegetarian and Non-vegetarian sources of protein was discussed.

Tool description:

- The education video is 4-and-a-half-minute video that consists of an animated character converses with the patients and explains every concept on the video. (Figure 2)



Figure 2: Educational Video Screen

- The video shows the connection between nutrition and health and explains the patients the importance of food during treatment
- It also focuses on the complications that occur in the body if nutritious food is not consumed.

Educational videos have been shown to improve the knowledge among children about various diseases. One such study on children aged 2-5 years suffering from asthma showed increased knowledge about the disease condition and also improved their compliance and health compared to the control group when exposed to educational videos about asthma (Holzheimer, 1998).

Over the years, videos were used as a mode of education for patients in the doctor's waiting room about various health related issues, symptoms, etc. (Sirota D, 2013). But there are lacking data in accordance to use video as a mode to teach patients about nutrition while counseling. Moreover, educational videos on cancer are available over the net, but limited data is available on the effect of educational videos on cancer patients. Thus, this video may help in improving nutritional knowledge among pediatric cancer patients.

3.1.3. Slideshow presentation (For Patients)

Lectures are a traditional approach to provide nutritional education and Slideshow presentations have been used commonly used in lectures to impart the required knowledge more effectively. Studies have shown that using visual features may represent in memory with verbal information and images of visual action. Thus a slideshow presentation may help in retaining nutrition education provided to patients (Anderson D.R, 1981; Calvert S, 1982). Keeping that in mind, the following topics were included in the slideshow presentation:

1. Role of a dietitian - Explaining who a dietitian is, what are her roles in helping the patient, and difference between a doctor's role and a dietitian's role in patient care
2. Importance of interacting with the dietician - The importance of interacting with the dietitian is explained. Along with that how a dietitian can help through treatment related complications are also discussed.
3. Hygienic practices - Also includes all the correct ways of hygienic practices including the importance of being hygienic and the repercussions of not following the correct ways.

Tool description:

- The slideshow presentation was made colourful and child friendly. (Figure 3)



Figure 3: Slideshow Presentation Screen for Patients

- It mostly comprised of pictorial presentation of information with minimum texts.
- Every topic had detailed explanation.

A study with a series of lectures in groups along with slideshow presentations was done to assess the effect of cancer prevention education and adopting pro-health attitudes among students in Poland. The study showed that awareness about cancer among young was low and that they are under informed about healthy habits and behaviors. After the intervention, adolescents had a higher awareness than before. It also stated that there is an urgent need to implement such education programs (Adamowicz K, 2015). A similar effect with respect to healthy behavior and habits can be expected among pediatric cancer patients as well.

3.1.4. Group Discussion (For Caretakers)

A review concluded that group intervention reduces stress and helps patients resume their daily activities (Taylor S.E, 1988). The following topics were thus included while developing group discussion protocol:

1. Reporting the dietitians about weight changes in patients
2. Reporting the doctors and dietitians about therapy induced complications
3. Complications of treatment and how to deal with it
4. Role of dietitian
5. Benefits of physical activity

Tool description:

- A protocol was made to ask the caretakers about the complication of the treatment, whether they report it to the dietitian or doctor or both, whether they notice any weight changes in patients, whether they allow the patients to play or have any sought of physical activity and whether they know the role of a dietitian for the health and wellbeing of the patient.
- The protocol addresses each question from the questionnaire using a hypothetical case with similar situations. One hypothetical case addresses questions like who a dietitian is and what her roles are, importance of follow up, what changes occur if follow up is not followed, importance of checking weight, repercussions of weight loss and what a dietitian can do to prevent that. (Figure 4)

Scenario 1

Tina is suffering from Acute Lymphoblastic Leukemia. She is currently on chemotherapy. Tina visits the doctor with her father. The doctor checks Tina's weight and suggest them to visit the dietitian. Tina's father Mahesh is doubtful to visit the dietitian; as he thinks the dietitian will repeat the same as the doctor said. He takes Tina to the dietitian anyway, but pays very little attention to what the dietitian explains. The Dietitian asks him to bring Tina for a follow up in 10 days and also asked him to keep a weight check in a week and report the weight on the follow up.

