Effect of Education program on improving patient reported recovery profile post Hyperthermia Intraperitoneal Chemotherapy for Peritoneal Carcinomatosis

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Abstract

Background; Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is associated with improved survival for patients with abdominal malignancies with peritoneal dissemination .**This study aimed** to evaluate the effect of Education program on improving patient reported recovery profile post Hyperthermia Intraperitoneal Chemotherapy for Peritoneal Carcinomatosis .**Design**: Quasi-experimental design was utilized in this study . **Setting** :The study was carried out at intensive care unit at the National Cancer Institute (NCI), Cairo University. During the period from the beginning of January 2019 till the beginning of January 2020 **Sample** :Purposive sample of 97 patients **Tools** :Two tools used to collect the study data .These are structured interview questionnaire to assess patients' knowledge regarding Hyperthermia Intraperitoneal Chemotherapy, and Patient-Reported Recovery Profile **Results :**Showed that there was statistically significant difference in term of increased knowledge level among study group , as well as a increase in total mean score in patient-reported recovery Profile pre ,immediately and after education program implementation ,shows high statistically significant negative correlation between of length of hospital stay and reported recovery profile immediately post and after program implementation inverse relationship. **Conclusion** :Implementing a designed education program for patients with Hyperthermia Intraperitoneal Chemotherapy was effective in improving knowledge, and patient-reported recovery. Shows high statistically significant negative correlation between length of hospital stay and reported recovery profile immediately post and after program implementation. **Recommendation :**additional demographic variables. Manuals, information booklets and self-instruction module should be developed in areas of Hyperthermia Intraperitoneal Chemotherapy management

Keywords: Hyperthermia intraperitoneal chemotherapy (HIPEC); Patient-Reported Recovery Profile, Peritoneal Carcinomatosis

Introduction:

Cytoreductive surgery (CRS) with heated intraperitoneal chemotherapy (HIPEC) has gained acceptance in the treatment of peritoneal carcinomatosis (PC) with reported morbidity and mortality rates of 27-56% and 0-11% respectively. According to the World Health Organization data, the mortality

rate associated with cancer ranks second highest after that associated with circulatory system diseases **(Ozgul duzgun, 2019)**

Hyperthermia (or Heated) Intraperitoneal Chemotherapy (HIPEC) is a surgical procedure that's giving new hope to patients with abdominal cancers. Immediately after removing visible tumors through what's called cytoreductive surgery, our surgeons pump a powerful dose of heated chemotherapy inside a patient's abdomen. The 108-degree chemo bath circulates throughout the abdominal area, also called the peritoneal cavity, delivering highly concentrated doses of hot chemotherapy. That allows doctors to intensify the drugs' cancer-fighting abilities while directly targeting cancerous cells. After about 90 minutes of the infusion, the chemo is washed out and incisions are closed. Cytoreductive surgery (CRS) with heated intraperitoneal chemotherapy (HIPEC) is an effective but morbid procedure in the treatment of peritoneal carcinomatosis**. (Sugarbaker, 2018)**

Benefits of HIPEC Surgery the best survival rates of any peritoneal mesothelioma treatment, fewer side effects than traditional chemotherapy, Safe delivery of higher drug doses than systemic chemotherapy, Local application means more cancerous cells than normal cells are exposed to the drugs, which prevents resistance to chemotherapy**. (Akash,et al., 2017)**

The Nurses face many challenges when caring for surgical oncology patients. This includes caring for the physical, spiritual, and emotional needs of the patient and family. It is important for the nurse to be aware of all of these challenges and gear care toward each specific patient. We must treat the patient as a whole, not just the cancer. And pain control, as with any surgery, can be a unique challenge as well, due to the fact that every person experiences pain differently. **(Lee, et al., 2018)**

Patients who undergo HIPEC may be in the hospital between 6 to 14 days. However, the exact number of days varies by patient because there are several factors to consider, including comorbidities, extent of disease, and the recovery period. The typical recovery time is not too extensive and patients are encouraged to get up and walk (with assistance) within 12 hours of surgery**. (Ozgul Duzgun, 2019)**

Postoperative recovery is a process of returning to normality, a concept defined as potentials achieved by regaining control over physiological, psychological, social and habitual functions. In postoperative recovery, the goal is to return to preoperative baseline of independence in activities of daily living. Three phases of postoperative recovery are applicable to hospital inpatient: early, intermediate and late recovery. The early phase begins after discontinuation of anesthesia with a return to consciousness and recovery of vital reflexes mainly airway and motor activity. In the intermediate phase, vital functions are stabilized until readiness to discharge home. The late phase is a return to preoperative health status of physical, social and psychological well-being after discharge home. Therefore, the length of hospital stay to discharge from care includes only early and

intermediate postoperative recovery phases **(Benjamin Rinius, 2018)**

Enhanced Recovery after Surgery (ERAS) protocol has been designed for preoperative and postoperative care to reduce the body physiological stress responses due to surgery by supporting body function. The protocol consists of evidence-based care elements associated with early recovery and discharge after surgery. Since the protocol requires team work, the key nursing role includes encouraging patients to comply with ERAS protocol. **(Ozgul Duzgun, 2019)**

Significance of the study

Approximately 7 million people worldwide develop colorectal, ovarian or gastric cancer each year, of which 8%–50% develop peritoneal metastases. The peritoneum is one of the most common sites of metastases from these cancers and is often the only site of metastases. **(Kurinchi Gurusamy et al., 2020)** Colorectal cancer is the 7th commonest cancer in Egypt, representing 3.47% of male cancers and 3% of female cancers. HIPEC was introduced in Egypt during 2010–2011 at the National Cancer Institute (NCI), Cairo University, followed by propagation of this novel approach to three other oncology centers in 2015 with great enthusiasm from both oncologists and patients. The National Cancer Institute (NCI), Cairo University documented the admitted number of patients in the years 2018 amounting for 103 patients, at operating department to do Cytoreductive surgery (CRS) with heated intraperitoneal chemotherapy **(Statistical Department National Cancer Institute (NCI), Cairo University, 2018)**

Operation definition

Patient-Reported Recovery Profile is a process of returning to normality, a concept defined as potentials achieved by regaining control over physiological, psychological, social and habitual functions.

