

Effect of nursing model based on Snyder's hope theory on fatigue and quality of life among women with cervical cancer

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Abstract

Background: Cervical cancer a significant health issue worldwide. Improving women hope level has a pivotal role in reducing fatigue and improve quality of life **Aim:** This research aimed to evaluate effect of nursing model based on Snyder's hope theory on fatigue and quality of life among women with cervical cancer **Design:** A quasi-experimental research (two groups pre/posttest design). **Sample:** 54 women diagnosed with cervical cancer. **Setting:** The present research conducted at obstetric & gynecological department at Helwan General Hospital, Egypt. **Tools:** Four tools were used for data collection: A structured interviewing questionnaire, Herth hope index, Cancer-related fatigue scale and Functional Assessment of Cancer Therapy- General. **Results:** There was no a statistical significant difference in the mean scores of the Herth Hope Index, Cancer-related fatigue and Quality of life between the study and control groups at pre intervention phase ($p > 0.05$). However, after three and six months of intervention, the mean score of the Herth Hope Index, Cancer-related fatigue and Quality of life were higher among study group than the control group with highly statistical significant difference ($p \leq 0.001$). **Conclusion:** Application of nursing model based on Snyder's hope theory was effective in improving level of knowledge, reducing level of fatigue and improving quality of life among woman with cervical cancer. **Recommendation:** All women diagnosed with cervical cancer should receive printed booklets and brochures containing component of Snyder's hope theory and how to apply it. These booklets should be kept in all obstetrics and gynecological units.

Keywords: Cervical cancer, Fatigue, Quality of life, Snyder's hope theory,

Introduction

Cervical cancer is currently considered as the fourth most common malignant tumors among women that can be defined as cancer that forms in tissues of the cervix (the organ connecting the uterus and vagina) occurs when cervical cells multiply rapidly. Cervical cancer is mainly caused by certain types of human papillomavirus (HPV) which include many types that are responsible for approximately 70% of cervical cancer cases in all countries around the world. It is usually a slow-growing cancer that may not have symptoms but can be found with regular Pap tests (a procedure in which cells are scraped from the cervix and looked at under a microscope).⁽¹⁾

One of the most significant psychological traits of people is hope, which

is the optimistic condition of the body based on an internal sense of success. People will increase their subjective initiative when faced with setbacks in order to increase their body's degree of optimism, which will aid in their physical and mental recovery. The ability to adopt a healthy coping style when dealing with disease is made easier by the patients' level of hope, which encourages patients to overcome challenges and alleviate anxiety and fatigue.⁽²⁾

The hope theory is a crucial area of positive psychology. It is a set of optimistic expectations for the future and for reaching one's own ideal goals. Every cancer women has a power called hope that rules the spirits and lives. Hope is also a crucial component of the cancer treatment process. According to

reports, patients' hope levels are directly correlated with their quality of life. ⁽³⁾

Nursing model based on hope theory is the model that based on the combination of the patient's situation, nurses' assistance in helping the women create realistic life objectives, and the women' ability to obtain recognition by achieving these goals results. Additionally, nurses, patients' families, and friends help patients feel loved, which reduces their bad feelings and improve quality of life. ⁽⁴⁾ This model involves asking women directly about the important variables that influence their moods. In the meantime, nurses and patients' relatives co-stimulate patients' positive mindset to foster a favorable rehabilitation environment for the patients, reducing their level of discomfort and exhaustion. ⁽⁵⁾

Cancer related fatigue is a symptom commonly experienced by women diagnosed with cervical cancer through all stages of the disease trajectory. Fatigue as a significant problem of women with cervical cancer that can be defined as feeling of extreme physical and mental tiredness. Being fatigued has a greater negative impact on functioning and health-related quality of life (HRQoL). ⁽⁶⁾

Quality of life is defined as an important aspect of the cancer patient care can be defined as individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals expectations standards and concern". Over the years, cervical cancer (CC), an extant lethal disease, has negatively impacted several women, Annually, new cases of cervical cancer are being appeared worldwide which has a great impact on quality of life of many women because cancer and its treatment can create difficulties in the ability to work and participate in common social activities. ⁽⁷⁾

Nurses are responsible for giving the bulk of direct care to women diagnosed with cervical cancer, who are essential to the delivery of healthcare. Nurses also play a

variety of crucial functions, including caretaker, counsellor, and researcher. Women with cervical cancer need help from nurses in identifying realistic goals and receiving positive feedback when achieving these goals. Also, nurses can help women by giving health education about drugs, illnesses, treatments, dietary modifications, and hospital release. All of these nursing actions improve quality of life and hope level and decrease women' fatigue. ⁽⁸⁾

