

Effect of Educational Program on Nurses' Perception and Family Empowerment regarding Children Undergoing Radiotherapy

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Abstract

Background: Radiotherapy is noninvasive modalities treatment that used to treat cancer in children. Nurses' perception is a golden role during care of children undergoing radiotherapy. **Aim of ths study:** This study aimed to evaluate the effect of educational program on nurses' perception and family empowerment regarding children undergoing radiotherapy. **Research design:** A quasi-experimental design was utilized to conduct this study. **Setting:** The study was conducted at the Radiology department at Sednawy Hospital affiliated to Zagazig University Hospital. **Subject:** 1- A convenient sample of 45 nurses working at previous setting and purposive sample of 30 families who accompanied the children. **Tools:** Two tools were used to collect data: (I) Nurses' Perception Structured Questionnaire included two parts: characteristics of the studied nurses& nurses' perception. (II) Family empowerment scale included four parts: characteristics of the studied families, characteristics of the studied children, medical history of the studied children and family empowerment scale. **Results:** There were a highly statistically significant differences in nurses' total perception level, a highly statistically significant differences in total family empowerment scale, a highly statistically significant relation between total nurses, perception level and their characteristics, a highly statistically significant relation relation between studied parents and total family empowerment scale level and a highly statistical positive significant correlation between total nurses' perception level and total family empowerment scale level. **Conclusion:** The educational program had a significant positive effect in improving nurses' perception and family empowerment regarding children undergoing radiotherapy. **Recommendations:** Dissimination of simplified and comprehensive Arabic guided pictures booklet about radiotherapy and family empowerment must be available in all pediatric radiology and oncology departments and distributed for each newly admitted child diagnosed with cancer and undergoing radiotherapy.

Keywords: Children, Educational program, family empowerment, nurses'perception and radiotherapy.

Introduction

Radiotherapy (RT) is an effective treatment, capable of damaging cancer cells by altering their genetic material and their ability to reproduce. Radiation can be given with the intent of cure as well as being used as a very effective modality of palliative treatment to relieve symptoms caused by the

cancer. Further indications of radiotherapy include combination strategies with other treatment modalities such as surgery, chemotherapy or immunotherapy. If used before surgery radiation will aim to shrink the tumor. If used after surgery radiation will destroy microscopic tumor cells that may have been left behind. Tumor is well known

that differ in sensitivity to radiation treatment (**Gardling et al., 2018**).

Nurses who work in radiotherapy have a relevant role in physical and psychological preparation of children and control of the specific adverse reactions of this modality of oncologic therapy. There are four roles of the nurses in radiotherapy; educate the children and parents about the therapy, including self-care, collaborate with physicians for the management of adverse effects, collaborate with radiology technicians to provide high-quality treatment safely and to provide psychosocial support for parents and children (**Kadom, 2021**).

Hence, the perception is the golden guideline that enables nurses to provide care effectively depending on clinical practice. Nurses not only provide care for children with cancer, but also increase the ability of parents to increase their knowledge, skills, and confidence in fulfilling their children's needs and helping children overcome their problems. Nurses are involved in daily child care play a role in empowering parents by providing opportunities for parents to participate and be involved in child care activities, increase parents' skills and confidence to determine the best choice for child treatment (**Zendeh et al., 2021**).

Family empowerment intervention is a kind of empowerment, which is result from the interaction between healthcare providers and families, brings about a sense of control over family life and leads to positive changes that get better the strengths, abilities, and skills of the family., the aim of the empowerment of an ill child and parents can be to assist in deal with and efficiently handle the disease. Moreover, nurses as the primary health care providers should perform interventions focused on empowering families to increase abilities of the family members so

that they can face the obstacles related to the health (**Moriyama, et al., 2019**).

The most essential to carefully examine how nurses perceive and describe the family empowerment in clinical settings, have a deep understanding of the phenomenon of supporting families and identify interactions in this case. The interactions are beneficial for expanding communication methods and improving care quality. Nurses can display the extensive dimensions of family empowerment to parents and help in gain a better understanding of the empowerment based on parents' actual experiences and achieves more realistic results (**Jafarian et al., 2020**).

Significant of the study:

The global occurrence of childhood cancer is higher than previously estimated, and incidence rates tend to increase over the years. Childhood cancer is a main cause of global disease burden. cancer is becoming a public health problem in Egypt, where 40% of the population are children under 18 years old. Age-standardized incidence rates of cancer in Egypt are 166.6 per 100 000 persons ,and 5-year survival of childhood cancer was estimated to be 40% based on baseline assessment of pediatric oncology care in Egypt (**Zaghloul et al., 2020**)

Childhood radiotherapy is a major challenge and a crisis to any family. Radiotherapy has many complications and side effects which can interfere with the daily life of children and affect all family empowerment dimensions. On the other hand, perception is the backbone of good nursing care so, nurses should have high perception toward all dimensions of family empowerment to cope with child before, during and after radiotherapy and thus, reduce the complications (**Jackson et al., 2017**).