Hyperthermia intraperitoneal chemotherapy (HIPEC):- surgical procedure to patients with abdominal cancers. Immediately after removing visible tumors through what's called cytoreductive surgery, the surgeons pump a powerful dose of heated chemotherapy inside a patient's abdomen.

Aim of the study:

This study aimed to evaluate the effect of Education program regarding Cytoreductive Surgery and Hyperthermia Intraperitoneal Chemotherapy for Peritoneal Carcinomatosis patients through:

- Assessing patient knowledge regarding Hyperthermia Intraperitoneal Chemo-therapy.
- Assessing the Patient-Reported Recovery Profile for Hyperthermia Intraperitoneal Chemotherapy Patient.
- Designing and implementing program regarding Hyperthermia Intraperitoneal Chemotherapy Patients.
- Evaluating its effect on patient-reported recovery Profile

Research hypothesis:

To achieve the aim of this study the following research hypothesis is formulated:

H1: The patients ' knowledge and Reported Recovery Profile for hyperthermia Intraperitoneal Chemo-therapy patients Will be improved after program implementation.

H2: There will be a significant correlation between total reported recovery profile with total knowledge, post and after program implementation.

H3: There will be a significant correlation between length of hospital stay with reported recovery profile, post and after program implementation.

Research Design:

A quasi-experimental research design was utilized to conduct this study.

Setting:

This study was conducted in surgery department, and intensive care unit for surgery at the National Cancer Institute (NCI), Cairo University

The patient is selected for surgery in the outpatient clinic and is transferred to general surgery department, whereby the patient is prepared for the operations. The patient is discharged from there to intensive care unit was composed of four rooms (two rooms meales & two rooms females each room contained five beds).

Subjects:

- Type: Purposive sample

- Size: The sample size of patients was calculated based on the previous year census report of admission in general surgery department from the National Cancer Institute (NCI), Cairo University **Census, 2018**.. Utilizing the following formula **(Yamane, 1967).**

$$n = \frac{N}{1+N(e)^2}$$

Where:

n= sample size

N= total population (103)

e= margin error (0.05)

A purposive sample of 97 patients undergoing Hyperthermia Intraperitoneal Chemotherapy. From the above mentioned settings was recruited. Inclusion Criteria: The patients had been selected according to the following criteria: All patients older than 18 years undergoing CRS-HIPEC treatment, both sexes (male and female), are willing to participate in the study, diagnosed with peritoneal carcinomatosis that originate from digestive cancers, free from sever cognitive, physical and communication impairment a. Besides, didn't receive any program related to Hyperthermia Intraperitoneal Chemotherapy.

Tools of data collection:

There are two tool used to collect the data of this study to collect the data by the researcher:

Tool I: Structured interviewing questionnaire:

The researchers constructed it after reviewing relevant literature. It was written in the simple Arabic language. It used to assess patients' knowledge regarding Hyperthermia Intraperitoneal Chemotherapy and included three parts:

Part one: Concerned with assessment of patients' socio-demographic data such as age, gender, educational level, occupation, marital status, and residence.

Part Two: Assessed medical history data. This tool was designed by the researcher to collect data related to diagnosis, site of tumor, Type of operation, Length of hospital stay , Blood tests (3 &7 day after surgery)and Complications after surgery.

Part three: Encompassed the patient's knowledge assessment. It was adapted from **Steenhagen, (2016). Tabrizian, et al. (2014).** It was developed in Arabic form in order to prevent misunderstanding. It included 13 MCQs about peritoneum and Hyperthermia Intraperitoneal Chemo-therapy as; part one: the definition of peritoneum, (1 question), tumors that affect the peritoneum (1 question), causes (1questions), signs and symptoms (1question), diagnosis and treatment (2 questions). Part two : patient information about after Hyperthermia Intraperitoneal Chemotherapy as: peritonectomy, aim of Hyperthermia Intraperitoneal Chemo-therapy, define of Hyperthermia Intraperitoneal Chemo-therapy and who is the patient candidate for Hyperthermia Intra-peritoneal Chemotherapy , long will be the stay in the hospital, and complication .

Scoring system

Knowledge obtained from patients was scored and calculated. Each question ranged from 0-2 grade. Whereas the correct answer scored 2 grades and scored zero for an incorrect answer. The total score level for the questionnaire sheet was 13 grades (equal 100%).

- The patients' knowledge ≥ 60% considered satisfactory knowledge.
- The patients' knowledge < 60% considered unsatisfactory knowledge.

Tool (II): Patient-reported Recovery Profile: to be used in the evaluation of patient's recovery process and modified by the researcher to utilize the study Adopted from **(Benjamin Rinius, 2018).**It was divided into the following parts: The Questionnaires items include. Physical symptoms, (5 questions), physical function (5 questions), psychological (4 questions), social (3 questions), and activity (2 questions)

Scoring system:

Obtained from patients was scored and calculated. Each question ranged from 0-3 grades. Each item is estimated with 4-degree verbal category scale: Difficult, Medium difficulty, Mild and No. The total score of all questions will be represented in 100%.

2- Content validity and reliability:

Tools' validity tested through a jury of five experts from the medical-surgical nursing department, faculty of nursing, Benha University. The modification was carried out according to the panel's judgment on the clarity of sentences, appropriateness, and completeness of the content

Testing reliability. The percentage of consensus among experts regarding structured interviewing questionnaire was 97%, and Patient-reported Recovery Profile was 98%. The reliability of the proposed tools was tested by Cronbach's alpha test (0.958) for a structured interview questionnaire

Ethical consideration:

All ethical issues were taken into consideration during all phases of the study. The ethical research consideration in this study included the following: the research approval was obtained before program of patient-reported recovery profile implementation, the objectives and aim of the study were explained to all participants and they informed that they could withdraw from the study at any time. Additional oral consent was taken from the patients who participated in the study. The researcher maintained the anonymity and confidentiality of the subjects

Pilot study

The pilot study was carried out on 10 % (ten) patients to test the practicability, applicability and timing of data collection. No modifications were done to the questionnaire. Therefore, the sample of the pilot study was included in the total study sample.