Questions

- Do you know who a dietitian is?
- What does she do?
- Do you think it is important to visit the dietitian for a follow up?
- How often should you visit the dietitian?
- Why is a follow up required?
- If a follow up is not followed through, what changes occur?
- How often should the patient's weight be checked?
- Why is it important to check the weight?
- If there is weight loss, what effects are seen in patients?
- What can the dietitian do if there is a weight loss?

Figure 4: Group Discussion Scenario 1

- The other hypothetical case addresses questions like what are nutrition related complications, importance of knowing nutrition related complications, what a caretaker can do in such situations, how can a dietitian help, and importance of physical activity.

Scenario 2

Dev is a patient of Acute Lymphoblastic Leukemia. He has undergone radiation and chemotherapy. Dev is suffering from vomiting, his appetite is low and he is having diarrhea as well. His parents took him to the doctor. The doctor gave medication for his complication and they took Dev home. Because of his illness Dev's parents are scared to make him do his own chores.

Questions

- What did the parents miss?
- Why should they visit the dietitian as well?
- What are nutrition related complications?
- What should be done when these complications arise?
- What is the reason to know about nutrition related complications?
- How can a dietitian help in this situation?
- How can the parents or caretakers help if such situation arises?
- Is physical activity required according to you?
- What can being physically active do to the patient's health? Does it benefit?
- When is the right time for the patient to be physically active?

Figure 5: Group Discussion Scenario 2

- The answers have to come from the caretakers to know the reason and perception for their response. This way the caretakers will be able to learn and understand why and what does another parent do in similar situations and whether what they are following is right or wrong

Group discussions allow dietitians to deliver a meaningful nutrition education in ways that aid their patients to improve their eating habits. Group discussions improve patient confidence, communicating skills, thinking skills and compliance. It is thus

recommended to use group discussion in clinic setups for better results (Abusabha, 1999). Thus group counseling can be tested to evaluate effectiveness among cancer patients as well.

3.1.5. Slideshow presentation (For Caretakers)

There are some principles to be followed when making an effective PowerPoint. The content should be relevant and useful, it should include active and reflective strategies and should be able to connect to the listener's previous experience and knowledge to bring about a meaningful difference (Palis A, 2014). Thus a slideshow presentation may help in retaining nutrition education provided to caretakers. The following topics were included while developing Slideshow Presentation for caretakers:

1. Neutropenic diet - That includes neutropenic diet and its purpose, criteria of giving neutropenic diet, basic guidelines to follow, and benefits and complication of not following neutropenic diets. It further separates foods in their respected food groups that can be consumed and those that should not be consumed. Kitchen safety and guidelines to follow hygienic practices in the kitchen as well as the importance of clean food handlers and equipment are also explained.
2. Myths about cancer - The slide show addresses different common myths about cancer and helps in clearing fact from fiction

Tool description:

- The slideshow presentation was made colourful and easy to understand. (Figure 6)



Figure 6: Slideshow Presentation Screen for Caretakers

- It mostly comprised of pictorial presentation of information with minimum texts.
- Every topic had detailed explanation.

Conventional lecture using PowerPoint presentation has been used in different settings commonly as a tool for teaching. In a study where lectures were provided on nutrition knowledge, there was an increase in fruits and vegetable consumption (Ha E.J, 2009). It may thus help in improving basic knowledge about nutrition by including instructional design principles to make them more useful, significant and memorable learning experience (Palis A, 2014).

3.1.6. Recipe Booklet (For Caretakers)

In a study it was reported that when cooking demonstrations were incorporated as a part of nutrition education, it inculcated healthy eating practices and habits among individuals (Goh L. M. L, 2017). Nutrition education given to parents especially Mothers also empowers them to utilize the resources around them at the maximum and thus improve their child's health (Milkulencak M, 1999). Keeping this in mind a recipe booklet was developed based on the following recipes:

1. Nutritious street food recipes - Pizza paratha, protein rich Frankie, oats idli, mix dal masala dosa, healthy pasta, vegetable momos, pav bhaji, steamed spring roll, and veg hakka noodles.
2. Nutritious recipes with sweet flavors - Sponge cake