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Aim of the study:

The aim of this study was to evaluate the effect of educational program on nurses' perception and family empowerment regarding children undergoing radiotherapy

Research hypotheses:

H1- It would be expected that; nurses' perception regarding children undergoing radiotherapy would improve after implementing educational program than before.

H2- It would be expected that; family empowerment regarding children undergoing radiotherapy would be improved after implementing educational program than before.

H3- There would be a statistical positive correlation between nurses' perception and family empowerment.

Subjects and Method

Research design:

Quasi- experimental research design was utilized to achieve the study's aim.

Study setting:

The study was conducted at Radiology department at Sednawy hospital affiliated to Zagazig University Hospital, Zagazig, Egypt.

Research Subject:

- 1- Convenient sample of (45) nurses who working at the above mentioned setting regardless their characteristics and willing to participate in the study.
- 2- Purposive sample of 30 parents accompanied their children who are receiving radiotherapy after fulfilled the following inclusion criteria:
 - Child is diagnosed with cancer recently.
 - Child has cancer at early stage.
 - Child didn't perform surgery.
 - Child receives only two doses of chemotherapy.

Tools of Data Collection

Data was gathered by using the following two tools:

Tool I: Nurses' Perception Structured Questionnaire

It was designed by the researcher based on a review of the current relevant researches. It was written in a simple Arabic language and consists of two parts:

Part A: Characteristics of the studied nurses

It was developed by the researcher based on the related literature to assess characteristics of nurses. It included data related to age, gender, level of education, years of experiences and attendance training courses related to radiotherapy treatment.

Part B: Nurses' Perception

It was adapted by researcher from **Thassari&Kritcharoen (2014)** to assess nurses' perception regarding children undergoing RT. It was consisted of three categories namely; knowledge (18), beliefs (13) and attitude (11) and was used three times pre, post and follow up educational program implementation.

Scoring system for nurses' perception

Three point likert scale response was ranged from disagree (1), uncertain (2) to agree (3). The total perception score was ranged from 42 to 126 degrees and the levels were categorized as the following: low perception <60% (42 to 75 degrees), moderate perception 60< 75% (76 to 94 degrees) and high perception ≤ 75% (95 to 126 degrees).

Tool II: Family empowerment scale (FES)

It was adopted by researcher from **Koren et al., (1992)** to measure empowerment. It was translated into Arabic version and consisted of four parts:

Part A: Characteristics of the studied families

It included data related to parent' level of education, marital status, occupation,

residence, monthly income, number of children in family, sources to gain information about RT and consanguinity between parents

PartB: Characteristics of the studied children

It included data related to child' gender, age, level of education, ranking of child in family.

Part C: Medical history data of the studied children

It included data related to medical diagnosis, onset of disease, symptoms appearing on child, diagnostic investigation, onset of undergoing RT, duration of RT session, type of RT, side effects of RT.

Part D: Family empowerment scale

It is a 34 items self- reported instrument grouped under two (2) dimensions; the first dimension refers to levels of empowerment which included 3 subscales; family (12 items), service system (12 items) and community/political (10 items). The second dimension refers to how empowerment is expressed in three ways:(a) Attitude, what a parent feels and believes, (b) Knowledge, what a parent knows and can potentially do and (c) Behavior, what a parent actually does. Each of these types of expression can occur within each category of the level dimension. It was used three times pre, post and follow up educational program implementation.

Scoring system for family empowerment

Each item was rated on five points Likert-type scale, ranging from not true at all (1), Mostly not True (2), Somewhat True (3), Mostly true(4) to very true (5). The total scores of the family and service system dimensions levels were ranged from (12) to (60), while the community/ political dimension level was ranged from ten (10) to fifty (50). So, the total FES scores were ranged from 34 to 170. So, the level of empowerment will be categorized

as high family empowerment scale $\geq 75\%$ (127 to 170 degrees), moderate family empowerment scale $60\% >75\%$ (102 to 126) and low family empowerment scale $< 60\%$ (102 to 126 degrees).