Field work:

Permission granted from the Dean of Faculty of Nursing, Benha University, hospital directors, and head of the intensive care unit at the National Cancer Institute (NCI), Cairo University. The researcher obtained approval for data collection. The study's objectives and nature explained so it became possible to carry out the study with minimum resistance.

Preparatory phase included reviewing the available literature and different studies related to the research problem and theoretical knowledge of its various aspects of the study, using textbooks, evidence-based articles, internet periodicals, and journals in order to collect data of this study.

A designed education program regarding for cytoreductive surgery and hyperthermia intraperitoneal chemo-therapy for Peritoneal Carcinomatosis patient's was developed by researchers based on patients' need assessment, literature review, researchers' experience, and opinions of experts. The researchers designed a booklet. It was written in the Arabic language with illustrations.

The theoretical part included information about peritoneum and Hyperthermia Intraperitoneal Chemo-therapy as; **part one:** The define of peritoneum, tumors that affect the peritoneum, causes, signs and symptoms, diagnosis and treatment. **Part two**: patient information about the necessary program after hyperthermia intraperitoneal chemotherapy as: definition peritonectomy, aim of hyperthermia intraperitoneal Chemo-therapy, define of hyperthermia Intraperitoneal chemotherapy and who is the patient candidate for Hyperthermia Intraperitoneal Chemo-therapy, long will be stay in the hospital, and complication. This tool is distributed three times preprograms, immediately post and after programs (21 days of operation, before discharge).

Field of work: The process of data collection extended over 12 months from the beginning of January 2019 to the end of January 2020. The researchers visited the general surgery department and intensive care unit two days weekly to collect the data by using previous tools. The researchers assessed the patients' knowledge about hyperthermia intraperitoneal

chemotherapy by using tool one part three of the structured interview questionnaire. The average time needed for the completion of a questionnaire was between 20-30 minutes.

Implementation phase:

The education program regarding cytoreductive surgery and hyperthermia intraperitoneal chemotherapy for Peritoneal Carcinomatosis patients was implemented for the general surgery department and intensive care unit. It has started for patient after admission with orientation about the content of the program. Individualized or small group sessions were done. The implementation of this health educational program was conducted on four sessions:

Session one: (introductory session) orientation and explanation of reasons and importance of educational program and give an explanation about the definition of peritoneum, tumors that affect the peritoneum, causes, signs and symptoms, diagnosis and treatment.

Session two: An explanation after Hyperthermia Intraperitoneal Chemo-therapy as: definition peritonectomy, aim of hyperthermia intraperitoneal chemotherapy, define of hyperthermia intraperitoneal chemo-therapy and who is the patient candidate for hyperthermia intraperitoneal chemo-therapy, how long will be stay in the hospital, and complication.

Session three: An explanation about reported Recovery Profile as:- coping strategies for medical treatment and self-care to relieve pain by using A-non pharmacological treatment through physical and natural treatment - mental and behavioral treatment include the following – guided thinking, relaxation exercises, guided imagery, hypnosis, and distraction. B-pharmacological treatment through analgesic drug and general anesthesia .Treatment of general weakness and fatigue by exercise to improvement activity and movement.

Session four: To re-demonstration daily exercise to promote physical activity and movement. An explanation Patient knowledge about Nutrition state of patient to maintain a healthy-body weight, nausea by personal hygiene and stress, sleep disturbances. Also psychological symptoms and depression treatment.

The duration of each session ranged from 45-60 minutes. Content of the program was similar for all patients except for its simplicity. The booklet was handled to the studied patients at the end of the sessions.

The teaching methods were composed of lectures, group discussions, and role-playing exercises. Visual aids included colored printed booklet (handout), Microsoft PowerPoint presentation, illustrated pictures, and videos.

Evaluation phase: The effect of the education program on patient knowledge, and reported recovery profile evaluated three times pre, immediately post and after program implementation (21 days of operation before discharge).

Administrative design:

An Approval to carry out this study was obtained from the dean of faculty of nursing and, hospital directors, and head of the intensive care unit at the National Cancer Institute (NCI), Cairo University. The researcher obtained approval for data collection. The study's objectives and nature explained so it became possible to carry out the study with minimum resistance.

Statistical design

Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 20. Data were collected, revised, coded, organized, tabulated, and analyzed using frequencies, number, percentage, mean scores, standard deviation and correlation coefficient. Data were presented in the form of tables and figures. Quantitative data was presented by mean ($\overline{X}$) and standard deviation (SD). Qualitative data was presented in the form of frequency distribution tables, number and percent. It was analyzed by Chi- square test (X^2) & correlation to detect the relation between the variables of the study (P- value).

Statistical significance was considered as follows:

- P- value > 0.05 Not significant
- P- Value < 0. 05 Significant
- P- value < 0.001 Highly significant

Limitations of the study:

- There was the limited number of researches that discuss this topic in Egypt.

Result:

Table (1): Regarding socio-demographic characteristics group of patients After Hyperthermia Intraperitoneal Chemo-therapy, it was observed that, their age 77.3% of the study sample was 41≤60 years old with mean (43.86 ± 6.371) and the majority 87.6% were males as well as, 62.9% were married. Moreover (62.9%) were living in urban area, and around (53.6%) had Secondary education. Besides, about (56.7%) of study groups were manual workers.

Table (2): Showed that, regarding site of tumor Less than half of the studied samples (45.4%) have peritoneal membrane.The majority of them (77.3%) their Length of hospital stay was 21 days and (66.0%) of then have abnormal blood test (3 day after surgery while normal blood test ,(79.4%) 3&7days after surgery without complication in (80.4%).

