Improving Oncology Nurses' Navigator Core Competencies Toward Caring for Children with Cancer

Fatma Ismael Mohammed [1], Hanan Nabawy Elaasar [2], Maha Elsayed Elaraby[3]

[1] Lecturer of Pediatric Nursing, Faculty of Nursing, Benha University, Egypt.

[2]Assistant Professor of Pediatric Nursing, Faculty of Nursing, Benha University, Egypt.

[3]Lecturer of Pediatric Nursing, Faculty of Nursing, Tanta University, Egypt.

Corresponding author: Fatma Ismael Mohammed

Email: fatema.ismael@fnur.bu.edu.eg

Abstract

Background: The navigator nurses were established to aid children with cancer by utilizing their practical experience and abilities to deliver patient-centered care, addressing physical, social, and emotional needs. They oversee the entire treatment process, empowering children, offering information and support and bridging the gap between children and health care team. **The aim** of this study was to improve oncology nurses' navigation core competencies toward caring for children with cancer. **Subjects and Method: Design**: A quasi-experimental design was used. **Subjects:** All available children and nurses who are working at oncology units of Benha Specialized pediatric in Benha City. **Tools: Tool (I):** A structured interview sheet, **Tool (II)**: Oncology nurses' navigator core competency scale, **Tool (III):** Medical data of the studied pediatric oncology &Pediatric oncology patient's satisfaction. **Results:** It was found that the vast majority of the studied nurses had an incompetent level of navigation core competencies at the pre- navigation implementation which improved to majority of them had a competent level of navigation competency post- and follow-up navigation implementation. **Conclusion:** The present study findings showed that navigation program has positive effect on nurses' navigation core competencies toward caring for children with cancer. **Recommendations:** Refreshing courses pre-service and in- services navigation programs to enhance nurses' navigation core competencies level toward caring for children with cancer.

Keywords: Caring, Children, Core Competencies, Navigator Nurses, Oncology.

Introduction

Worldwide, more than 400,000 children between the ages of one and nineteen year are diagnosed with cancer each year. Globally, there is a tendency for the incidence of childhood cancer to raise .With early diagnosis and treatment, cancer is a highly curable disease. The primary obstacle is early diagnosis because many cancers in this age have early symptoms that resemble those of more prevalent pediatric illnesses and typically entail a brief latency period and rapid growth. Child diagnosed with cancer has an impact on family and leading to unpleasant and burdensome lifestyle adjustments. There is a strong correlation between childhood cancer and the family impact domains **(World Health Organization, 2021)**.

In developing nations, where access to cancer therapies is limited leads to high mortality rates and almost two thirds of all cancer deaths occur (**Pautasso et al., 2020)**.

Globally, children affected by cancer are a top priority when it comes to cancer. Providing complex care regimens in hospital and community settings calls for a variety of specialized knowledge, abilities and expertise in caring for children with cancer **(Drury et al., 2023**). It is crucial to understand that providing care for children with cancer is a highly specialized area of nursing practice that demands education, training, and high competency levels (**Challinor et al., 2020)**.

Implementing policies for cancer management, such as those pertaining to prevention, early detection, diagnosis, treatment, quality of life, and survival of cancer care, is aided by oncology nurse navigators (ONN). Nurse navigator's role is critical to enhancing children's physical Health. Oncology nursing society defines ONN as a professional registered nurse with oncology-specific clinical knowledge who offers individualized assistance to oncology children and their families to help overcome healthcare system barriers **(Chan et al., 2023)**.

Oncology nurse navigator supplies children and their parents with guidance and resources to take educated decisions and get prompt access to high-quality medical and psychological treatment at every stage of the cancer spectrum **(Oncology Nursing Society, 2024)**. Building compassionate and reliable relationships with cancer children and their parents by making the first phone calls before their clinic visits, giving them access to resources right away, and concentrating on removing barriers to communication between them and their healthcare providers about their physical health **(Newton et al., 2022)**.

Oncology nurse navigator plays a pivotal and often varied role in meeting the needs of children affected by cancer **(Drury, 2023)**. They help children's, families, and caregiver make decisions with the treatment's interdisciplinary team **(Oncology Nursing Society, 2021)**. They monitor the process of treatment, give children a sense of power and provide them with knowledge, assistance and link children with team professionals.

Children receive an education and navigator services improve their confidence, skills, and self-awareness. Also children feel empowered to interact more positively with healthcare professionals because they are more conscious, involved, and accountable **(Budde et al., 2022)**.

The Oncology Nursing Society's recommendations serve as the foundation for the ONN's core competencies. The categories of competencies that are essential for carrying out the ONN duty effectively grow in accordance with the experience of the nurse. The competencies are: Education: provide support and education about cancer diagnosis and treatment side effects and their management; Coordination of Care: starts with identifying the children's unmet needs by determining their potential barriers to care; Communication: through developing trusting relationships with the children and their family; and Professional Role: encourages the use of evidence-based nursing practice to improve the quality of care provided and outcomes **(Reed & Rua, 2020)**.

Significance of the study:

The estimated crude national incidence rates of childhood cancer in Egypt for children ages 0 to 15 years were 132.9 for both sexes, 143.4 for boys, and 122.1 for females per one million children **(Zaky et al., 2022)**.

Oncology children and caregivers faced many obstacles to get timely and effective therapy. These obstacles include insufficient experience in the medical field, inadequate health insurance and trouble completing everyday duties like traveling to treatment and taking time off work **(Dalton et al., 2019)**. Implementation of navigation program improves cancer children's treatment adherence and wellness, also improve quality of cancer care and increase children and care giver satisfaction with cancer care and health outcomes. The oncology nurses navigator provides physical, social and emotional care to their children, also examines children needs and design a plan to overcome barriers to maintain high-quality care **(Sharpe & Scheid, 2018)**. Therefore, the aim of the present study was to improve oncology nurses' navigator core competencies toward caring for children with cancer.

The aim of the study was to:

Improve oncology nurses' navigator core competencies toward caring for children with cancer

Research Hypothesis:

Navigation programs have positive effects on nurses' navigation core competencies toward caring for children with cancer, which will influence pediatric oncology patients and their caregivers' satisfaction receiving cancer care.

Subjects and Method

Research design:

A quasi-experimental design was used.

Setting:

This study was conducted in oncology units of Benha Specialized Pediatric Hospital which is affiliated to Secretarist of Specialized Medical Centers in Benha City it located on the fourth floor of medical building and consists of three rooms each room have three beds and one room for isolation.

Subjects:

All available nurses are 40 who are working at previously mentioned settings regardless of their characteristics and willing to participate in the study and 40 children suffering from cancer.

Tools of data collection:

Three tools were used as the following:

Tool (I) A structured interview sheet

It was designed by researchers in the light of current relevant studies and research based on **Rodrigues et al., (2021); Mcfarland, (2020)** to assess oncology nurses characteristics and knowledge. It was written in an Arabic language and composed of two main parts:

Part (I): Characteristic of the studied nurses: age, gender, educational level, years of experience in oncology units and attendance of training courses related to navigator core competencies.

Part (II): Oncology nurses' knowledge assessment questionnaire It was developed by the researchers based on **Mcfarland, (2020**) to assess oncology nurses' knowledge about navigation core competencies, it included definition of navigation, importance of oncology nurse navigator, benefits of navigation for healthcare organizations, benefits of navigation for oncology children, different types of navigation, differences between case management and navigation, navigation core competency, end of life care, role of the oncology nurse navigator and challenges in applying navigation. The tool composed of (6) multiple choice questions and (4) open ended questions.