Content Validity:

Tools of data collection were investigated for their content validity by panel of five experts (two professor and one assistant professor in pediatric nursing specialty from the Faculty of Nursing Benha University and two assistant professor from Oncology Department Faculty of Medicine Benha University), who were selected to test content validity of the tools and to judge its clarity, relevance, comprehensiveness, understanding and applicability. The opinion was elicited regarding the layout, format and sequence of the questions and all of their remarks were taken into consideration and the tools were regarded as a valid from the experts' point of view.

Reliability:

Reliability for tools was applied by the researcher for testing the internal consistency of the tools by administrating of the same tool to the same subjects under similar condition. Internal consistency reliability of all items of the tools was assessed using Cronbach's alpha coefficient. It was (.93) for nurses' perception structured questionnaire and (.81) for family empowerment scale.

Ethical considerations:

Written approval was obtained from ethical committee The researcher clarified aim of the study to the studied nurses and the studied parents. Verbal approval was prerequisite to participate in the study. The studied nurses and the studied parents were assured that all gathered data were used in research purpose only and the study was harmless. Additionally, the studied nurses and the studied parents were allowed to withdraw from the study at any time without giving the

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reason. Confidentiality of the gathered data and results were secured.

Pilot Study

A Pilot study was conducted to test the clearness and applicability of the study tools and to estimate the time needed for each tool, it was done on 10% of the total subjects,(5) nurses, (3) parents and excluded from the present study to avoid sample bias and contamination. In the light of pilot study analysis, modification was done and last form was developed.

Filed Work:

The following phases were adopted to achieve the aim of the current study; assessment, planning, implementation and evaluation phases. These phases were conveyed from the earliest starting point of January 2021 to September 2021 covering 9 months.

Assessment Phase

Assessment phase involved interviews with the studied nurses and the studied parents to collect baseline data. The researcher was visited Sednawy Hospital affiliated to Zagzig University three days/ weeks (Saturday, Monday and Wednesday) from 10:00 AM to 12: 00 PM, number of families taken every day was ranged from 3-4 families and 4-5 nurses daily. At the beginning of interview; the researcher welcomed nurses, parents and their children, explained the purpose, duration, activity of the study and take their oral approval to participate in the study prior to data collection.

The researcher gave the studied nurses (Tool I) for filling it to assess their perception regarding children undergoing RT, it took nearly 30- 45 minutes. After that, the data of the children undergoing RT was collected from medical record and from the parents and it took nearly 15 minutes for each child then gave the studied parents (Tool II) for filling it to assess family empowerment scale it took

nearly 60 minutes. This period of pretest took 4 weeks **(from the beginning of January 2021 to the end of January 2021).**

Planning phase

Based on baseline data obtained from assessment phase and relevant review of literature, the educational program content was designed by the researcher in simple Arabic language according to the nurse's and parent's needs. It was constructed, revised and modified from the related literature to improve the nurses' perception and family empowerment regarding children undergoing RT. Different methods of teaching were used as power point presentation , group discussion and modified lecture. Suitable teaching media were included hand out, data show to help proper understanding of the content for both nurses and families.

Program construction: It took two months from the beginning of **Feburary2021 to the end of March 2021..**

Statement of objectives

General objective

The program was aimed to improve nurses' perception and family empowerment regarding children undergoing radiotherapy.

Implementation phase

This phase took six months from the beginning of April 2021 to the end of September 2021.

- The implementation phase was achieved through sessions, each session started by a summary of the previous session and objective of the new one. Taking into consideration the use of Arabic language that suits the studied nurses and the studied parents educational level. Motivation and reinforcement during sessions were used to enhance sharing in the study. The studied nurses were divided into 7 groups; each group consisted of 6-7 nurses while the studied parents consisted of 5-6 parents. The total

number of sessions for both the studied nurses and were 7 sessions 4 sessions for knowledge part, 1 session for belief part and 1 session for attitude part and 1 session for family empowerment, The program has taken 44 hours (18 for for knowledge, 6 hours for attitude, 6 hours for beliefs and 14hours for family empowerment). The sessions related to studied families started at 10:00 AM to 11:00 AM. These sessions were repeated to each group.

Theoretical part for nurses and parents as the following; the first session of the program definition, causes, types, sign& symptoms, and types of treatment of cancer. **The second session** of the program included definition, types, advantages, benefits, investigation, the duration of RT session and. **The third session** included nursing care before, during, after RT, side effects of RT and nursing care of each side effect. **The fourth session** of the program included definition, factors, importance of perception and the importance and role of nurses' attitude regarding children undergoing RT. **The fifths session** The importance and role of nurses' beliefs regarding children undergoing RT.

The sixth session included definition, importance, values, reasons and dimensions of family empowerment. **The seventh session** included illustration of family empowerment scale, empowerment dimension levels, role of nurses in family empowerment and the relation between nurses' perception and family empowerment regarding children undergoing radiotherapy.