Table (3): Shows, 88.7% of patients had an unsatisfactory level of knowledge pre-program. While (80.5%) had a satisfactory immediately post-program implementation.Also (61.9%) of patients had a satisfactory after program implementation (21 days of operation before discharge).With statistically difference with significant (P < 0.000**).

Table (4): This table shows high statistically significant difference in Physical symptoms domine (Pain , Bladder function, Fatigue , Appetite changes & Sleeping Difficulties) pre-program, immediately post and after program implementation (21 days of operation before discharge).

Table (5): This table shows high statistically significant difference in Physical function domine

(Gastrointestinal function, Bladder function, Muscles weakness and Sexual activity) pre-program, immediately post and after program implementation (21 days of operation before discharge).

Table (6): This table shows high statistically significant differences in psychological domine (Anxiety and worry, Feeling down and Difficulty in Concentration) pre-program, immediately post and after program implementation (21 days of operation before discharge).

Table (7): This table shows high statistically significant differences in social domine (Social activities, Dependence on Others and Interest in Surrounding) pre-program, immediately post and after program implementation (21 days of operation before discharge).

Table (8): This table shows high statistically significant differences in activity domino (Re-establishing everyday life personal hygiene) pre-program, immediately post and after program implementation (21 days of operation before discharge).

Table (9): This table illustrate that regarding total Reported Recovery Profile in all domino there was degree of complete recover after program implementation. With statistical significance (P <0.001**).

Table (10): shows positive and significant correlations between Reported Recovery Profile and total knowledge, immediately post and after 21 days of operation (before discharge).

Table (11): shows negative correlation between length of hospital stay and Reported Recovery Profile immediately post and after program implementation (21 days of operation before discharge).

Table (1): Frequency distribution of the studied nurses according to their socio-demographic characteristics

Demographic characteristics	No.	%
Age		
18<40	22	22.7
41≤60	75	77.3
Mean±SD	43.86 ± 6.371	
Gender		
Male	85	87.6
Female	12	12.4
Marital status		
Single	14	14.4
Married	61	62.8
Divorced	15	15.5
Widower	7	7.3
Residence		
Rural	36	37.1
Urban	61	62.9
Level of Education		
Not read &write	8	8.2
Read&write	18	18.6
Secondary	52	53.6
University	19	19.6
Occupation		
Worker(manual)	55	56.7
Employee	29	29.9
Student & Not working	13	13.4

Table (2): Description of medical data among the studied group (n=97).

Medical history	No.	%
-site of tumor		
Colon	**26**	26.8
Rectum&bladder	**13**	13.2
Ovarian&uters	14	14.4
peritoneal membrane	44	45.4
-Type of operation		
- Eradication of the right colon& small intestine	23	23.7
- Partial cystectomy	19	19.6
- One-sided ovarian resection& Hysterectomy	21	21.6
Peritonealmembrane& cystectomy	34	35.1
- **Length of hospital stay**		
Stay 21 days	75	77.3
More than 30 days	22	22.7
Blood tests (3 day after surgery)		
Normal	33	34.0
Abnormal	64	66.0
Blood tests (7 day after surgery)		
Normal	77	79.4
Abnormal	20	20.6
Complications after surgery		
No	78	80.4
Pneumonia	5	5.2
Sepsis	3	3.1
Hypertention	3	3.1
Irregular heartbeat	3	3.1
Renal failure	1	1.0
a fistula	4	4.1

Table (3): Distribution of patient knowledge preprogram immediately post and after program implementation (21 days of operation before discharge)

Total knowledge	Pre program		immediately post		after program		T- test p- value (1)	T- test p-value (2)
	N	%	N	%	N	%	T	T
Unsatisfactory	86	88.7	17	17.5	37	38.1	10.82	9.577
Satisfactory	11	11.3	80	80.5	60	61.9	P:<0.000*	P:<0.000*

Table (4): Distribution of patient Reported Recovery Profile (physical symptoms) preprogram, immediately post and after program implementation (21 days of operation before discharge).

Physical Symptoms	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
1- Pain	N	%	N	%	N	%		
Difficult	83	83.6	7	7.2	0	0		
Moderate	9	9.3	58	59.8	6	6.2	T:98.636	T:33.137
Light	5	5.2	19	19.6	11	11.3	P:0.000	P:<0.004**
No	0	0	13	13.4	80	82.5		
2-Nausea								
Difficult	77	79.4	4	4.1	4	4.1		
Moderate	14	14.4	69	71.1	9	9.2	T:162.37	T:31.817
Light	6	6.2	18	18.6	18	18.6	P:<0.000**	P:<0.132
No	0	0	6	6.3	66	68.8		
3-Fatigue								
Difficult	79	81.4	10	10.3	0	0		
Moderate	13	13.3	66	68.0	6	6.2	T:46.942	T:65.850
Light	5	5.2	16	16.5	18	18.6	P: <0.003*	P:<0.000*
No	0	0	5	5.2	73	75.2		
4- **Appetite changes**								
Difficult	75	77.3	7	7.2	0	0		
Moderate	16	16.5	77	79.4	6	6.2	T :57.369	T:81.162
Light	6	6.2	7	7.2	22	22.7	P:<0.000**	P:<0.000*
No	0	0	6	6.2	69	71.1		
5-**Sleeping Difficultie**								
Difficult	76	78.4	7	7.1	5	5.2		
Moderate	15	15.5	58	59.8	6	6.2	T:66.804	T:75.729
Light	6	6.2	19	19.6	11	11.3	P:<0.000**	P:<0.000*
No	0	0	13	13.4	75	77.3		

* P < 0.05 (significant) ** p-0.000 (highly significant)

Table (5): Distribution of patient Reported Recovery Profile on physical function preprogram, immediately post and after program implementation (21 days of operation before discharge).