Total scoring system:

The studied nurses' answers were compared with a model key answer, where scored as; complete correct answer had score (2), incomplete correct answer had score (1) and unknown or wrong answer had score (0). Total knowledge scores ranged from (0 - 20) point. In this respect the level of nurses' knowledge was categorized as poor knowledge (< 60%) was ranged from (0 > 12) points, average knowledge (60 % to < 80%) was ranged from 12 > 16 points and good knowledge (≥80 %) was ranged from 16 - 20 points.

Tool (II): Oncology nurses' navigator core competency scale

Oncology nurses' navigation core competency scale adapted from **Baileys et al., (2018)** and modified by the researchers to suit the nature of the study to assess oncology nurses' navigation core competencies. It included 27 steps grouped under four main competencies as coordination of care (8 steps), communication (5 steps), heath education about cancer and chemotherapy education (11 steps), and professional role (3 steps)

Total scoring system:

The studied oncology nurses' practice was compared with observational checklist, where scored as; complete done had score (2), incomplete done had score (1) and not done had score (0). Total competencies scores ranged from (0 - 54) point. In this respect the level of nurses' competencies was categorized as incompetent level (< 80%) was ranged from (0 > 43) points

and competent level (≥80 %) was ranged from 43 ≥ 54 points.

Tool (III): Medical data of the studied pediatric oncology &Pediatric oncology patient's satisfaction.

It consists of three parts:

Part (I): Characteristic and medical data of the studied pediatric oncology patients; age, residence, educational level and type of cancer and type of treatment modalities.

Part (II): Pediatric oncology patients and care giver satisfaction with cancer care scale

Pediatric oncology patients and care giver satisfaction with cancer care scale was based on **Pierre et al., (2012)** and modified to assess pediatric oncology patients and care giver satisfaction with cancer care. It includes 17 statements.

Total scoring system:

The studied oncology children and care giver ' response were compared using five point Likert scale ranged from (1-5) as; (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly agree. So, the level of satisfaction with cancer care was categorized as low satisfaction (< 70%) was < 59 point, and high satisfaction (≥70 %) was 59 point.

Part (III): Pediatric oncology patients and care giver satisfaction with the interpersonal relationship with the oncology nurse navigator

Pediatric oncology patients and care giver satisfaction with the interpersonal relationship with the oncology nurse navigator was adapted from **Pierre et al., (2012)** It includes 9 statement as the following; the child feel oncology nurse navigator is ; friendly, pays attention to child issues , honest , accessible to child, shows concern for child well-being, treats child with respect and kindness, allows child sufficient time , identifies the critical problems with child medical care and makes child feel relaxed.

Total scoring system:

The studied oncology children and care giver ' response were compared using five point Likert scale ranged from (1-5) as; (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly agree. So, the level of satisfaction with cancer care was categorized as poor satisfaction with the interpersonal relationship (< 70%) was < 31.5 point, and good satisfaction with the interpersonal relationship (≥70 %) was ≥ 31.5 point.

Methods

The study was conducted through the performing the subsequent steps:

Formal permission:

Official approval was granted by the Dean of the Faculty of Nursing at Benha University, as well as hospital directors and the head of the oncology units at the Specialized Pediatric Hospital in Benha city. Clarification was provided on the study's nature and significance of study to facilitate smooth implementation with limited obstacles.

Ethical and legal considerations

The researchers received permission from the Scientific Research Ethical Committee at Benha university faculty of nursing code REC-PN-P 55 on 2 June 2024 and from the directors of the oncology unit at Benha specialized pediatric hospital. Before collecting data, the written consent

from nurses and pediatric oncology patients, with their caregivers, was obtained for the study. Nurses and children with their caregivers were given an overview of the study's goals and expected results. Furthermore, oncology nurses and children with their caregivers were given assurance about the safety of the study. Following the presentation of the research's nature and objectives, every nurse, child, and their caregiver had the option to withdraw from the study at any point. Furthermore, all subjects involved in the study were guaranteed that their data would remain private, confidential, and safe.

Developing study tools:

The researchers collect data using three tools

Content validity:

The validity of the tools was evaluated by a panel consisting of three experts, two professors in pediatric nursing from faculty of nursing Benha University and one professor from faculty of nursing, pediatric nursing department, Tanta University. The purpose of the evaluation was to evaluate the content validity of the instruments as well as their level of clarity, comprehensiveness, relevance, simplicity, and correctness. All of their comments were taken into consideration. To arrive at the final version of the tools, several of the elements under consideration underwent rephrasing. According to the opinions of the knowledgeable professors, the tools were reliable.

Reliability of the study tools:

Toward the reliability of the study tools, the researchers used Cronbach's coefficient alpha to evaluate the internal consistency of each component of the tools. This came out to be 0.85 for the oncology nurses' knowledge assessment questionnaire. The reliability of the oncology nurses' navigator core competency scale was found to have a value of 0.76, pediatric oncology patients and care giver satisfaction with cancer care scale has a reliability of 0.88, pediatric oncology patients and care giver satisfaction with the interpersonal relationship with the oncology nurse navigator was found to have a value of 0.93.

Pilot study:

A preliminary study was carried out to assess the clarity and usability of the research instruments and to gauge the time required for each instrument. The present study included (4) pediatric oncology patients and (4) oncology nurses, which accounted for 10% of the total subjects. Based on analysis of the pilot study, minor changes were made by rephrasing certain steps and creating the final version. This period spanned ten days starting in 3 June and ending in 12 June 2024.

Field of Work:

The navigation program was conducted with the aim of the current research through stages of assessment, planning, implementation and evaluation from 13 June 2024 to 14 November 2024, spanning a five-month and two weeks period.

Assessment phase

Assessment stage required conducting interviews with oncology nurses for gathering initial data. The researchers were present every week for four days on rotation between researchers: Saturday, Monday, Tuesday, and

Thursday, from 11.00 AM until 1.30 PM, the researchers greeted every nurse, outlined the study's purpose, duration, and activities, and obtained written consent. Researchers gathered information from the medical records of pediatric oncology patients, spending approximately 10 minutes on each child's data collection. The researchers provided the nurses being studied with a questionnaire to evaluate their knowledge, which required 15 minutes to complete. Every nurse was individually monitored while performing tasks to evaluate their level of competencies, with duration of 30 minutes.

Planning phase

After analyzing the initial data from the assessment stage and conducting a thorough review of existing literature, the researchers created the navigation program. The program was customized to match the comprehension level of oncology nurses in basic Arabic. Different teaching techniques were employed, including lecture, brainstorming, demonstration, re-demonstration, and group discussion. Various teaching materials such as handouts, audio-visual aids and role play were used to help oncology nurses grasp the content effectively.

Implementation phase

At the onset of the navigation program sessions, a clarification regarding the purpose of the program was provided. The participating nurses were split into 8 groups, with each group consisting of 5 nurses. The program lasted 6 hours for each group and was conducted based on the nurses' readiness.

Figure.1 navigator nurse care model

Baileys, K., McMullen, L., Lubejko, B., Christensen, D., Haylock, P. J., Rose, T., Sellers, J., Srdanovic, D. (2018). Nurse navigator core competencies. Clinical Journal of Oncology Nursing, 22(3), 272–281. Available at: https://doi.org/http://dx.doi.org.

It was structured as follows: (2) sessions for the theoretical part, lasting 30-40 minutes each, and (4) sessions for the practical part, lasting 40-50 minutes each. The sessions were held 4 days per week during the morning shift, with rotation among researchers.