Evaluation phase:

This phase took one month from the beginning of September 2021 to the end of September 2021.

After the implementation of the program contents, the post test was carried out

immediately to assess nurses' perception and family empowerment and the follow up test was carried after one month of implementing the educational program by using the same formats of pretest .

Statistical Analysis

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 22 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). Test of significance, Chi-square test (χ^2) this test used to measure significant of qualitative variables and correlation coefficient (r) used for quantitative variables that were normally distributed or when one of the variables is qualitative, these tests were applied to test the study hypothesis. Analysis of variance (ANOVA test) used for comparison of means more than two categories. linear regression is a linear approach for modelling the relationship between a scalar response and one or more explanatory variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.001$. No statistical significance difference was considered when $p > 0.5$.

Results

Table (1): Shows that, more than two fifths (42.2%) of the studied nurses are in the age groups 30 to less than 35 years with mean \pm SD (30.11 ± 3.09) years old, the majority (82.2%) of them are females. As regards to years of experience one third (33.3%) of them have (11 - 15) years with mean \pm SD (8.95 ± 1.9) years and all of them (100%) have not any training courses regarding children undergoing radiotherapy.

Table (2): Shows that two thirds (66.7%) of the studied families accompanied the child

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is mother, the majority (80.0%) of them are married, half (50.0%) of them have intermediate education, while two thirds (66.7%) of them unemployed, one third (33.3%) of them have three children, less than two thirds (60.0% & 63.3%) of them living at rural areas and have not enough income respectively. Finally, more than three quarters (76.7%) of them reports positive consanguinity.

Table (3): Displays that less than two thirds (60%) of the studied children are in the age group between 6 to 12 years with mean \pm SD (8.7 \pm 2.98) years old, and two thirds (63.3%) of the studied children were males. In addition to less than half (43.3%) of them have second ranking and primary stage of education.

Table (4): Indicates that two fifths (40%) of the studied children have medullablastoma, two thirds (66.7%) of them have diseases from one to less than 3 months, majority (80%) of them report pain as the most common symptom appear before diagnosis. In addition to, less than half (46.7%) of them start RT session from more than 6 weeks. Moreover, all (100%) of the studied children receive external RT and more than half (53.3%) of them report 10 minutes duration of RT session. Moreover, all (100%) studied

children are suffering from fatigue & Readiness of skin as the side effects of RT.

Figure (1): Proves that there is a highly statistically significant difference in total nurses' perception level where the majority (82.2%) & three quarters (75.5%) of the studied nurses have high total perception at post and follow up program implementation respectively compared with two fifths (40.0%) of them have moderate total perception level at preprogram implementation (p value <0.01).

Figure (2): Reveals there is a highly statistically significant differences in total family empowerment scale where the majority (83.3%) & more than three quarters (76.7%) of the studied parents have high total family empowerment scale level at post and follow up program implementation respectively compared with half (50.0%) of them have low family empowerment scale level before program implementation (p value <0.01).

Table (5): Reveals that there is a highly positive significant correlation between total perception of the studied nurses and total family empowerment scale of the studied parents pre, post and follow up program implementation (p < 0.01).

Table (1): Percentage Distribution of the studied nurses' according to their personal characteristics (n=45).

Nurses' Characteristics	No	%
Age		
20 >25years	6	13.3
25 >30 years	9	20.0
30 >35 years	19	42.2
≥35 years	11	24.5
mean ± S.D 30.11±3.09		
Gender		
Male	8	17.8
Female	37	82.2
Years of experience		
1 - 5 years	9	20
6 - 10 years	11	24.4
11 - 15 years	15	33.3
> 15 years	10	22.2
mean± S.D 8.95±1.99		
Training courses regarding children undergoing radiotherapy		
No	45	100

Table (2): Percentage distribution of the studied families according to their characteristics (n=30).

Personal data of families	No	%
Accompanied the child		
Father	10	33.3
Mother	20	66.7
Marital status		
Married	24	80.0
Divorced	4	13.3
Widow	2	6.7
Level of education		
Illiterate	2	6.7
Read and write	3	10.0
Intermediate	15	50.0
University	10	33.3
Occupation		
Employee	10	33.3
unemployed	20	66.7
Number of children in family		
One	6	20.0
Two	7	23.3
Three	10	33.3
Four or more	7	23.3
Family' residence		
Urban	12	40.0
Rural	18	60.0
Monthly income		
Enough and save	5	16.7
enough	6	20.0
Not enough	19	63.3
consanguinity		
Yes	23	76.7
No	7	23.3

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Table (3): Percentage distribution of the studied child according to their characteristics (n=30).