Significance of the study

The distribution of cervical cancer burden is uneven globally, with over 90% of the highest incidence rates of cervical cancer occurring in sub-Saharan Africa. Annually, Africa records 20% of the new cases diagnosed with cervical cancer worldwide, and is considered the leading cause of cancer deaths among females. ⁽⁹⁾

The quality of life for cervical cancer patients in low- and middle-income nations must be improved. 85% of the 279 000 cervical cancer deaths worldwide in 2015 happened in low- and middle-income countries. ⁽¹⁰⁻¹¹⁾ 25.76 million Egyptian women over the age of 15 are at risk of having cervical cancer. According to current statistics, 299 women die from cervical cancer each year while 514 people are diagnosed with this disease. ⁽¹²⁾

Patients with cervical cancer have more physical and psychological suffering due to cancer discomfort, which often interferes with their quality of life. A study has shown that the incidence of cancer-related fatigue in patients with gynecological malignant tumors is about 93%. Enhancing women's recovery hope played a crucial part in reducing fatigue and enhancing quality of life. ⁽¹³⁾

Aim of the research:

This research aimed to evaluate effect of nursing model based on Snyder's hope theory on fatigue and quality of life among woman with cervical cancer.

Research hypotheses:

H1: Women who receive nursing care based on Snyder's hope theory will exhibit less level of fatigue compared to those in the control group.

H2: Women who receive nursing care based on Snyder's hope theory will exhibit higher quality of life compared to those in the control group.

Operational definitions:***Nursing model based on Snyder's hope theory:***

Nursing model that allow nurses to help women diagnosed with cervical cancer to be able to change the future for the better, reach a desired goal, make best use of opportunities, put talents to good use, and become more fulfilled in life by setting and vigorously pursuing meaningful goals. ⁽⁵⁾

Quality of life:

Quality of life can be defined as "individuals' view of their place in life in relation to their objectives, expectations, standards, and worries, as well as the culture and value system in which they live. It is a wide notion that is intricately influenced by a person's physical and mental well-being, amount of independence, social connections, and interaction with key elements of their environment. ⁽¹³⁾

Cancer related fatigue:

Cancer related fatigue is defined as a severe kind of weariness experienced by cancer patients. It is defined as a debilitating feeling of weakness and exhaustion that doesn't go away with sleep and rest. ⁽⁶⁾

Subject and methods:**Research design**

A quasi-experimental research (two groups pre/post design) was used.

Setting

The study was conducted at obstetric & gynecological department at Helwan General Hospital.

Subject

A purposive sample of 54 women diagnosed with cervical cancer. According to Helwan General Hospital statistical center, 2022, flow rate of the women diagnosed with cervical cancer were 540 women at the end of year 2022. Ten percent of flow rate (54 women) were selected and divided into two groups at random: the control group, which consisted of 27 women who received only routine hospital care, and the study group, which consisted of 27 women who received nursing model application based on Snyder's hope theory in addition to routine hospital care.

The studied sample was selected according to the following *inclusion criteria*: Women diagnosed with cervical cancer by pathological biopsy, can read and write, and accepted to participate in the study. *Exclusion criteria*: women with any other chronic medical diseases or cancer metastasis or malignant tumors in other parts of body are excluded. In addition, patients had taken anti-anxiety and depression drugs recently or were unwilling to participate in the investigation are excluded.

Tools of Data Collection

Four tools were used for data collection:

First tool: A Structured Interviewing Questionnaire

The researchers created it after reading relevant literature and it consisted of two parts:

Part one: it was concerned with personnel characteristics of the studied women. It included four items (age, educational level, occupation, residence).

Part two: Women knowledge related cervical cancer:- This part was developed by researchers after reading relevant literature **Qayum et al. & Weng et al.** ⁽¹⁴⁻¹⁵⁾ to assess women's knowledge about cervical cancer. It included 10 items (Meaning of cervical cancer, types, risk factors, symptoms, associated psychological symptoms, methods of screening, diagnosis, complication,

prevention and treatment) regarding cervical cancer.