The theoretical part of the program covered various topics. **The first session** included the definition of navigation, the importance of oncology nurse navigators, and the benefits of navigation for healthcare organizations and oncology children. It also discussed different types of navigation and the differences between case management and navigation. The second session focused on navigation core competencies, end-of-life care, the

role of oncology nurse navigators, and challenges in implementing navigation.

The practical part focused on the application of oncology nurses' navigator core competencies. **The first session** covered coordination of care competency, **the second session** covered communication competency, **the third session** covered health education about cancer and chemotherapy education competency, and **the fourth session** covered professional role competency.

Evaluation phase

Evaluation of the navigation program was done using the pre-constructed tools to measure the changes in knowledge and navigation competencies of oncology nurses as follows: immediately after the navigation program (immediate post-test), and after one month later (follow-up test), and contact with oncology nurses by phone for any instruction throughout the one month. Level of pediatric oncology patient and caregiver satisfaction with cancer care and level of pediatric oncology patient and caregiver satisfaction with the interpersonal relationship with the oncology nurse navigator were evaluated after implementation of the navigation program.

Statistical Design

The data collected was organized, tabulated, and statistically analyzed using Statistical Package for Social Science (SPSS) version 21 for Windows, running on an IBM compatible computer. Data were presented using descriptive statistics in the form of numbers and percentages for qualitative variables, and mean and standard deviation for quantitative variables. Qualitative variables were compared using Chi-square test. Whenever the expected values were less than 5, Fisher exact test was used instead. Quantitative variables were compared using paired sample t test. Pearson correlation analysis was done for assessment of the interrelationship among quantitative variables. Statistical significance was considered at p-value < 0.05 and a highly statistical significance was considered at $p < 0.001$.

Results

Figure (1): In relation to educational level of oncology nurses, less than two-thirds (62.5%) of nurses had technical institute of nursing.

Nurses' knowledge regarding navigation was illustrated in **table (1)**. It was evident that the majority of nurses (90.0%) had wrong answers /or don't know regarding navigation core competency pre navigation program. This percentage increased to the majority (92.5% and 85%) of nurses giving complete correct answers post the navigation program and during the follow-up respectively. Furthermore, there was a very noticeable statistical difference ($p < 0.000$) supporting the implementation of post and follow-up.

Figure (2): was clarified that the majority (90%) of the studied nurses had a poor level of knowledge at pre-navigation program implementation. This improved to 87.5% and 82.5%, respectively, of them had a good level of knowledge post- and follow-up navigation program implementation.

Toward nurses' navigation competency of care coordination, **table (2)**, was showed that less than half (40.0%) of

nurses do not evaluate the needs of children during the first meeting and regularly in the pre-navigation program. This percentage increased to the majority (87.5% and 82.5%) of them done complete evaluations of children's needs during the first meeting and regularly post the navigation program, as well as during follow-up respectively. Furthermore, there was a very noticeable statistical difference (p <0.000) supporting the implementation of post- and follow-up navigation programs.

Regarding nurses' navigation communication competency, **table (3)**, was demonstrated that more than half (60.0%) of nurses did incompletely offering emotional support for children and caregivers during times of emotional stress and anxiety in the pre-navigation program. This percentage increased to the majority (85% and 80%) of them offering complete emotional support for children and caregivers during times of emotional stress and anxiety post the navigation program, as well as during follow-up respectively. Furthermore, there was a very noticeable statistical difference (p <0.000) supporting the implementation of post- and follow-up navigation programs.

Table (4) was outline that less than two-thirds (62.5%) of nurses providing in complete education about chemotherapy in the pre-navigation program. This percentage increased to the majority (95% and 87.5%) of them providing complete education about chemotherapy post the navigation program, as well as during follow-up respectively. Furthermore, there was a very noticeable statistical difference (p < 0.000) supporting the implementation of post- and follow-up navigation programs.

Toward nurses' navigation competency of professional role, **table (5)** was clarified that the majority (90%) of nurses do not play a part in advancing the oncology nurse navigator program and shaping its role through development, implementation, and evaluation in both healthcare settings and the community in the pre-navigation program. This percentage increased to the majority (87.5% and 82.5%) of them completing playing a part in advancing the oncology nurse navigator program and shaping its role through development, implementation, and evaluation in both healthcare settings and the community post the navigation program, as well as during follow-up, respectively. Furthermore, there was a very noticeable statistical difference (p < 0.000) supporting the implementation of post- and follow-up navigation programs.

Figure (3): Nurses' total navigation competency level, It was explained that the vast majority (97.5%) of the studied nurses had an incompetent level of navigation competency at the pre-navigation program implementation. This improved to 92.5% and 85% of them had a competent level of navigation competency post- and follow-up navigation program implementation, respectively.

Figure (4): was clarified majority (80%) of the studied pediatric oncology patients were from rural area.

Table (6): It was noticed that the mean score of the studied pediatric oncology patients and caregivers' satisfaction with cancer care in the pre-navigation

implementation was 45.60±10.95, which improved to be 74.40±8.64 and 71.80±7.52 post the navigation, as well as during follow-up, respectively. Furthermore, there was a very noticeable statistical difference ($p < 0.000$) supporting the implementation of post- and follow-up navigation.

Figure (5): was demonstrated that more than three-quarters (77.5%) of the studied pediatric oncology patients and their caregivers had a low satisfaction level with cancer care at the pre-navigation program implementation. This improved to 92.5% and 90% of them had a high satisfaction level with cancer care post- and follow-up navigation program implementation, respectively.

Table (7): was showed that the mean score of the studied pediatric oncology patients and caregivers' satisfaction with the interpersonal relationship with the oncology nurse navigator in the pre-navigation program implementation was 25.52±3.77, which improved to be 40.05±4.73 and 38.62±4.06 post the navigation program, as well as during follow-up, respectively. Furthermore, there was a very noticeable statistical difference ($p < 0.000$) supporting the implementation of post- and follow-up navigation programs.

Figure (6): was mentioned that more than three-quarters (80%) of the studied pediatric oncology patients and their caregivers had a poor satisfaction level with interpersonal relationship with the oncology nurse navigator at the pre-navigation program implementation. This improved to 85% and 77.5% of them had a good satisfaction level with interpersonal relationship with the oncology nurse navigator post- and follow-up navigation program implementation, respectively.

Table (8): was reflected that there was statistical significant positive correlation between studied nurses' total knowledge, total navigation competencies and pediatric oncology patient and care giver satisfaction with cancer care score pre, post and follow-up navigation program implementation ($P <0.000$).