Physical Function	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
6- Gastrointestinal Function	N	%	N	%	N	%		
Difficult	83	85.6	5	5.2	0	0	T:30.875 P:0.057	T:150.542 P:<0.000*
Moderate	5	5.2	70	72.2	6	6.2		
Light	9	9.3	13	13.4	11	11.3		
No	0	0	9	9.3	80	82.5		
7-Bladder function								
Difficult	83	85.6	3	3.1	0	0	T:150.542 R: 0.011	T:39.827 P:<0.005*
Moderate	12	12.4	79	81.4	6	6.2		
Light	2	2.1	11	11.3	22	22.7		
No	0	0	4	4.1	69	71.1		
8. Mobilization								
Difficult	84	86.6	6	6.2	0	0	T:47.693 R: 0.011	T:16.656 P:<0.082
Moderate	7	7.2	76	78.4	6	6.2		
Light	6	6.2	11	11.3	18	18.6		
No	0	0	4	4.1	73	75.2		
9. Muscles weakness								
Difficult	86	88.7	5	5.2	0	0	T:26.013 R: 0.206	T:28.187 P:<0.020
Moderate	5	5.2	84	86.6	5	5.2		
Light	6	6.2	4	4.1	13	13.4		
No	0	0	4	4.1	79	81.4		
10. Sexual activity								
Difficult	88	90.7	3	3.1	0	0	T:47.504 R: 0.012	T:43.997 P:<0.002*
Moderate	7	7.2	76	78.4	4	4.1		
Light	2	2.1	10	10.3	10	10.3		
No	0	0	8	8.2	83	85.6		

* P < 0.05 (significant) ** p-0.000 (highly significant)

Table (6): Distribution of patient Reported Recovery Profile on psychological symptoms preprogram, immediately post and after program implementation (21 days of operation before discharge).

Psychological	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
11. Anxiety and worry	**N**	**%**	**N**	**%**	**N**	**%**		
Difficult	83	85.6	2	2.1	0	0	T:109.894 P:<0.000*	T:70.264 P:<0.000*
Moderate	9	9.3	77	79.4	3	3.1		
Light	5	5.2	13	13.4	11	11.3		
No	0	0	5	5.2	83	85.6		
12. Feeling down								
Difficult	84	86.6	5	5.2	0	0	T:52.807 P:<0.152	T:26.447 P:<0.003*
Moderate	9	9.3	80	82.5	2	2.1		
Light	4	4.1	9	9.3	10	10.3		
No	0	0	3	3.1	85	87.6		
13. Feeling lonely								
Difficult	74	76.3	3	3.1	0	0	T:27.553 P:<0.691	T:22.785 P:<0.299
Moderate	14	14.4	85	87.6	3	3.1		
Light	9	9.3	5	5.2	8	8.2		
No	0	0	4	4.1	86	88.7		
14. Difficulty in Concentration								
Difficult	85	87.6	5	5.2	0	0	T:43.463 P:<0.269	T:17.878 P:<0.004*
Moderate	6	6.2	74	76.3	3	3.1		
Light	6	6.2	10	10.3	6	6.2		
No	0	0	8	8.2	88	90.7		

Table (7): Distribution of patient Reported Recovery Profile on social symptoms preprogram, immediately post and after program implementation (21 days of operation before discharge)

Social	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
15. Social activities	**N**	**%**	**N**	**%**	**N**	**%**		
Difficult	89	91.8	7	7.2	0	0	T:44.287 P:<0.007*	T:64.829 P:<0.000*
Moderate	5	5.2	69	71.1	2	1.1		
Light	3	3.1	16	16.5	14	14.4		
No	0	0	5	5.2	81	83.5		
16. Dependence on Others								
Difficult	76	78.4	7	7.2	0	0	T:21.654 P:<0.360	T:86.331 P:<0.000*
Moderate	17	17.5	77	79.4	2	2.1		
Light	4	4.1	7	7.2	10	10.3		
No	0	0	6	6.2	85	87.6		
17. Interest in Surrounding								
Difficult	86	88.7	5	5.2	0	0	T:43.206 P:<0.033	T:0.815 P:<0.81
Moderate	6	6.2	73	75.3	2	2.1		
Light	5	5.2	11	11.3	12	12.4		
No	0	0	8	8.2	83	85.6		

Table (8): Distribution of patient Reported Recovery Profile on activity preprogram, immediately post and and after program implementation (21 days of operation before discharge)

Activity	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
18. Re-establishing everyday life	**N**	**%**	**N**	**%**	**N**	**%**		
Difficult	63	64.9	7	7.2	0	0	T:46.580 P:<0.015	T:36.527 P:<0.014
Moderate	17	17.5	77	79.4	6	6.2		
Light	17	17.5	7	7.2	22	22.7		
No	0	0	6	6.2	69	71.1		
19. Personal hygiene								
Difficult	74	76.3	7	7.2	0	0	T:71.689 P:<0.000*	T:55.152 P:<0.000*
Moderate	12	12.4	58	59.8	6	6.2		
Light	11	11.3	19	19.6	18	18.6		
No	0	0	13	13.4	73	75.3		

Table (9): comparison of total reported recovery profile preprogram, immediately post and after program implementation (21 days of operation before discharge)

Physical Total	Pre Program		Post program		After program		T- test p- value (1)	T- test p- value (2)
1- Physical symptoms	**N**	**%**	**N**	**%**	**N**	**%**		
Complet recovered	2	2.1	5	5.2	92	92.9	T:82.021 P:<0.000*	T:97.324 P:<0.000*
partially recovered	8	8.2	86	88.7	5	5.2		
Not recovered	87	89.7	6	6.2	0	0		
2-Physical function								
Complet recovered	2	2.1	7	7.2	91	93.8	T:87.021 P:<0.000*	T:97.324 P:<0.000*
partially recovered	5	5.2	87	89.7	6	6.2		
Not recovered	90	92.8	3	3.1	0	0		
3- Psychological								
Complet recovered	2	2.1	4	4.1	81	83.5	T:51.390 P:<0.046	T:96.258 P:<0.000*
partially recovered	4	4.1	88	90.7	16	16.5		
Not recovered	91	93.8	5	5.2	0	0		
4-Social								
Complet recovered	0	0	6	6.2	86	88.7	T:87.021 P:<0.000*	T:97.324 P:<0.000*
partially recovered	5	5.2	83	85.6	9	9.3		
Not recovered	92	93.8	8	8.2	2	2.1		
Activity-5								
Complet recovered	0	0	6	6.2	85	87.6	T:87.566 P:<0.001*	T:52.513 P:<0.003*
partially recovered	6	6.2	85	86.6	10	10.3		
Not recovered	91	93.8	6	6.2	2	2.1		