Personal data of child	N	%
Age		
<6 years	9	30
6 – 12 years	18	60
>12 years	3	10
mean ±S.D	8.7±2.98	
Gender		
Male	19	36.7
Female	11	63.3
Ranking		
The first	8	26.7
The second	13	43.3
The third or more	9	30.0
Educational stage		
Before nursery	4	13.3
nursery stage	5	16.7
Primary stage	13	43.3
Preparatory stage	5	16.7
Secondary stage	3	10.0

Table (4): Percentage distribution of the studied children according to their medical history (n=30).

Items	N	%
The medical diagnosis of the child		
Medullablastoma	12	40%
Astrocytoma	8	26.7%
Hodgkin's Lymphoma	6	20%
Wilims tumor	4	13.3%
The onset of disease		
<1 month	7	23.3%
1 <3 months	20	66.7%
3 - 6 months	3	10.0%
*The symptoms appear on child before the diagnosis of cancer		
Pain	24	80.0%
Fever without causes	20	66.7%
Bleeding without causes	13	43.3%
Recurrence of infection	18	60.0%
Skin rashes	17	56.7%
*The diagnostic investigation		
CBC	30	100%
PCR	30	100%
CT	30	100%
MRI	30	100%
The onset of RT session		
<3 week	5	16.6%
3 <6 weeks	11	36.7%
≥6 weeks	14	46.7%
The type of RT		
Internal	0	0%
External	30	100%
The duration of RT session		
5 min	10	33.3%
10 min	16	53.4%
15 min	4	13.3%
*The side effects of RT		
Fatigue	30	100%
Readiness of skin	30	100%
Nausea and vomiting	26	86.7%
Stomatitis	21	70.0%
Hair loss (alopecia)	23	76.7%

***more than one answer**

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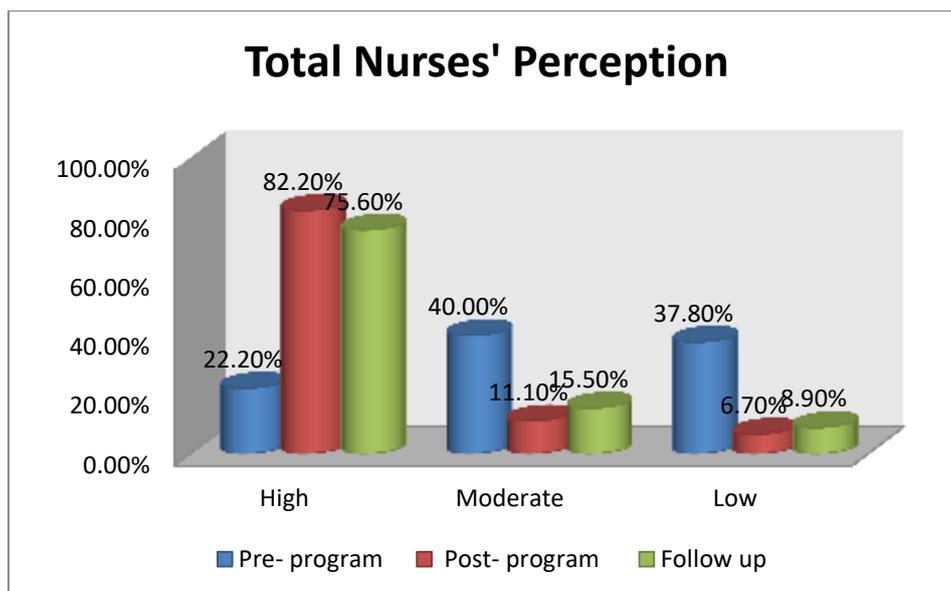


Figure (1): Total perception of the studied nurses' at pre & post and follow up program implementation regarding to their total perception (n=45).