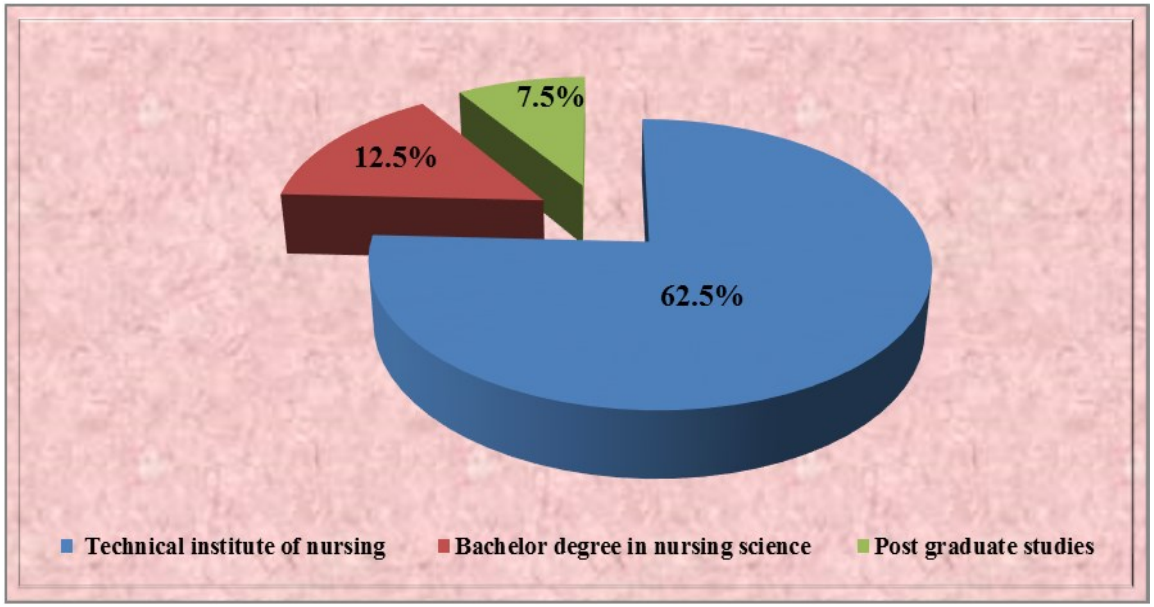

Figure (1): Distribution of studied oncology nurses' according to educational level (n =40)

Table (1): Distribution of studied nurses' knowledge regarding navigation pre, immediate post and follow-up navigation program implementation (n =40

Items	Pre navigation program						Immediate post navigation program				X^2 FET	P value	Follow-up navigation program				X^2 FET	P value
	Complete correct answers		Incomplete correct answers		Wrong answers /or don't know		Complete correct Answers		Incomplete correct answers				Complete correct answers		Incomplete correct answers			
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%		
Definition of oncology navigation	2	5.0	12	30.0	26	65.0	33	82.5	7	17.5	54.77	0.000**	30	75.0	10	25.0	50.68	0.000**
Importance of oncology nurse navigator	3	7.5	7	17.5	30	75.0	31	77.5	9	22.5	53.30	0.000**	29	72.5	11	27.5	52.01	0.000**
Benefits of navigation for healthcare organizations	1	2.5	8	20.0	31	77.5	33	82.5	7	17.5	61.18	0.000**	31	77.5	9	22.5	59.18	0.000**
Benefits of navigation for oncology children	2	5.0	7	17.5	31	77.5	33	82.5	7	17.5	58.45	0.000**	30	75.0	10	25.0	56.02	0.000**
Different types of navigation	1	2.5	3	7.5	36	90.0	34	85.0	6	15.0	68.11	0.000**	31	**77.5**	9	22.5	67.12	0.000**
Differences between case management and navigation	0	0.0	5	12.5	35	87.5	34	85.0	6	15.0	69.09	0.000**	32	80.0	8	20.0	67.69	0.000**
Navigation core competency	0	0.0	4	10.0	36	**90.0**	37	**92.5**	3	7.5	73.14	0.000**	34	**85.0**	6	15.0	70.40	0.000**
End of life care	1	2.5	15	37.5	24	60.0	36	90.0	4	10.0	63.47	0.000**	32	80.0	8	20.0	55.25	0.000**
Role of the oncology nurse navigator	1	2.5	17	42.5	22	55.0	32	80.0	8	20.0	54.36	0.000**	29	72.5	11	27.5	49.41	0.000**
Challenges in applying navigation	1	2.5	25	62.5	14	35.0	37	92.5	3	7.5	65.39	0.000**	34	85.0	6	15.0	56.75	0.000**

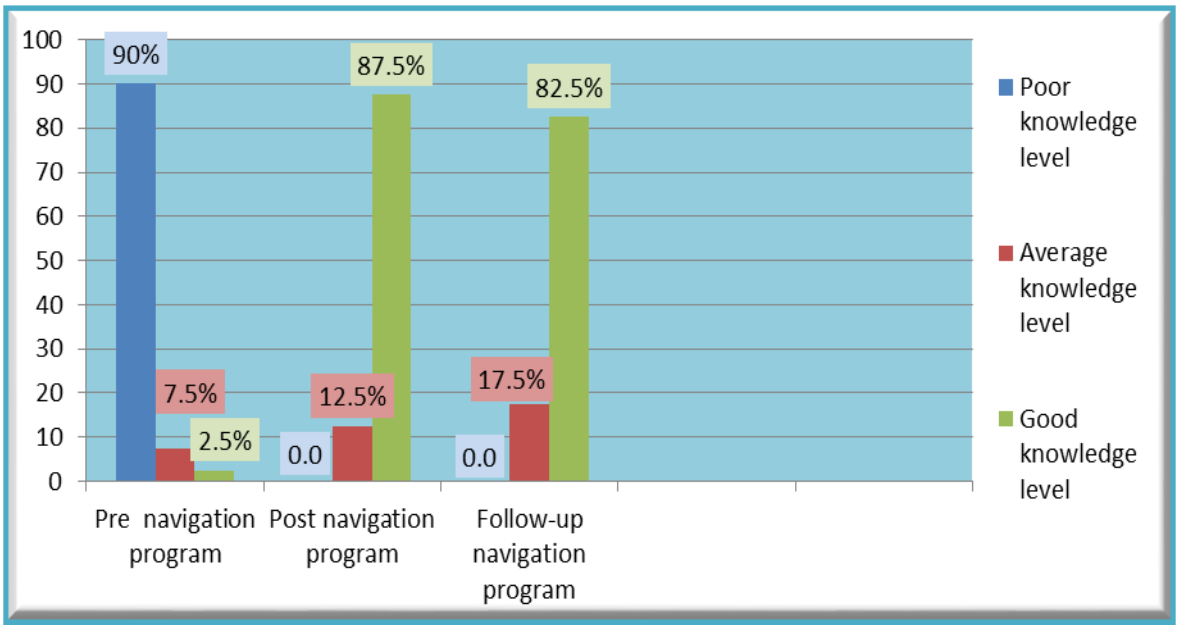

Figure (2): Distribution of total level of studied nurses' knowledge regarding navigation pre, immediate post and follow-up navigation program implementation (n =40)

Table (2): Distribution of studied nurses' navigation competency 1: coordination of care pre, immediate post and follow-up navigation program implementation (n =40)

Items	Pre navigation program						Immediate post navigation program				X^2 FET	P value	Follow-up navigation program				X^2 FET	P value
	Complete done		Incomplete done		Not done		Complete done		Incomplete done				Complete done		Incomplete done			
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%		
Evaluate the needs of children during the first meeting and regularly	3	7.5	21	52.5	16	40.0	35	87.5	5	12.5	52.79	**0.000****	**33**	**82.5**	**7**	**17.5**	**48.00**	**0.000****
Recognizes possible obstacles to treatment and helps with referrals.	1	2.5	22	55.0	17	42.5	34	85.0	6	15.0	57.25	**0.000****	**32**	**80.0**	**8**	**20.0**	**52.65**	**0.000****
Helps to schedule tests, and procedures promptly to ensure smooth care continuity	5	12.5	21	52.5	14	35.0	37	92.5	3	7.5	51.88	**0.000****	**35**	**87.5**	**5**	**12.5**	**46.34**	**0.000****
Involves in coordinating the care plan with the inter-professional team.	2	5.0	23	57.5	15	37.5	35	87.5	5	12.5	56.00	**0.000****	**33**	**82.5**	**7**	**17.5**	**50.99**	**0.000****
Encourages the child and care giver prompt adherence to cancer treatment	4	10.0	22	55.0	14	35.0	36	90.0	4	10.0	52.06	**0.000****	**34**	**85.0**	**6**	**15.0**	**46.82**	**0.000****
Supports personalized care based on child health status, cultural, health literacy, psychosocial, and spiritual needs for children and caregivers	5	12.5	24	60.0	11	27.5	38	95.0	2	5.0	54.94	**0.000****	**35**	**87.5**	**5**	**12.5**	**45.94**	**0.000****
Helps children move smoothly through treatment journey	4	10.0	22	55.0	14	35.0	33	82.5	7	17.5	44.48	**0.000****	**31**	**77.5**	**9**	**22.5**	**40.28**	**0.000****
Ensures documentation of children encounters and provided services	6	15.0	25	62.5	9	22.5	38	95.0	2	5.0	51.86	**0.000****	**35**	**87.5**	**5**	**12.5**	**42.84**	**0.000****