Tool description:

- The recipe booklet comprises of at least 10 recipes that include nutritious street food recipes and nutritious recipes with sweet flavour. (Figure 7)

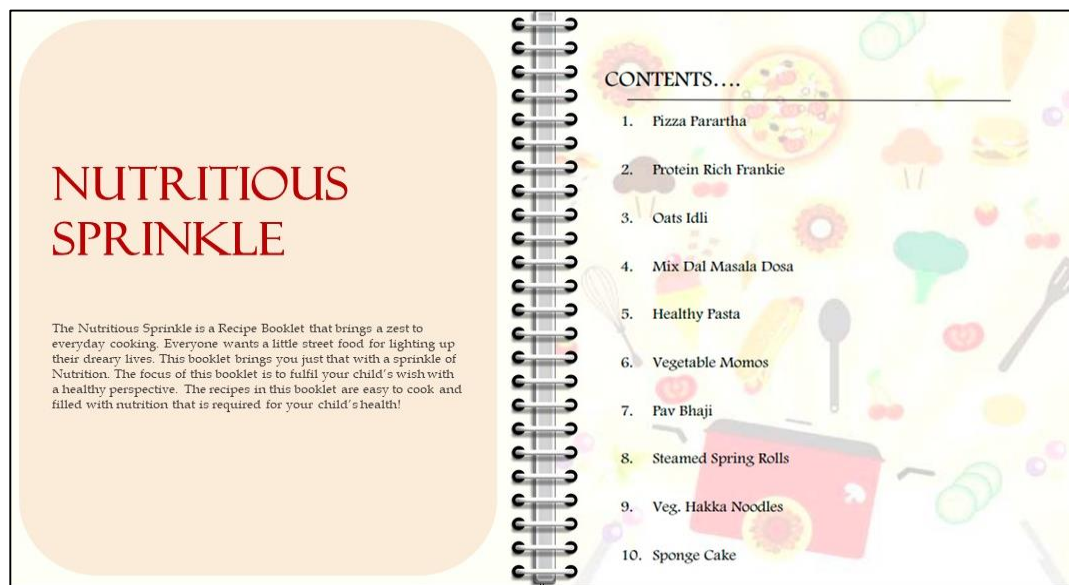


Figure 7: Recipe Booklet

- The recipes are easy to make and require less of heavy equipment and they all are children friendly.
- The recipes are modified so as to improve their nutrition value for e.g. healthy pasta is made with oats white sauce instead of the original use of Maida, the sauce for pizza paratha is made using pumpkin to add to the variety of vegetables and nutrients, protein rich Frankie uses all vegetarian sources of protein like kidney beans, cow pea and soya bean, etc. Along with healthy nutrients, healthy cooking methods are also incorporated in the recipes for e.g. vegetable momos and spring rolls are made using steaming process instead of frying.
- Demonstration of some of the recipes with the help of the caretakers using hygienic cooking methods, will aid in observing the caretakers cooking methods so as to know whether they follow hygienic practices or not.

Providing a recipe booklet will give the caretakers option of street food that they can prepare at home without the worry of their child catching an infection or falling sick. Cooking demonstration will also help in improving their knowledge of hygienic cooking methods as well as help improve their food choices.

3.1.7. Street Play (For Caretakers)

Street plays have been conducted for years as a means of communication to deliver social issues and improve awareness about public health. In a study it was stated that nutrition education programs that use a communication mix including song and street plays with repeated reinforcement, can improve the awareness about infant feeding practices (Sethi V, 2003). Keeping that in mind, the street play topic was:

1. Hygienic practices - That includes personal hygiene, kitchen hygiene, avoiding cross contamination and ways and methods to eradicate disease causing germs.