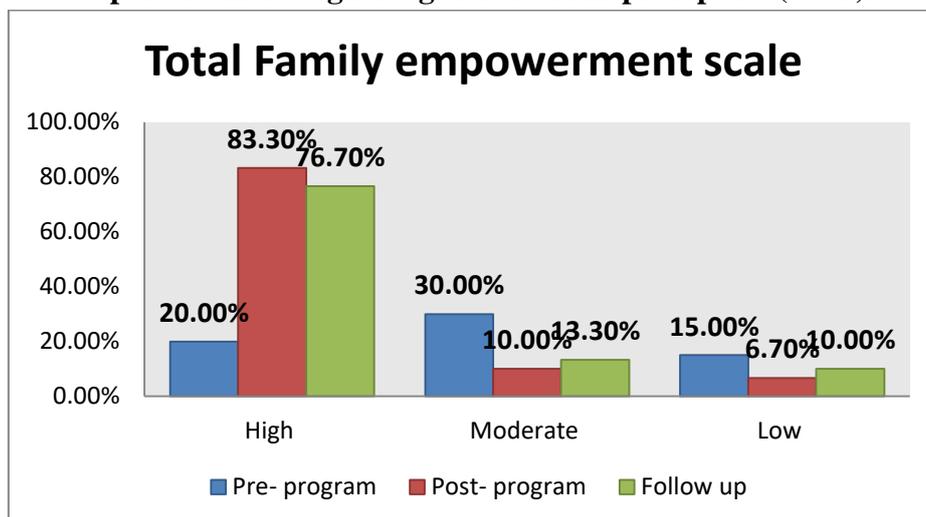


Figure (2): Total family empowerment scale of the studied families at pre & post and follow up program implementation regarding to their total family empowerment scale (n=30).

Table (5): Correlation between total perception scores of the studied nurses and total family empowerment scores of the studied parents at pre, post and follow up program implementation

Studied variables	Total family empowerment scores					
	Pre program		Post program		Follow up program	
	R	P - value	r	P- value	r	P- value
Total perception scores	0.536	.000**	0.490	.000**	0.795	.001**

**highly significant at p < 0.01

Discussion:

Perception and family empowerment support nurses to assess children in a continuous process throughout the treatment and follow up. Meanwhile, nurses are the most important person that can detect seriously of radiotherapy on children and families, so family empowerment is a nursing intervention used by nurses to assist families in caring for and providing support to family members with cancer and is seen as the most important element for treatment success (**Grundy et al., 2019**). Regarding characteristics of studied nurses the finding of present study shows that two fifths of the studied nurses has a mean age 30.11 ± 3.09 years old. This can be due to age of nurses are important factor in acquiring knowledge and understanding new experience that improve nurses' perception. This result is paralleled with **Rostagno et al., (2020)** who conduct study in Italy about "Italian nurses knowledge and attitudes towards fatigue in pediatric onco-hematology: A cross-sectional nationwide survey" and stated that less than half of the studied nurses have mean age 30.13 ± 3.06 years old.

Concerning gender of the studied nurses the present study reveals that the majority of them are female. This can be due to the fact that the number of female join to nursing school or institute is greater than the number of male in Egypt. This finding agrees with **Skanda et al., (2019)** who conduct study in Japan about "Nursing interventions taken by radiotherapy nurses and the difficulties faced by these nurses" and found that, the majority of the studied nurses are female.

Regarding to years of experience, the present study shows that, one third of the studied nurses have 11-15 years of experience. This can be due to the nurses' experience is a very important issue in critical areas as oncology radiotherapy

department. This finding agreed with **El Malky et al., (2016)** who conduct study about "The effectiveness of the nursing intervention program on feeling of burden and coping among caregivers of children with cancer" and found that more than one quarters of the studied nurses have 10-15 years old of experience.

Related to companion of the studied children two thirds of the studied parents are mothers. This might due to mothers are the main caregiver in the Egyptian society providing physical care and psychosocial support to the ill child and other well children in the family. This finding harmony with **Mohammed et al., (2019)** and found that three quarter of companion of children are mothers.

Regarding marital status of the studied parents, the majority of the studied parents were married while half of them had intermediate education level. This can due to social status can deeply affect the needs of the family regarding educational, spiritual, psychosocial, and financial needs, moreover presence of parents enhance positive coping for children and family. This finding agrees with **Ahmed, (2018)** who conduct study in Egypt about "Effects of empowering families on improving quality of life for children with chronic diseases" and found that the vast majority of the studied parents are married and more than half of them had intermediate education.

Concerning occupation and residence of the present study showed that, two thirds of the studied parents are unemployed and lived in rural area This may due to the majority of the studied parents are mothers and the place of residence can have contributing factors with the child/parents and family coping with disease. This result agrees with **Khademi et al., (2019)** who conduct study in Iran about "Caring power of mothers who have a child with cancer and its predictors" and states that

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less than two thirds of the study subjects are living in rural area and more than one quarter of them have two children or more.

Regarding monthly income of the studied parent, two thirds of them have not enough income. This can be due to that two thirds of the studied parents are unemployed and the diagnosis of cancer has an impact on family financial status. This finding is agreed with **Ahmed, (2018)** who found that more than two thirds of the studied families have not enough income.