Table (3): Distribution of studied nurses' navigation competency 2: communication pre, immediate post and follow-up navigation program implementation (n =40)

Items	Pre navigation program						Immediate post navigation program				X^2 FET	P value	Follow-up navigation program				X^2 FET	P value
	Complete done		Incomplete done		Not done		Complete done		Incomplete done				Complete done		Incomplete done			
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%		
Establishes therapeutic relationship with children and caregivers by employing effective communication and listening abilities.	7	17.5	18	45.0	15	37.5	37	92.5	3	7.5	46.16	0.000**	33	82.5	7	17.5	36.74	0.000**
Serves as a bridge between children, caregivers, and cancer management team to improve child health status	2	5.0	20	50.0	18	45.0	31	77.5	9	22.5	47.65	0.000**	29	72.5	11	27.5	44.12	0.000**
Offers emotional support for children and caregivers during times of emotional stress and anxiety.	5	12.5	24	**60.0**	11	27.5	34	**85.0**	6	15.0	43.36	0.000**	32	**80.0**	8	20.0	38.70	0.000**
Enables children and care giver to advocate for themselves and express their needs	3	7.5	22	55.0	15	37.5	35	87.5	5	12.5	52.65	0.000**	33	82.5	7	17.5	47.75	0.000**
Makes sure communication is culturally appropriate and matches the identified health literacy level	9	22.5	20	50.0	11	27.5	37	92.5	3	7.5	40.60	0.000**	34	85.0	6	15.0	33.07	0.000**

Table (4): Distribution of studied nurses' navigation competency 3: heath education about cancer and chemotherapy education pre, immediate post and follow-up navigation program implementation (n =40)

Items	Pre navigation program						Immediate post navigation program				X^2 FET	P value	Follow-up navigation program				X^2 FET	P value
	Complete done		Incomplete done		Not done		Complete done		Incomplete done				Complete done		Incomplete done			
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%		
Evaluates the educational requirements of children and caregivers	2	5.0	13	32.5	25	62.5	37	92.5	3	7.5	62.66	0.000**	34	85.0	6	15.0	56.02	0.000**
Provides health education for children, and caregivers about the nature of cancer and diagnosis	3	7.5	18	45.0	19	47.5	35	87.5	5	12.5	53.29	0.000**	31	77.5	9	22.5	45.05	0.000**
Provide education about treatment choices of cancer	3	7.5	23	57.5	14	35.0	36	90.0	4	10.0	55.29	0.000**	34	85.0	6	15.0	49.93	0.000**
Provide education about chemotherapy	4	10.0	25	**62.5**	11	27.5	38	**95.0**	2	5.0	58.11	0.000**	35	**87.5**	5	12.5	48.97	0.000**
Provide education about common side effect of cancer treatment (e.g., nausea and vomiting, fatigue, dry mouth, hair lose, stomatitis, and anemia)	7	17.5	21	52.5	12	30.0	38	95.0	2	5.0	49.05	0.000**	36	90.0	4	10.0	43.11	0.000**
Provide education about management of	5	12.5	24	60.0	11	27.5	38	95.0	2	5.0	54.94	0.000**	34	85.0	6	15.0	43.36	0.000**

common side effect																		
Instructs children and caregivers about the responsibilities of the oncology nurse navigator	5	12.5	25	62.5	10	25.0	37	92.5	3	7.5	51.66	0.000**	35	87.5	5	12.5	45.83	0.000**
Teaches and emphasizes the importance of children and caregivers sticking to treatment schedules and follow-up appointments.	6	15.0	23	57.5	11	27.5	34	85.0	6	15.0	40.56	0.000**	31	77.5	9	22.5	34.01	0.000**
Encourages positive lifestyle and practices self-care	6	15.0	25	62.5	9	22.5	36	90.0	4	10.0	45.63	0.000**	33	82.5	7	17.5	37.81	0.000**
Offers advice and sets realistic expectations to help children and care giver deal with a cancer	3	7.5	26	65.0	11	27.5	35	87.5	5	12.5	52.17	0.000**	33	82.5	7	17.5	46.93	0.000**
Creates educational Arabic booklet and brochures about cancer for children and caregiver	4	10.0	25	62.5	11	27.5	36	90.0	4	10.0	51.80	0.000**	34	85.0	6	15.0	46.32	0.000**

Table (5): Distribution of studied nurses' navigation competency 4: professional role pre, immediate post and follow-up navigation program implementation (n =40)

Items	Pre navigation program						Immediate post navigation program				X^2 FET	P value	Follow-up navigation program				X^2 FET	P value
	Complete done		Incomplete done		Not done		Complete done		Incomplete done				Complete done		Incomplete done			
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%		
Maintains continuous learning and using evidence-based practice to improve quality of nursing care provided to children with cancer.	2	5.0	23	57.5	15	37.5	33	82.5	7	17.5	50.99	0.000**	30	75.0	10	25.0	44.62	0.000**
Plays a part in advancing the oncology nurse navigator program and shaping its role through development, implementation, and evaluation in both healthcare settings and the community	0	0.0	4	10.0	36	**90.0**	35	**87.5**	5	12.5	71.11	0.000**	33	**82.5**	7	17.5	69.81	0.000**
Works with the hospital administration to record and assess results of the navigation program	0	0.0	0	0.0	40	100.0	34	85.0	6	15.0	80.00	0.000**	32	80.0	8	20.0	80.00	0.000**

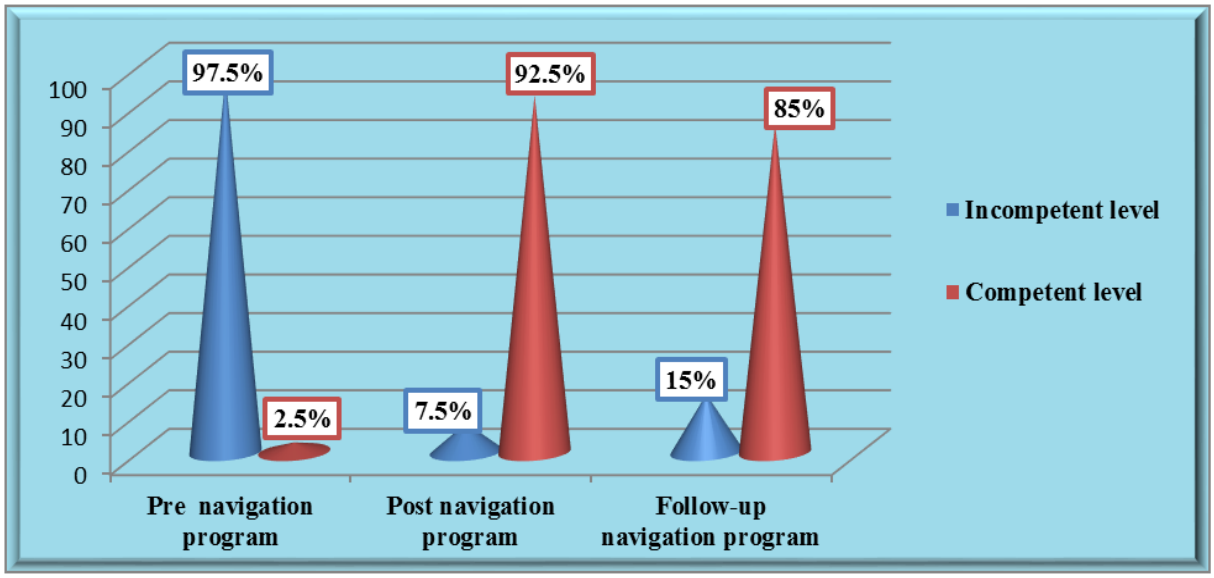

Figure (3): Distribution of studied nurses' total navigation competency level pre, immediate post and follow-up navigation program implementation (n =40)