Tool description:

- A script for a street play was developed which contained a scenario explaining the importance of hygiene.
- The play revolves around a family and their interactions with the doctor, other caretakers, the dietitian and also shows practices followed at home like washing hands before and after handling food, or after using the washroom or petting an animal, separating raw and cooked foods and maintaining kitchen hygiene.
- Different aspects of catching an infection, methods to eradicate germs, how to maintain personal and kitchen hygiene and how to protect foods from being a source of infection are explained by the dietitian using Flashcards as an aid. (Figure 8)

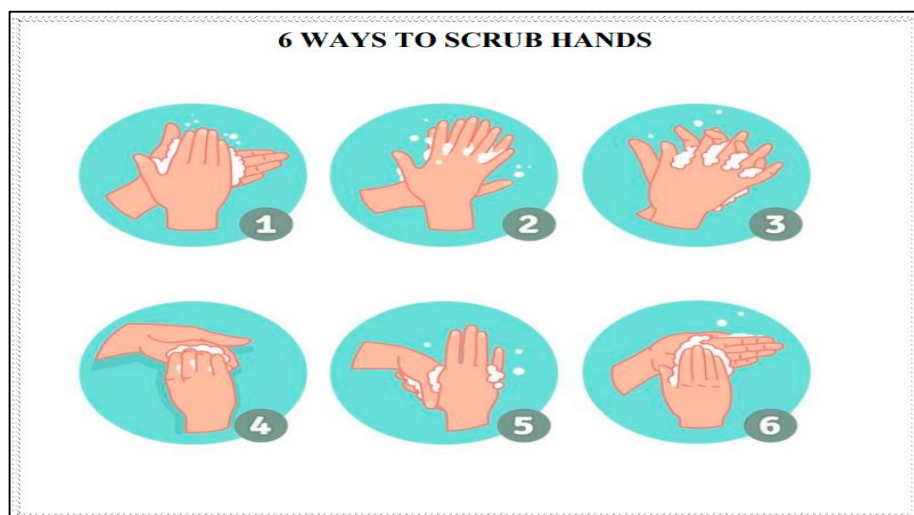


Figure 8: Flashcard on ways to wash hands

- Involvement of caretakers in the play can bring about a change in the patient's health and also becomes a mode to discuss the practices that are followed at home.

A street play involving the caretakers will help other caretakers relate to similar situations and thus improve their knowledge. Therefore, an approach towards using nutrition education tool to convey important message such as hygiene can also be tested.

3.1.8. Questionnaires

Two types of questionnaires were developed in vernacular languages (English, Hindi and Marathi) for each nutrition education material. The content of the questionnaire was on the basis of the following:

1. To Test Efficacy of the Nutrition Education Material: Questionnaire was developed to measure Knowledge, Attitude and Practices for each tool based on (to be given before and after intervention)
2. To Test the Acceptance and Relevance of the Nutrition Education Material: A smileyometer was used to rate the characteristics of the nutrition education materials for patients. A smileyometer has been used for commonly for children as it is an easy and interactive way to measure the fun and satisfaction. It is also easier for children to use as it involves no writing (Sim G, 2013). For the caretakers, a 5 point Likert scale was used to rate the characteristics of the nutrition education materials. Likert scale is one of the most crucial and commonly used tools in qualitative research (Joshi A, 2015).

3.2. Testing Nutrition Education Tools for Relevance and Application

A Google form was sent to 25 pediatric dietitians practicing in Mumbai to rate the Questionnaires and Nutrition education materials for pediatric cancer patients and their caretakers developed in English based on its relevance of content and application in a clinical setup. They were asked to evaluate the tools on an average. Since they have a first-hand experience with pediatric patients, they would be able to share their inputs whether the nutrition education tools and protocols can be used in a clinic setup and whether it would make a difference in the patient's health. A study was done to check the extent to which dietitians evaluate nutrition education materials. It was noted that dietitians evaluated the content characteristics of nutrition education materials before providing it to clients (Angela M, 2000). Thus it is important to know their acceptance. In the study, 92% dietitians accepted the nutrition education materials whereas 8% were unsure about it. All the dietitians (100%) accepted the questionnaires (Figure 9).