Concerning consanguinity, the present study shows that more than three quarters of the studied parents have positive consanguinity. This may be due to the traditional habits of relatives' marriage in the rural areas. This result matches with **Rasmita, (2021)** who conducted a study in Indonesia about "Barriers and Supports in Empowering Parents Care for Children with Cancer" and found that three quarters of the studied parents have positive consanguinity.

Regarding children characteristics, less than two thirds of the studied children have a mean age of 8.7 ± 2.98 years old and at the primary educational stage. This may be related to the most common age of cancer onset in children is the school age. This result is in the same direction with **Yavuz & Yilmaz (2015)** who conducted a study about "Investigation of the effects of planned mouth care education on the degree of oral mucositis in pediatric oncology patients Oncology Nursing" and found that two thirds of the studied children ages are ≤ 11 years old.

Related to gender of the studied children, the present study indicates that, less than two thirds of the studied children are males. Gender differences are not fully understood but probably reflect differences in exposure to environmental risk factors and endogenous hormones, as well as complex interactions between these influences. Gender differences

in immune function and response may also play a role in increasing cancer rate in male than female. This result is in the same line with **El malla et al., (2017)** who conducted a study in Egypt about "Advances in Pediatric Oncology- a Five-Year Nation-Wide Survival follow-up at Children's Cancer Hospital in Egypt" and mention that more than half of the studied children are male.

Regarding children medical data, the current study mentions that two fifths of the studied children are diagnosed with medullablastoma followed by Hodgkin's lymphoma. This may be due to the fact that the CNS tumor is the second cancer incidence in children especially at school age. The result of this study is in harmony with **Ward et al., (2019)** who conducted a study in USA about "Annual Report to the Nation on the Status of Cancer" and reports that more than half of the studied subjects are diagnosed with CNS tumor followed by Hodgkin's lymphoma.

Concerning the onset of cancer diagnosis, the current study shows that more than two thirds of the studied children have been diagnosed with cancer from one to three months. This may be due to the seriousness of prodromal signs and symptoms appeared on the studied children. This result is supported by **Park et al., (2021)** who mention that more than two thirds of the studied children have cancer three months ago.

Concerning the symptoms appearing on the studied children before diagnosis with cancer, the present study shows that the majority of the studied children suffer from pain while more than two thirds of them suffer from fever without causes before diagnosis with cancer. This can be due to the most common frequent complaint of children before diagnosis with cancer are fever and pain. This result is paralleled with the result by **Armstrong et al., (2016)** who conducted a study in England about "Reduction in late mortality among 5-year survivors of

childhood cancer” and found that the majority of studied children suffered from pain and fever before diagnosed with cancer.

As regard to the onset and types of RT session, the current study shows that less than half of the studied children started RT from six weeks or more while all of them expose to external RT . This may due to the appropriate RT sessions in children varied from six weeks to eight weeks and external RT is appropriate for children compared to internal RT. This result isin the same line with **Saati (2020)** who conduct study in Saudi Arabia Kingdom about “Impact of an Educational Intervention in Developing Knowledge, and Awareness of Radiation Therapy among Families Having Pediatric Oncology Patients” and states that two fifths of studied children had eight weeks of RT sessions and vast majority of studied children expose to external RT.

Concerning the side effects of radiotherapy, the current study reveals that all of the studied children suffered from fatigue and readiness of skin while the majority of them have nausea and vomiting as the side effects of RT. This can due to fatigue, readiness of skin, nausea and vomiting are the most common side effects associated with RT in children. This finding is harmony with **Coyne et al., (2016)** who conduct study about “Information-sharing between healthcare professionals, parents and children with cancer: More than a matter of information exchange” and found that vast majority of studied children suffer from fatigue and readiness of skin as side effects of RT.

On investigating total nurses’ perception regarding children undergoing RT, the current study indicates that less than two fifths of the studied nurses have low total perception level preprogram implementation about children undergoing RT. This may due to lack of updating nurses’ information toward importance of perception and its role

regarding children undergoing RT. This finding paralleled with **Zendeh et al., (2021)** and found that two fifths of the studied nurses have low perception regarding children undergoing RT.

Perception considered a turning point that affects all nurses’ care and intervention that support children undergoing RT. The current study reveals that, the majority and three quarters of the studied nurses have high total nurses’ perception level post and follow up program implementation. This can due to reflection of acquired knowledge, attitude and beliefs that the studied nurses are receiving after implementation of educational program. This finding is harmony with **Soko et al., (2019)** who conduct study in Tanzania about “Nurses Awareness and Perceptions of Radiotherapy and Their Influence on the Use of Radiotherapy” found that that more than three quarters of the studied nurses have total perception with a highly statistically significant improvement in total nurses’ perception.