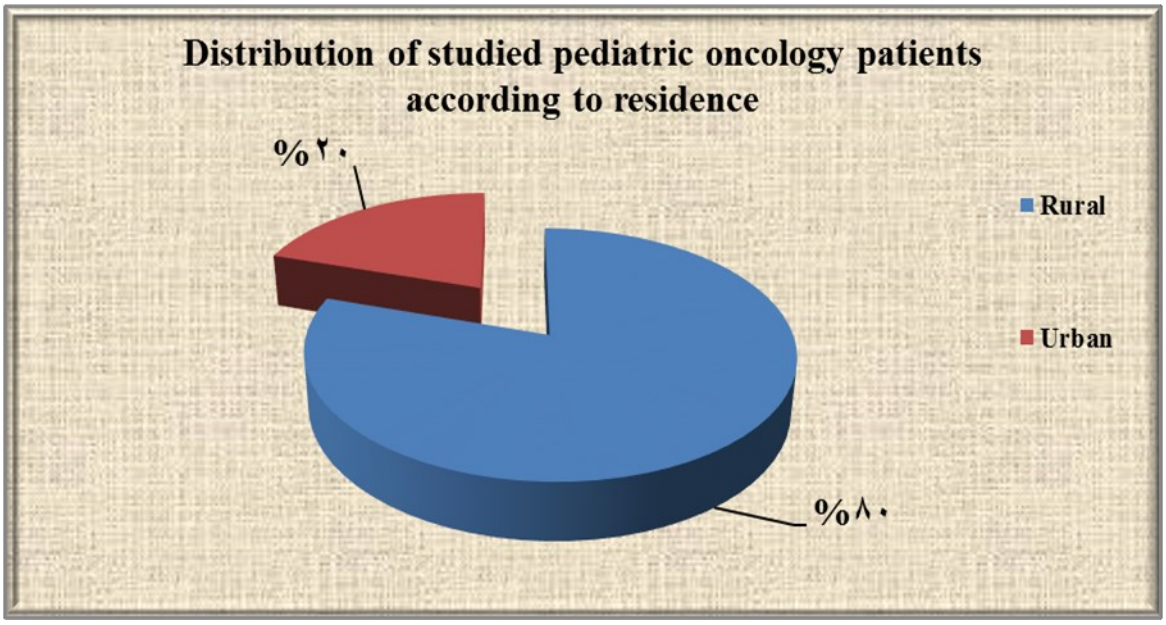

Figure (4): Distribution of studied pediatric oncology patients according to residence (n =40)

Table (6): Mean scores of the studied pediatric oncology patient and care giver satisfaction with cancer care pre, immediate post and follow-up navigation program implementation (n =40)

Items	Pre navigation program	Immediate post navigation program	Paired t test	P value	Follow-up navigation program	Paired t test	P value
	Mean ± SD	Mean ± SD			Mean ± SD		
I thought my worries about my health were acknowledged.	2.80±1.11	4.20±.853	11.89	0.000**	4.02±.973	11.10	0.000**
I thought I received kind and respectful care.	2.70±.992	4.22±.861	16.11	0.000**	4.10±.928	11.89	0.000**
I felt involved in choices regarding my treatment	2.72±.993	4.27±.846	16.76	0.000**	4.15±.863	13.74	0.000**
I was instructed on self-care	2.52±.816	4.15±.802	20.96	0.000**	4.02±.733	18.73	0.000**
I felt inspired to discuss my private health issues.	2.27±.905	4.05±.875	17.01	0.000**	3.80±.911	10.65	0.000**
I thought I had sufficient time with the nurse and doctor	2.45±.904	4.12±.882	22.33	0.000**	3.95±.782	18.73	0.000**
I was satisfied with the responses to my inquiries	2.67±.572	4.42±.500	25.23	0.000**	4.12±.515	14.36	0.000**
I was aware of what would come next in my care	2.55±.677	4.32±.655	26.54	0.000**	4.17±.594	20.96	0.000**
I'm confident in my ability to deal with the cancer management team	2.70±.709	4.35±.622	14.18	0.000**	4.20±.563	12.63	0.000**
I was able to receive the necessary guidance on my medical concerns	2.95±.388	4.67±.474	19.68	0.000**	4.50±.506	16.42	0.000**
I was aware of who to ask questions	2.75±.742	4.55±.530	17.55	0.000**	4.37±.540	13.88	0.000**
I got all the assistance I required.	2.82±.594	4.62±.490	20.18	0.000**	4.47±.505	16.77	0.000**
I felt satisfied with the cancer care I got	2.77±.530	4.45±.503	20.15	0.000**	4.30±.464	17.40	0.000**
My treatment appeared to be well-communicated by the oncology nurse and doctors	2.70±.563	4.32±.655	20.96	0.000**	4.12±.563	18.00	0.000**
My cancer management team provided me with excellent medical care.	2.78±.520	4.70±.464	17.54	0.000**	4.37±.704	10.59	0.000**
I got excellent nursing care.	2.67±.764	4.47±.598	17.55	0.000**	4.20±.607	12.30	0.000**
My cancer management team informed me about the results of the tests I got.	2.76±.532	4.43±.678	17.69	0.000**	4.05±.749	9.88	0.000**
Total	**45.60±10.95**	**74.40±8.64**	24.92	0.000**	**71.80±7.52**	21.15	0.000**

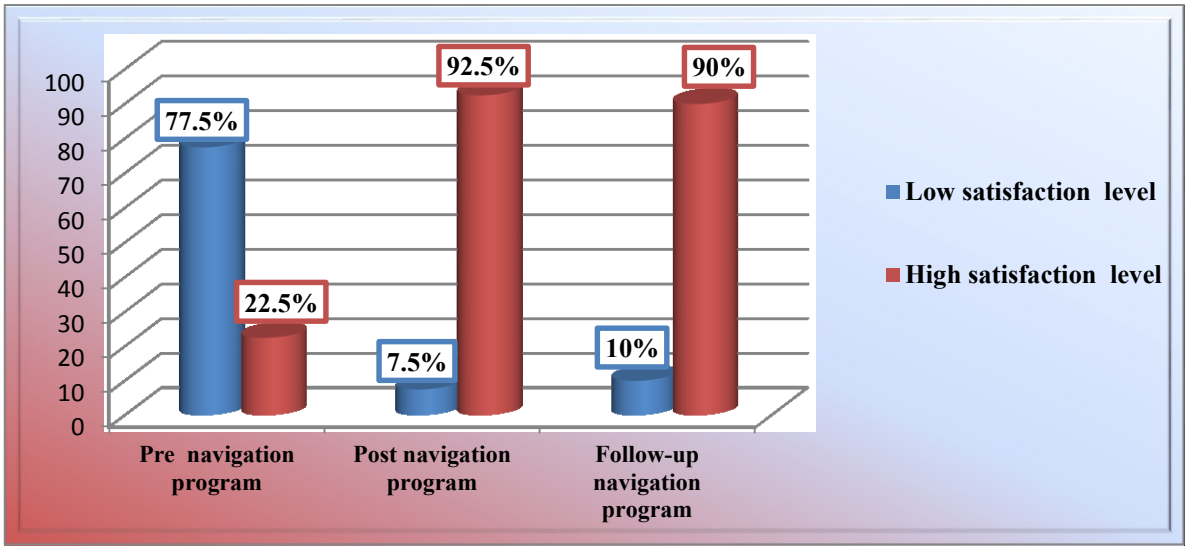

Figure (5): Distribution of the studied pediatric oncology patient and care giver satisfaction with cancer care pre, immediate post and follow-up navigation program implementation (n =40)