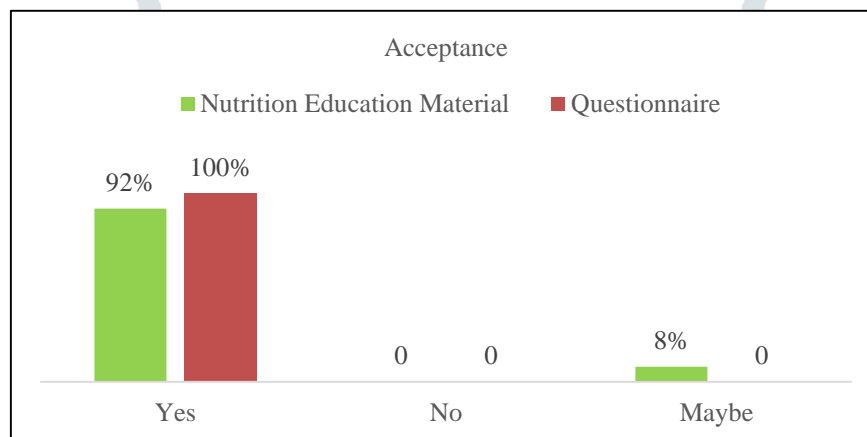


Figure 9: Acceptance of Nutrition Education Tools

The dietitians were asked whether the nutrition education materials were applicable to use in a clinical setup and were also evaluated based on characteristics like Appeal, Simple to understand, Convenient to use and Appropriate for content. These characteristics were rated on a 5 point Likert scale from 1-5 where 1 was very poor and 5 was Excellent. In the study, 80% thought the tools were applicable to use in a clinic setup whereas 20% were unsure about it (Figure 10). The characteristics Appeal (n=13), Convenient to use (n=13) and Appropriate for clinic setup (n=13) were rated as Above Average (Good and Excellent) by 52% dietitians whereas 48% rated Simple to understand (n=12) as Above Average for Nutrition education materials (Figure 11) with a mean rating of 3.6 ± 1.2 .