Table (10): Correlations between patients reported recovery profile and total knowledge, immediately post and after program implementation (21 days of operation before discharge)

	Reported Recovery Profile		
Total Knowledge		**R**	**P**
	Post	0.292	0.004
	After	0.349	0.000

Table (11): Correlations between lengths of hospital stay and reported Recovery Profile, immediately post and after program implementation (21 days of operation before discharge)

Reported Recovery Profile	**L ength of hospital stay**		
		R	**P**
1- Physical symptoms	Post	-256	0.011
	After	0.207	0.042
2- Physical function	Post	0.201	0.048
	After	0.207	0.029
3- Psychological status	Post	-220	0.031
	After	0.253	0.012
4- Activity	Post	-270	0.007
	After	0.239	0.019
5- Social	Post	-264	0.009
	After	-215	0.034

Discussion

In the past, peritoneal carcinomatosis has been regarded as a terminal disease that would result in the death regardless of the form of intervention. Today, hyperthermic intraperitoneal chemo-therapy combined with cytoreductive surgery has been reported to improve the rate of survival for selected patients **(Glehen et al., 2010).**Morbidity and mortality rates can be minimized not only by increasing the experience of the surgeons but also by developing a selective team to improve the overall patient outcomes

Regarding socio demographic characteristics of the study sample, the age group of the majority was 41≤60 years old with mean (43.86 ± 6.371), were males as well as, about two third of them were married ,and were residing in Urban area, and more than half have Secondary level education. Besides, about more than half of study sample were manual works. This These results agreed with **(Verwaal et al., 2003)** who conducted a study about " Randomized Trial of Cytoreduction and Hyperthermic Intraperitoneal Chemotherapy Versus Systemic Chemotherapy and Palliative Surgery in Patients With Peritoneal Carcinomatosis of Colorectal Cancer" Demonstrated that, the majority of studied sample were males . Disagree with (**Alyami et al., 2017)** study about "Ninety-day post-operative morbidity and mortality using the National Cancer Institute's common terminology criteria for adverse events better describe post-operative outcome after cytoreductive surgery and hyperthermic intraperitoneal

chemotherapy" and stated that 66% of studied patients were females, and the minority (34%) of them were males.The mean age at time of surgery was 59 years old.

On other side disagree with **(Elgendy et al. (2019)** who studied " Perioperative management and postoperative outcome of patients undergoing cytoreduction surgery with hyperthermic intraperitoneal chemotherapy" and illustrated that, regarding patients characteristics , mean age was 52 ± 13.7 years and the majority of them were females.

Referring to medical data of study sample, the present study showed that, regarding site of tumors less than half of them had peritoneal membrane. The majority of them their duration of hospitalization was 21 days and had normal blood test 3&7days after surgery without complication. These results agreed with the study conducted by **(Cooksley and Haji-Michael, 2011)** who conducted a study about " Post-operative critical care management of patients undergoing cytoreductive surgery and heated intraperitoneal chemotherapy (HIPEC)" demonstrated that, the appendix was the most common site of the primary tumor while the minority of studied subjects with peritoneal cancer as a primary site for tumor, the length of hospital stay was 19 days after surgery with normal blood tests and no complications .And this was in congruent with **(Elgendy et al., 2019)** who found that, the overall hospital stay was 23 days.

Concerning knowledge about cytoreductive surgery and hyperthermia Intraperitoneal Chemotherapy for Peritoneal carcinomatosis ,the majority of the study sample had an unsatisfactory level of knowledge pre-program .While the majority had a satisfactory immediately post and two third had a satisfactory after program implementing. From the viewpoint of the researcher, the educational program provided to patients who underwent the operation had a positive effect on disease information.These results agreed with the study conducted by **(Martin Hübner et al., 2020)** who studied about "Guidelines for Perioperative Care in Cytoreductive Surgery (CRS) with or without hyperthermia Intraperitoneal chemo-therapy (HIPEC)". Showed that, patients preparing for HIPEC overwhelmingly requested mixed-type educational information, related to operative decision-making and the recovery process, as opposed to just written materials. In the same line with **(Sohan Lal Solanki et al., 2019)** who study about (The post-operative patient-reported quality of recovery in colorectal cancer patients under enhanced recovery after surgery using QoR- (quality of recovery score40) reported that, information was limited regarding patients undergo HIPEC.

Regarding Patient Reported Recovery Profile the present study clarified that, there was high statistically significant difference in Physical symptoms domino (Pain, Bladder function, Fatigue, Appetite changes & Sleeping Difficulties) pre-program, immediately post and after program implementation.This was Supported to this study **(Rinius, 2018)** in his study entitled "Patient-reported recovery profile after cytoreductive Surgery and hyperthermic Intraperitoneal Chemotherapy" .Stated that, physical symptoms domino (fatigue, appetite changes ,pain and sleeping difficulties)

were dominated decreased in the recovery period. This was on the same line, **(Forsberg et al., 2015)** who study was about (patient's perception of their postoperative recovery for one month) who illustrated that, Fatigue and muscle weakness were the two most prevalent item variables related to Physical symptoms dominated which were decreased in the recovery period. Agree with**, (Martin et al., 2016)** in his study entitled" Factors Associated with Readmission After Cytoreductive Surgery and Hyperthermia Intraperitoneal Chemotherapy for Peritoneal Carcinomatosis", reported that, Pain, muscle weakness, fatigue, infections, and anxiety decreased in the recovery period.