Table (7): Mean scores of studied pediatric oncology patient and care giver satisfaction with the interpersonal relationship with the oncology nurse navigator pre, immediate post and follow-up navigation program implementation (n =40)

Pediatric oncology patient and care giver feel oncology nurse navigator is:	Pre navigation program	Immediate post navigation program	Paired t test	P value	Follow-up navigation program	Paired t test	P value
	Mean ± SD	Mean ± SD			Mean ± SD		
Friendly	2.85±.483	4.47±.678	19.03	0.000**	4.20±.882	13.72	0.000**
Pays attention to their issues	2.82±.500	4.50±.506	22.33	0.000**	4.30±.723	15.58	0.000**
Honest	3.12±.404	4.80±.464	18.51	0.000**	4.45±.749	10.96	0.000**
Accessible to child	3.02±.530	4.43±.687	14.36	0.000**	4.25±.630	13.43	0.000**
Shows concern for their well-being	2.72±.554	4.27±.640	19.45	0.000**	4.02±.479	17.71	0.000**
Treats child with respect and kindness	2.84±.483	4.40±.590	18.54	0.000**	4.17±.500	17.66	0.000**
Allows child sufficient time	2.62±.554	4.48±.632	20.15	0.000**	4.07±.474	14.73	0.000**
Identifies the critical problems with child medical care	2.52±.846	4.30±.723	23.40	0.000**	4.20±.516	15.94	0.000**
Makes child feel relaxed	2.32±.736	4.20±.624	20.42	0.000**	4.02±.576	15.83	0.000**
Total	**25.52±3.77**	**40.05±4.73**	24.78	0.000**	**38.62±4.06**	21.83	0.000**

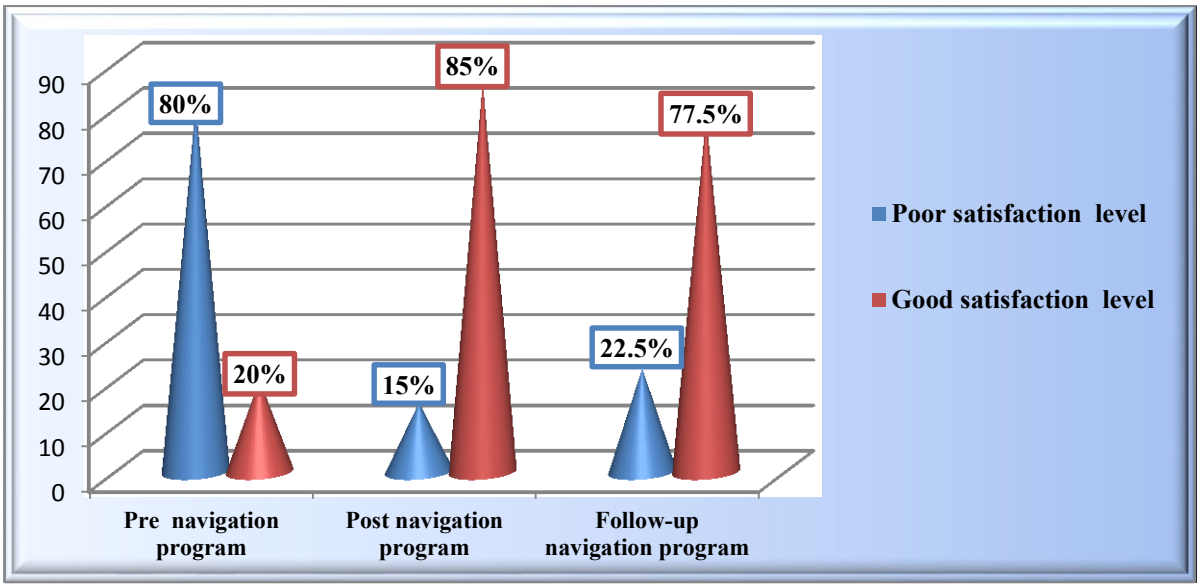

Figure (6): Distribution of studied pediatric oncology patient and care giver satisfaction with the interpersonal relationship with the oncology nurse navigator pre, immediate post and follow-up navigation program implementation (n =40)

Table (8): Correlation between studied nurses' total knowledge, total navigation competencies and pediatric oncology patient and care giver satisfaction with cancer care score pre, immediate post and follow-up navigation program implementation

Total scores	Pearson correlation coefficient					
	Navigation competencies score pre program		Navigation competencies score immediate post program		Navigation competencies score follow-up program	
	r	P-value	r	P-value	R	P-value
Knowledge score	0.762	0.000**	0.856	0.000**	0.748	0.000**
Pediatric oncology patient and care giver satisfaction with cancer score	0.887	0.000**	0.815	0.000**	0.742	0.000**

** Correlation is significant at the 0.01 level (2- tailed).

Discussion

In healthcare field, navigation is defined as "locating the path." It acts as a tool to guide a range of health activities, including preventing cancer, diagnosing & screening, treating, and providing end-of-life care. The objective of navigation is to reduce cancer morbidity and mortality by removing barriers in healthcare service access, communication, and transportation, including psychosocial, financial and cultural obstacles, and guaranteeing prompt access to cancer treatment **(Çınar, 2022)**. This research was conducted to improve oncology nurses' navigator core competencies toward caring for children with cancer.

Regarding the educational level of oncology nurses, less than two-thirds of nurses had technical institute of nursing, this finding disagree with study done by **Radwan et al., (2022)** who implement training program for nurses in the provision of palliative care for children with cancer in an advanced stage and found that, less than two thirds of the studied nurses had nursing diploma. This might be related to different study setting.

Toward oncology nurses knowledge regarding navigation, it was evident that the majority of the studied nurses had a poor level of knowledge at pre-program implementation. This may be occurring because the concept of navigation is not common among oncology nurses and there is no specific training program regarding navigation. Lack of oncology nurse' navigation knowledge was in agreement with a study conducted by **Salem, A. (2020)** who assesses competency level of critical care nurses regarding early detection and interpretation of potentially fatal dysrhythmia and found that, majority of nurses had a significantly poor level of knowledge.

In relation to total level of oncology nurses' navigation knowledge at immediate post and follow up-navigation program implementation, the research result showed that, majority of them had a good level of knowledge immediate post- and follow-up navigation program implementation. This finding supported by **Abd El-Salaheen, et al., (2022)** who study effectiveness of a nurse education program on chemotherapy extravasation prevention and management and reported that, there is a statistically significant difference between pre and post program where satisfied knowledge increased significantly from minority prior to program implementation to majority after program implementation. This improved might be attributed to effect of educational program and using different and attractive educational methods and material.