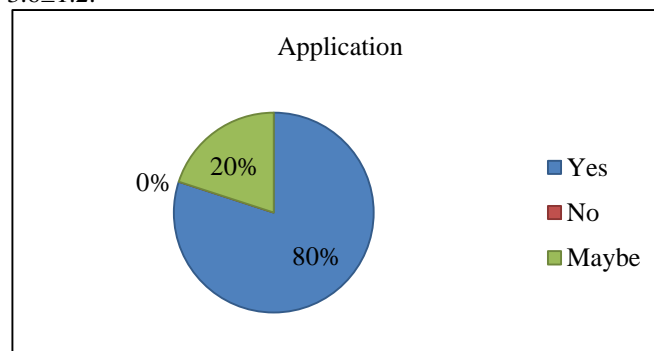


Figure 10: Applicability in clinic - Nutrition Education Material

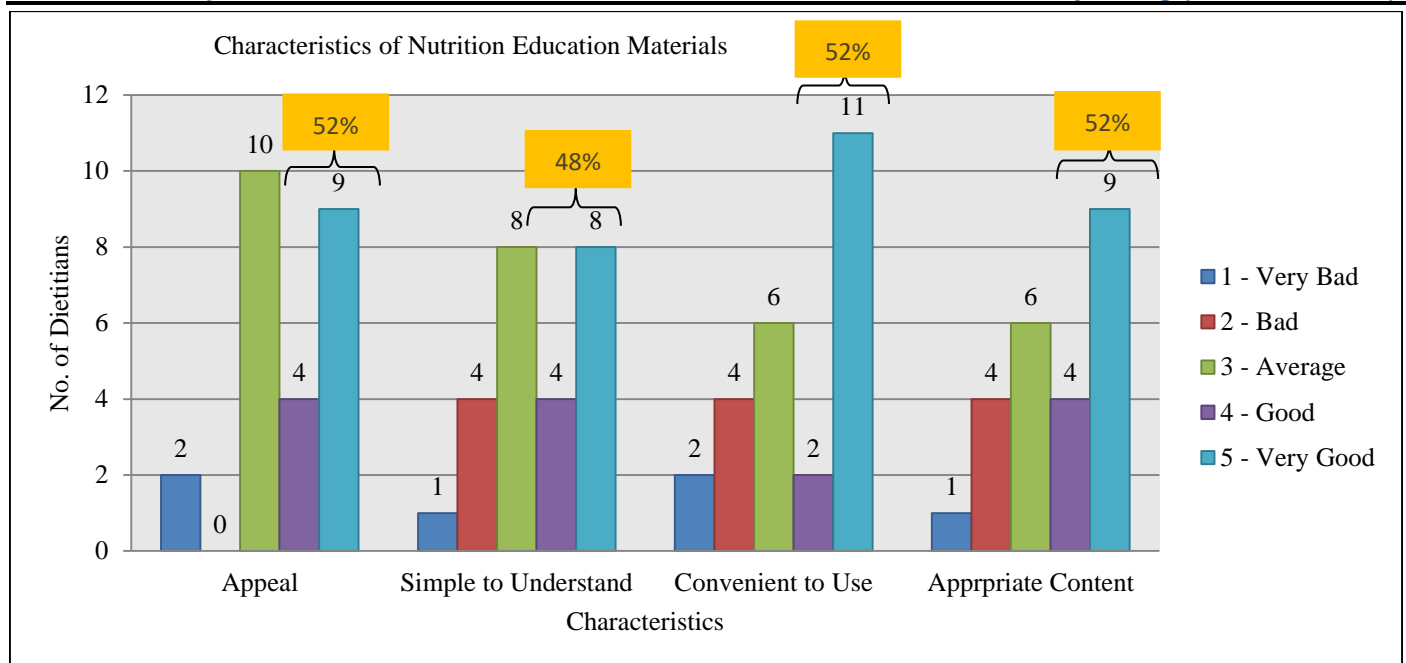


Figure 11: Characteristics of Nutrition Education Materials

The dietitians were also asked whether the content of the questionnaires are appropriate to the topics covered in the nutrition education materials. Though the questionnaires were liked by all dietitians, 92% found the questions appropriate to the topic whereas 8% were unsure (Figure 12). For the questionnaires, characteristics like Convenient to use, Simple to understand and Justifiable were asked to be rated on a 5 point Likert scale where 1 was very poor and 5 was rated as Excellent. The characteristics Convenient to use (n=14) and Simple to understand (n=14) were rated Above Average (Good and Excellent) by 56% Dietitians whereas Justifiable (n=15) was rated Above Average by 60% dietitians for questionnaires (Figure 13) with a mean rating 3.4 ± 1.4 .