Regarding Patient Reported Recovery Profile the present study finding in Physical function domino (Gastro-intestinal function, Bladder function, Muscles weakness & Sexual activity) the majority of them in difficult level pre-program, while the minority of them immediately post and after program implementation. In agreement to the study of **(Vernon and Fitz-Henry, 2017)** who study about (Guidelines for the Prevention and Treatment of Postoperative Nausea and Vomiting) Stated that, to reduce baseline risks of physical function, regular assessment and frequent health education allows for early detection and rapid relive physical function problem. This wasn't in accadace with (**Rinius, 2018),**who cleared that, in related to physical function postoperative, patients experiences disturbances in gastro-intestinal and bladder functions, difficulties in mobilization, and muscle weakness.

Regarding Patient Reported Recovery Profile in psychological syptoms these was had stasistcally significant difference regarding (Anxiety and worry, Feeling down & Difficulty in Concentration) them in difficult level pre-program, immediately post and after program implementation. The was agreement with the study of **(Kalogianni et al., 2016)** stated that, Health education to patients delivered by nurses has been shown to decrease anxiety ,worries level and other psychological symptoms. These was the same line with **(Wooten, 2009)** who stated that, health education for patient undergoing cytoreductive surgery and heated intraperitoneal chemotherapy (HIPEC) decreases anxiety level.

Regarding Patient Reported Recovery Profile these was had stasistcally significant difference social symptams (Social activities, Dependence on Others and Interest in Surrounding) the majority of them in difficult level pre-program, while the minority of them immediately post and after program implementation. This was agreement with **(Kalogianni, et al., 2016**) who study was about (Can Nurse-led Preoperative Education Reduce Anxiety and Postoperative complications of Patients undergoing Cardiac Surgery?) who reported that half of study sample interest in surrounding has been improved.

AS Regarded Patient Reported Recovery Profile these was had stasistcally significant difference in present study finding in activity domino (Re-establishing everyday life personal hygiene) the majority of them in difficult level pre-program, while the minority of

them immediately post and after program implementation.This was in the same line **(Martin et al., 2016)** who stated that, HIPEC patients have complex health problems associated with personal hygiene impairment. (32%) were able to perform personal hygiene activity without help on the discharge day while the remaining majority was still asking for help. This was in disagrrement with, **(Hawkin, & Grunberg, 2009)** in his study entitled, " Chemotherapy-Induced Nausea and Vomiting: Challenges and Opportunities for Improved Patient Outcomes" and reported that, in some patients, deficit to perform personal hygiene occurs after recovery period.

Regarding the correlation between length of hospital stay and reported recovery profile among patients reveals inverse correlation between length of hospital stay and reported recovery profile after immediately post and after program implementation, This means that the educational program that was given to the patient undergoing heated intraperitoneal chemotherapy had a positive result, and the program achieved its intended goal. These results indicate that as the level of information of a patient reported recovery profile improved and length of hospital stay decrease. Supporting the four research hypothesis. This result matched a study conducted by **(Jeff, & Taylor, 2014)** who stated that, the global level of recovery showed that HIPEC patients did not recovered at all during hospital stay period suggesting that the recovery time was extended beyond hospitalization and No significant difference was found in the length of stay or readmission. In the study of **(Kalogianni et al., 2016).** stated that, Health education to patients delivered by nurses before surgery has been shown to decrease the length of hospital stay.Also this was in the same line with these study findings **(Dai Shida, 2015)** who stated that Enhanced recovery after surgery (ERAS) protocols may reduce the length of hospital stay. This was supported by these study results **(Schmidt, 2018)** in his study entitled" Impact of synchronous liver resection on the perioperative outcomes of patients undergoing HIPEC". illustrated that, HIPEC were associated with decreased length of hospital stay, reoperation, and postoperative morbidity, and worse outcomes.

Conclusion:

Based on the findings of the current study, it can be concluded that: Implementing an education program for patients with CRS ± HIPEC was effective in improving knowledge, Reported Recovery Profile and decrease of the length of hospital stay.

Recommendations:

1- The need to increasing awareness of patients and nursing care providers about (CRS-HIPEC).
2- Further study with replication of the current study on a larger probability sample is recommended to achieve generalization of the results and wider utilization of the designed educational program

References:

Akash M. Mehta M, Alwin D. and Huitema P. (2017): Standard Clinical Protocol for Bidirectional Hyperthermic Intraperitoneal

Chemotherapy (HIPEC): Systemic Leucovorin, 5-Fluorouracil, and Heated Intraperitoneal Oxaliplatin in a Chloride-Containing Carrier Solution, Annals of Surgical Oncology volume 24, pages 990–997.

Alyami ,M, Kim, B.J, Villeneuve,L, Vaudoyer, D, Francois-Noel Gilly, Glehen, O & Passot, G. (2017): Ninety-day post-operative morbidity and mortality using the National Cancer Institute's common terminology criteria for adverse events better describe post-operative outcome after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy, International Journal of Hyperthermia, DOI: 10. 1080/ 02656736. 2017.1367846.

Benjamin Rinius R. (2018): patient-reported recovery profile after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy, School of Health, Care and Social Welfare,

Benjamin, R. (2018):- Patient-Reported Recovery after Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy, Care and Social Welfare, 10 credits / 15 HE credits, Carcinomatosis of Colorectal Cancer, Journal of Clinical Oncology, Vol 21, No 20 (October 15), 2003: pp 3737-3743 DOI: 10.1200/JCO.2003.04.187

Cooksley, T.J and Haji-Michael, P.(2011): Post-operative critical care management of patients undergoing cytoreductive surgery and heated intraperitoneal chemo-therapy (HIPEC), World Journal of Surgical Oncology 2011, 9:169. http:// www. wjso.com/content/9/1/169

Dai Shida, t., Kotaro W, Yuu T, Atsushi Y., Masahiko K, Sachio M, and Kyoko T., (2015): The postoperative patient- reported quality of recovery in colorectal cancer patients under enhanced recovery after surgery using QoR-40, Oct 26;15:799.