Toward nurses' navigation competency of care coordination, the present study was showed that less than half of nurses do not evaluate the needs of children during the first meeting and regularly in the pre-navigation program. This percentage increased to the majority of them done complete evaluations of children's needs during the first meeting and regularly post the

navigation program, as well as during follow-up respectively. Furthermore, there was a very noticeable statistical difference (p <0.000) supporting the implementation of post- and follow-up navigation programs. This study finding congruent with study done by **Suazo et al., (2023)** who study role of oncology nurse navigators: an integrative review and found that oncology nurse navigators coordinating care of oncology patient with various healthcare team members participating in cancer management.

Regarding nurses' navigation communication competency, there were a very noticeable statistical difference (p <0.000) supporting the implementation of immediate post- and follow-up navigation programs. This result supported by **Radwan, et al., (2022)** who found there were high statistical significant differences regarding communication domain of competency (P=0.0001) with mean± SD 12.777 ± 3.502, 22.333 ± 1.381 and 21.800 ± 1.272 before, immediately and one month after implementing the educational program respectively.

More over this result supported by **Suazo et al., (2023)** and reported that oncology nurse navigators assist in lowering patients' levels of worry and distress, raising their level of satisfaction, reducing the amount of time between diagnosis and treatment, supplying them with the information they need, offering them emotional support.

Regarding nurses' navigation competency of health education about cancer and chemotherapy education, the study results was outline that less than two-thirds of nurses providing in complete education about chemotherapy in the pre-navigation program. This percentage increased to the majority of them providing complete education about chemotherapy post the navigation program, as well as during follow-up respectively. Furthermore, there was a very noticeable statistical difference (p < 0.000) supporting the implementation of post- and follow-up navigation programs. These results congruent with **Ahmed and Khudair (2020**), they evaluated the impact of a health education program on nurses' practices regarding chemotherapy-induced peripheral neuropathy in children, and found that the majority of study participants had low levels of practice at pre-test phase, which improved to high levels following the implementation of the education program.

Toward nurses' navigation competency of professional role, the current study finding was clarified that the majority of nurses do not play a part in advancing the oncology nurse navigator program and shaping its role through development, implementation, and evaluation in both healthcare settings and the community in the pre-navigation program. This percentage increased to the majority of them completing playing a part in advancing the oncology nurse navigator program and shaping its role through development, implementation, and evaluation in both healthcare settings and the community post the

navigation program, as well as during follow-up, respectively. Furthermore, there was a very noticeable statistical difference ($p < 0.000$) supporting the implementation of post- and follow-up navigation programs. This result congruent with **Pan et al., (2024)** who implementing navigation program based on nodding's care theory to improving career planning and professional identity of first-year nursing students and mentioned that, The mean score of professional identity in the experimental group increased significantly after program implementation ($p < 0.001$), moreover they reported that nurse navigation program based showed effectiveness in improving professional identity and career planning among first-year nursing students in China.

Toward nurses' total navigation competency level, it was explained that the vast majority of the studied nurses had an incompetent level of navigation competency at the pre-program implementation. From the researchers' point of view, this is related to the low level of oncology nurses knowledge about navigation and none of them having training courses about navigation. Which improved to majority of them had a competent level of navigation post- and follow-up program implementation. In line with our finding, **Pautasso et al., (2020)** develop nursing navigation program in Brazil and reported that, the creation of a cancer navigation program led to the construction of an oncology reference service and the building of a program model that was patient centered.

Furthermore, this improvement post-program could be attributed to one or more factors, such as the detailed information in the educational program, the program's written handout that acts as a constant reference, and the motivation and diligence of nurses in learning and adapting. Encouraging inquiries, holding engaging discussions using multimedia, and reviewing the material. The nurses were also motivated with the program and made an effort to apply what they had learned in navigation program.

Regarding residence of pediatric oncology patients**,** the majority of the studied pediatric oncology patients were from rural area. In line with our finding, a study conducted by **Zaky et al., (2022)** who assess characteristics of malignancies of children in the governorate of Minia, Egypt and reported that the majority of cases were from rural residents.

In relation to pediatric oncology patient and care giver satisfaction with cancer care, it was noticed that the mean score of the studied pediatric oncology patients and caregivers' satisfaction with cancer care in the pre-navigation program implementation was 45.60±10.95, which improved to be 74.40±8.64 and 71.80±7.52 post the navigation program, as well as during follow-up, respectively. Furthermore, there was a very noticeable statistical difference ($p < 0.000$) supporting the implementation of post- and follow-up navigation this results supported by **Geevarghese et al., (2020)** who

evaluating the value of a nurse navigation program for tertiary care patients having open abdominal surgery and found that, patients in the experimental group had better pain management, and the mean difference in pain scores between subjects in the control and experimental groups was shown to be statistically significant at the 0.05 level of significance. Additionally, the mean difference in exercise scores between the experimental and control groups was determined to be statistically significant. Also; the mean comfort score was found to be statistically significant, where patients in the experimental group reporting higher levels of comfort.

Toward total satisfaction level of pediatric oncology patients and their caregivers about cancer care provided, the present research finding was demonstrated that more than three-quarters of them had a low satisfaction level at the pre-navigation program which improved to majority of them had a high satisfaction level with cancer care post- and follow-up navigation program. These results were congruent with **Wells et al., (2018)** who studied navigation program effectiveness on oncology patients' satisfaction to care provided and mentioned that patient who got navigation program expressed greater overall satisfaction scores with cancer-related care more than patient who did not receive navigation program.

Regarding pediatric oncology patients and caregivers' satisfaction with the interpersonal relationship with the oncology nurse navigator **,** the study results clarified that there were a very noticeable statistical difference ($p < 0.000$) supporting the implementation of immediate post- and follow-up navigation programs. These results go in line with study done by **Rodrigues et al., (2021)** about assessment of clinical outcome of nursing navigation program provided to oncology patients and clarified that, reduction in distress, anxiety, and depression; better symptom control and management; enhanced physical conditioning; better care quality and continuity; enhanced quality of life; and a shorter time to treatment initiation.

Moreover; majority of the studied pediatric oncology patients and their caregivers had a poor satisfaction level with interpersonal relationship with nurse navigator at the pre-program implementation, which improved to majority of them had good satisfaction level post- and follow-up navigation program implementation. This results supported by **Bruno, L. (2016)** who assess satisfaction of oncology patient with nursing navigational services provided and demonstrated that applying nurse navigators services in the oncology environment improves patient satisfaction and lowers care obstacles.

#Regarding correlation between studied nurses' total knowledge, total navigation competencies and pediatric oncology patient and care giver satisfaction with cancer care, the present study results was reflected that, there was statistical significant positive correlation

between studied nurses' total knowledge, total navigation competencies and pediatric oncology patient and care giver satisfaction with cancer care score pre, post and follow-up navigation program implementation (P <0.000). This finding goes in line with **Radwan, et al., (2022**) and reported that there was significant positive correlation between total competency and total knowledge pre, immediately and one month post implementation of educational program. This indicates that oncology nurses' levels of navigation competence increase when they learn new information about navigation both during and after the educational session.

Conclusion

The present study findings showed that navigation program has positive effect on nurses' navigation core competencies toward caring for children with cancer, which will be influence pediatric oncology patients and their caregivers' satisfaction receiving cancer care.

Recommendations

- Refreshing courses pre-service and in- services navigation programs to enhance nurses' navigation core competencies level toward caring for children with cancer.
- Oncology nurses should be updated on their navigation core competencies level through attending seminars, workshops, lectures and reviewing researches.
- An orientation program for newly graduated nurses in oncology unit about navigation core competencies should be prepared.
- Further research is recommended to identify factors that affect nurses' navigation core competencies toward caring for children with cancer.

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