Scoring system of knowledge

A correct answer was scored as "two" and the incorrect "one". The total knowledge score was calculated by summation of the scores for the correct answers. The higher scores reflect higher levels of knowledge about cervical cancer. The score of total knowledge was classified as the following:

- Inadequate knowledge: less than 60%
- Adequate knowledge: 60% to 100%

Tool II: Herth hope index (HHI):

It was used to determine women' hope-level before and after intervention. It was adopted from *Herth* ⁽¹⁶⁾ and included 12 items and 3 dimensions: positive attitudes towards reality and the future (4 items) which were items 1, 2, 6, and 11, taking positive actions (4 items) which were items 4, 7, 10, and 12 and maintaining close relationships with others (4 items) which were items 3, 5, 8, and 9.

Scoring system:

A 4-point Likert scale was used that ranges from 1 (strongly disagree) to 4 (strongly agree) with reverse items (#3 and #6). Each single-item scores range from 1 to 4. The total score of the scale ranges from 12–48, with scores ranging from 12–23 indicating a low level of hope, 24–35 indicating a medium level and 36–48 indicating a high level. The higher the score of the patient is, the higher the level of hope is.

Tool III: Cancer-related fatigue scale (CRFS):

The scale was adopted from *Lee et al.* ⁽¹⁷⁾ mainly used to evaluate the subjective fatigue status of women which consists of 22 items and uses the modified Piper fatigue scale. Scale items divided into behavioral /severity (6 items), total affective meaning (5 items), total sensory (5 items) and total cognitive/ mood (6 items)

Scoring system:

The score of each item was 0–10 points and the total score was 0–220 points. The total score is calculated by the mean of all the items of the instrument and the scores of the dimensions are calculated from the mean of the items contained in each dimension. The average score was 1–3 points for mild fatigue, 3–6 points for moderate fatigue, and 6 points or more for severe fatigue, that was, the higher the patient's score, the more severe the fatigue.

Tool IV: Functional Assessment of Cancer Therapy- General (FACT-G):

Quality of Life (QOL) was assessed using FACT-G which was adopted from *Cella et al.* ⁽¹⁸⁾ The scale consisted of 27 items divided on four domains (physical well-being, social wellbeing, emotional well-being, and functional wellbeing).

Physical well-being contains 7items (I have low energy, I have nausea, Because of my physical condition .I am having difficulty to meet the needs of my family, I have pain, The side effects of the treatment bother me, I feel sick, I have to sleep in bed).

Social wellbeing contains 7items (I feel close to my friends, I get moral support from my family, I get support from my friends, My family accepted my illness, I am satisfied with the communication with my family about my illness, I feel close, My sex life is satisfying).

Emotional well-being contains 6items (I feel sad, I am satisfied with my way of coping with my illness, I'm losing hope in my fight with my disease, I feel angry, I'm afraid of dying and I'm worried my condition will get worse).

Functional wellbeing contains 7items (I can work including housework, My job including housework satisfies me, I can enjoy life, I accepted my disease, I sleep well, I enjoy the things I do for fun and I am satisfied with the quality of my life right now)

Scoring system:

Each item was scored ranged from 0, 1, 2, 3, 4 for strongly disagree, disagree, sometimes, agree and strongly agree for positive items and vice versa for negative items. Higher scores indicate a higher quality of life. High quality if score >70%, moderate if score 50% to 70% and low if score <50%.

Content Validity and Reliability:

Three nursing specialists in the field of obstetrics and gynecology reviewed the data collecting tools to determine the validity of the content. The tools were modified in accordance with the panel's recommendations about the clarity of the sentences and the relevance of the material. Reliability was calculated by Cronbach's alpha coefficient test, and the internal consistency of the knowledge assessment sheet (Tool I – part two) was $\alpha=0.88$. Herth hope index (Tool II) was $\alpha=0.85$. Cancer-related fatigue scale (Tool III) was 0.84 and it ranged from 0.79 to 0.86 in the four domains. Additionally, Cronbach's alpha for the Functional Assessment of Cancer Therapy (Quality of life questionnaire) (Tool IV) was 0.86, and it ranged from 0.81 to 0.89 for the four domains.

A Pilot Study

The pilot study was carried out on 10% of the total sample (6 women) to confirm sequence, clarity and applicability of tool and detect any problem of the statements that might interfere with data collection as well as estimation of the time needed to fill the questionnaire. Women involved in the pilot study were included in the sample as there weren't any modifications.

Administration and ethical considerations

A written letter was obtained from the Faculty of nursing Dean, then directed to Helwan General Hospital director. This research was conducted under the approval of the Faculty of Nursing Ethical Committee, Helwan University.