Elgendy H, Nafady-Hego H,Abd Elmoneim HM, Youssef T, Alzahrani A.(2019): Perioperative management and postoperative outcome of patients undergoing cytoreduction surgery with hyperthermic intraperitoneal chemotherapy. Indian J Anaesth 2019; 63: 805-13.

Forsberg, A., Vikman, I., Wälivaara, B., & & Engström, Å. (2015). Patient's perception of their postoperative recovery for one month. Journal of Clinical Nursing, 24:1825-1836,

Glehen, O., Franc¸O., Noel Gilly, M. &, Catherine Arvieux, D.,(2010):- Peritoneal Carcinomatosis from Gastric Cancer: A Multi-Institutional Study of 159 Patients Treated by Cytoreductive Surgery Combined with Perioperative Intraperitoneal Chemotherapy Society of Surgical Oncology 2010, Ann Surg Oncol DOI 10.1245/s10434-010-1039-7

Hawkins, R., Grunberg, S. (2009). Chemotherapy-Induced Nausea and Vomiting: Challenges and Opportunities for Improved Patient Outcomes. Clinical Journal of Oncology Nursing, 13 (1), 54-64**.**

Jeff, A., & Taylor, C. (2014). Ward Nurses' Experience of Enhanced Recovery After Surgery: A Grounded Theory Approach. Gastrointestinal Nursing, 12:4, 23-31

Kalogianni, A., Almpani, P., Vastardis, L., Baltopoulos, G., Charitos, C., & Brokalaki, H. (2016). Can Nurse-led Preoperative Education Reduce Anxiety and Postoperative Complications of Patients Undergoing Cardiac Surgery? European Journal of Cardiovascular Nursing, 15(6), 447 – 458.

Kurinchi Gurusamy, Claire L, Elena P, Bhanot, R., Brian D, Mould, T., Muntzer M., Mark S, and Omer A.(2020): Cytoreductive surgery (CRS) with hyperthermic intra-operative peritoneal chemotherapy (HIPEC) versus standard of care (SoC) in people with peritoneal metastases from colorectal, ovarian orgastric origin: protocol for a systematic review and individual participant data (IPD) meta-analyses of effectiveness and cost-effectiveness, Sarah O'Dwyer ost-effectiveness. BMJ Open, 039314

Lee, S., Chia, G. Tan, K. Soo, and Teo,. M. (2018): Cost Effectiveness of Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemo- therapy for Management of Colorectal Peritoneal Carcino-matosis, original article – colorectal cancer, National Cancer Center, Singapore, Singapore, Society of Surgical Oncology , 8 June 2018.

Martin H, , Shigeki K, Laurent V, Ahmed Al,Mohammad A, and Konstantin B.,(2020):- Guidelines for Perioperative Care in Cytoreductive Surgery (CRS) with or without hyperthermic Intra PEritoneal chemotherapy (HIPEC): Enhanced recovery after surgery (ERAS®) Society recommendations Part I: Preoperative and intraoperative management, original article: https:// doi. org/ 10. 1016/ j. ejso.2020.08.006.

Martin, A., Abbott, D., Hanseman, D., Sussman, J., Kenkel, A., Greiwe, P., Ahmad, S. (2016). Factors Associated with Readmission After Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy for Peritoneal Carcinomatosis. Annals of Surgical Oncology, 23(6), 1941-1947

Ozgul Duzgun, C., (2019): Evaluation of Enhanced Recovery After Following a Surgical Protocol for Cytoreductive Surgery and Hyperthermic Intraperitonea C https// www. orcid. org/0000-0001-7214-2276hemotherapy for Peritonea Carcinomatosisdoi, 10. 5455/ medarh. 2019.73.331-337,

Rinius, B. (2018): Patient-Reported Recovery Profile After Cyto-reductive Surgery and Hyperthermic Intraperitoneal Chemotherapy, School of Health, Care and Social Welfare, Master Thesis in Nursing Sciences, Västerås, Webb: www. mdh.se doi:10.1111/jocn.12793

Schmidt C. (2018): Impact of synchronous liver resection on the perioperative Society of Onco-

Anaesthesia and Perioperative Care consensus guidelines for perioperative management of patients for cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS-HIPEC), Indian J Anaesth, Dec;63(12):972-987.

Sohan L,. Solanki, T., Sudipta, M, Vandana A., Raghu S., Thota F., Kalpana B, Shagun B., Shah G., NehaD., Rakesh G.,, Reshma P., Ambulkar, N., Madhukar B., Viplab P ., Snita S , Meenakshi V., and Venketeswaran v., (2019): outcomes of patients undergoing CRS-HIPEC. J Gastrointest Surg.; 22 (9): 1576–84.

Steenhagen, E. (2016). Enhanced Recovery after Surgery: It's Time to Change. Nutrition in Clinical Practice, 31(1):18-29.

Sugarbaker P.,(2018):- Normothermic intraperitoneal chemotherapy long term (NIPEC-LT) in the management of peritoneal surface malignancy, an overview, Epub 2017 May 23.PMID: 30911636.

Tabrizian, P., Shrager, B., Jibara, G., Yang, M., Romanoff, A., Hiotis,S., Labow, D.(2014). Cytoreductive Surgery and Hyperthermic Intra-peritoneal Chemotherapy for Peritoneal Carcinomatosis: Outcomes from a Single Tertiary Institution. Journal of Gastrointestinal Surgery, 18(5), 1-8

Vernon, J., & Fitz-Henry, J. (2017). Guidelines for the Prevention and Treatment of Postoperative Nausea and Vomiting (PONV) in Adults. NHS Trust, (5), 1-16.

Verwaal,V. J, Ruth, S. E, van, G. W, Tinteren, H.V.(2013): Randomized Trial of Cytoreduction and Hyperthermic Intraperitoneal Chemotherapy Versus Systemic Chemotherapy and Palliative Surgery in Patients With Peritoneal

Wooten, L. (2009). Appendix B. Nursing Care of the HIPEC Patient. Current Problems in Cancer, 33 (3), 227-237.

Yamane, T. (1976). Statistics an Introductory Analysis. 2nd Ed. New York Harper and RowCO.USA,213.