On investigating total family empowerment scale, the current study indicates that, half of the studied parents had low total family empowerment scale level preprogram implementation. This may due to shortage of educational courses about value of family empowerment which help parents that have children with chronic condition such as cancer. This finding in line with **Angelo et al., (2018)** who conducted study in Brazil about “Investigating the factor structure and validity of the Family Empowerment Scale for parents of children with emotional disturbance in middle school” and mention that more than half of the studied parents have low total family empowerment scale at pretest.

Concerning the total FES post program implementation, the present study reveals that, the majority and three quarters of studied

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parent have high total FES level post program implementation with a highly statistically significant improvement. This can be due to focusing of educational program on explaining the value and components of family empowerment and the parents are viewing it as a very supporting resource in children's treatment. This finding parallels with **Angelo et al., (2018)** and found that more than three quarters of studied families have high family empowerment scale after program implementation.

Concerning correlation between total nurses' perception and total family empowerment scale, the present study showed that there is a highly statistically significant correlation between total nurses' perception and total family empowerment scale pre, post and follow up implementation of the educational program. This may be due to nurses' perception and family empowerment directly influenced by each other during radiotherapy treatment for children; moreover, nurses' perception and family empowerment was considered the baseline that helps in achieving best outcome regarding children undergoing RT. So, the role of nurses' perception is essential to help nurses in applying family empowerment as a routine care for parents having children undergoing radiotherapy. This result is agreed with **Zende (2021)** who found that there was a statistically significant correlation between total nurses' perception level and family empowerment pre implementation of the educational program.

Conclusion

The educational program had a significant positive effect in improving nurses' perception and family empowerment regarding children undergoing radiotherapy. Besides, there was a highly statistically significant positive correlation between nurses' perception and family empowerment

pre, post and follow up implementation of the educational program

Recommendations

- Nurses should continuously update their knowledge as it reflects on their perception and helps them to have a positive attitude and beliefs toward children diagnosed with cancer and undergoing RT.
- Family empowerment should be considered a basic core for nurses to guide and supply parents having children diagnosed with cancer or any chronic diseases.
- Dissemination of comprehensive and clarified Arabic guided pictures booklet about radiotherapy and family empowerment must be available in all pediatric radiology and oncology departments and distributed for each newly admitted child diagnosed with cancer and undergoing radiotherapy.
- Replication of the study on a larger probability sample in other different settings is highly recommended to achieve generalizable results.

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تأثير برنامج تعليمي على إدراك الممرضات وتعزيز الأسرة فيما يتعلق بالأطفال الذين يتلقون العلاج الإشعاعي

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يعتبر العلاج الإشعاعي من الطرق المستخدمة في علاج السرطان عند الأطفال. يلعب إدراك الممرضات دورًا هامًا أثناء رعاية الأطفال الذين يخضعون للعلاج الإشعاعي. ينتج التعزيز الأسري نتيجة التفاعل بين مقدمي الرعاية الصحية والأسر ، ويؤدي إلى تغييرات إيجابية تعمل على تحسين نقاط القوة والقدرات والمهارات للأسرة. تهدف هذه الدراسة إلى تقييم تأثير البرنامج التعليمي على إدراك الممرضات وتعزيز الأسرة فيما يتعلق بالأطفال الذين يخضعون للعلاج الإشعاعي. الطريقة. وقد أجريت هذه الدراسة في قسم الأشعة بمستشفى صيدناوي التابع لمستشفى جامعة الزقازيق. واشتملت على عينة ثابتة من ٤٥ ممرضة وعينة هادفة من ٣٠ من الآباء. أظهرت النتائج تحسنا ايجابيا في مستوى إدراك للممرضات ومستوى تعزيز الأسرة فيما يتعلق بالأطفال الذين يخضعون للعلاج الإشعاعي ، وأظهرت أيضا العلاقة الإيجابية بين مستوى إدراك الممرضات مستوى تعزيز الأسرة. وخلصت الدراسة بأنه كان للبرنامج التعليمي أثر إيجابي كبير في تحسين إدراك الممرضات وتعزيز الأسرة فيما يتعلق بالأطفال الذين يخضعون للعلاج الإشعاعي. كما اوصت الدراسة بتوفير كتيب باللغة العربية مبسط وشامل وموضح حول العلاج الإشعاعي وتعزيز الأسرة في جميع أقسام الأشعة والأورام للأطفال وتوزيعه على كل طفل مصابًا حديثًا بالسرطان ويخضع للعلاج الإشعاعي.