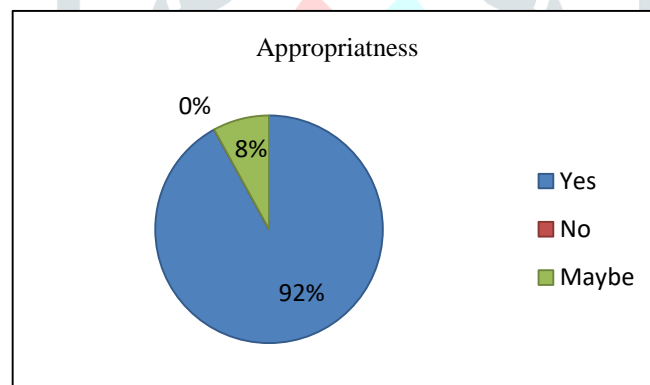


Figure 12: Appropriate to topic - Questionnaire

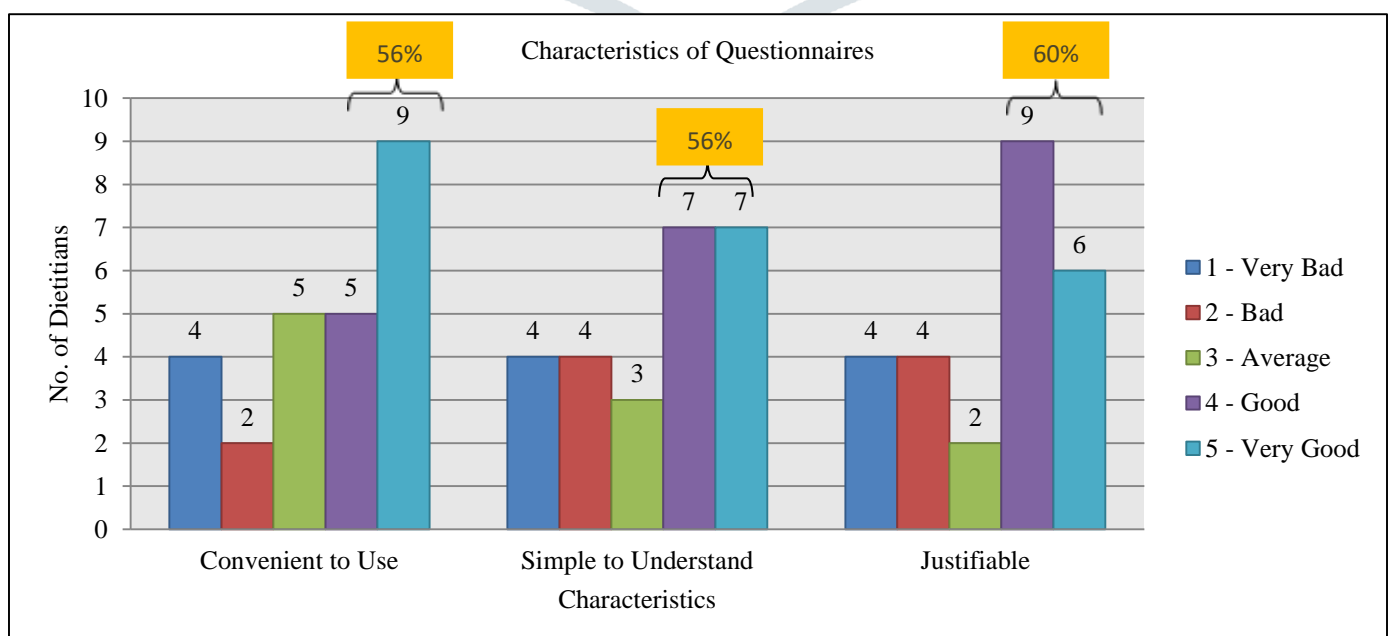


Figure 13: Characteristics of Questionnaires

IV. Conclusion

Nutrition education has been defined as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition- related behaviors conducive to health and well-being; nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels (Birch L.L, 1999).”

The tools for pediatric cancer patients included a Board Game (neutropenic diet), an Educational Video (food groups, my pyramid, my plate, concept and sources of protein) and a Slideshow Presentation (hygienic practices, role of a dietitian and importance of interacting with the dietitian). The tools for caretakers of pediatric cancer patients included a Slideshow Presentation (neutropenic diet and its purpose and myths about cancer), a Recipe Booklet with recipe demonstration (nutritious street food recipes and nutritious recipes with sweet flavor), a Street Play with Flashcards (hygienic practices), and a Group Discussion Protocol (reporting the dietitian of weight changes and treatment related complications, how to deal with complications, role of dietitian and benefits of physical activity). Questionnaires for each tool to check its efficacy, relevance for content and application in a clinical setup were also developed and converted in local languages (Hindi and Marathi). All the tools were validated by 2 trained and practicing pediatric dietitians.

All the tools and questionnaires developed were then sent to 25 practicing pediatric dietitians. They were asked to rate the tools and questionnaire via Google forms. From the responses it was seen that, dietitians liked the tools (92%) and questionnaire (100%), whereas 80% and 100% found the tools and questionnaire appropriate respectively. Most of the dietitians rated the characteristics of the tools and questionnaire excellent. Effectiveness of the tools can be measured once tested. Overall they appreciated the effort and found the work promising.

In summary, Nutrition education is more about bringing out a behavioral change than just spreading knowledge to be effective. The aim of the study, to develop interactive and innovative nutrition education protocol and tools to assure proper nutrition and knowledge might be helpful in bringing about a healthy behavioral change in pediatric cancer patients as well as their caretakers. As a positive response was achieved in this pilot study, further research with a larger sample size developed in vernacular languages should be tested for efficacy with patients and their caretakers. Efficient, innovative and interactive nutrition communication mediums is thus a need of the hour so as to bring about a greater change and improve the health of pediatric cancer patients. Similarly, nutrition education materials that caters to pediatric and adult patients with any other conditions can also be worked on.

V. Acknowledgement

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