An official permission was obtained from the directors of the pre-mentioned settings to conduct the research after explaining its purpose. An agreement was taken from every woman in the study at the time of data collection after clear and proper explanation.

The study approval was obtained from Scientific Research Ethical Committee of the Faculty of Nursing at Helwan University to the fulfilment of this research. To gain confidence and cooperation, aim of the research was clarified to each woman before filling the tools.

Each woman signed consent to participate in the research. To promote confidentiality of the research, all tools of data collection was burned after statistically analysis.

The research tools were ensured that the research didn't touch participant's dignity, culture, traditional and religious aspects and didn't cause any harm for any participant during data collection. Also didn't include any immoral statements and respect human rights. The women were free to withdraw from research at any time.

Field Work

The study took place over nine month period from the beginning of July 2022 and ending at the end of April 2023. Three days a week from 9:00 am to 12:00 pm, the researchers visited the location mentioned above until the predetermined sample size was reached.

The necessary tools were distributed to three experts in the field of obstetrics &gynecology to test their appropriateness, clarity and applicability. Then the researchers went to predetermined setting and checked clinical records to identify women who met the inclusion criteria. Women were greeted and informed of the overall purpose of the research and provided with all information about the research. Then the following phases were done.

Assessment phase:

To collect baseline data of the studied women, the researchers attended the study setting, introduced themselves, welcomed each woman, and then stated the importance and aim of this research to selected women to assure adherence to interventions. The researchers then took the women's participation consent.

The researcher distributed a structured interviewing questionnaire (tool No. I) to assess personnel data and knowledge regarding cervical cancer (pretest). Herth hope index (tool II) was used to determine women' hope-level. Then Functional Assessment of Cancer Therapy-General and cancer-related fatigue scale were be filled by researchers according to responses of studied women to assess quality of life and fatigue level (tool No. II &III). This were done to both control and study group. Each sheet took an average time of 15 to 20 minutes to be filled.

Implementation of nursing model based on Snyder's hope theory

- Women in the control group receive only routine usual care by the responsible nurses.
- Women in the study group receive nursing model based on the Snyder's hope theory on the basis of the usual care. Application of model was carried out over the course of four sessions, each lasting 45–60 minutes. Each woman attended all four sessions in a prepared room in the mentioned setting to provide more confidentiality, and interviewing were made either individually if woman preferred or in a group (three to five women can attend each session):

(1) The first session (knowledge regarding cervical cancer).

The first step of this model was concerned with enhancing knowledge regarding cervical cancer (the meaning, types, risk factors, symptoms, associated

psychological symptoms, methods of screening, diagnosis, complication, prevention and treatment).

(2) The second session (Correct the women's wrong perception).

The second step of this model was concerned with correction of miss perception of cervical cancer because some women with cervical cancer have lost hope in life, researchers provided women with the cancer knowledge and therapies, and communicate with them in a friendly language. Moreover, researchers not only use multimedia, lectures and instructional booklet to provide women with health education in order to encourage them to face the reality, but also list some good recovery cases to enhance patients' hope for the future, thereby guiding patients to correctly evaluate the disease, changing their poor cognition, inspiring the patient's confidence, and improving their treatment compliance.

(3) The third session (Clear life goals).

In this step, the researchers helped women to formulate realistic life goals, such as instructing patients practice favorite exercise to ease the negative emotion, listen to music. The researchers not only encourage women to set goals but also follow them to complete the daily goals and give positive feedback after completion of the goals. For patients who hadn't complete their goals, the researchers encouraged them to try again after analyzing the failure reasons and encouraged them to continue to adhere to their life goals. When the researchers were guiding women to carry out some daily activities, women' physical and emotions fitness were adjusted, thereby reducing the effects of negative emotions, reducing level of fatigue and increasing hope to live.

(4) The fourth session (Establish a good family social support system).

In this step, the researchers give health education to women' family fostering importance of companionship and then encourage the families to accompany

patients throughout the treatment journey to meet the psychological needs of the women' love because all these actions enhance women' confidence in defeating cancer. Furthermore, the researchers instructed women to make social relationship with friends and get moral support from them and invite the women' friends to participate in the treatment. After discharge from the hospital, nurses tried to maintain active communication with the patients through video, telephone, visits and other ways to give patients confidence to return to social life, thereby improving their treatment compliance.

Before each session, the researchers provide opportunity to women to express their feelings. Illustrated media and colored pictures were used to facilitate understanding and there was a discussion on the predetermined topics. At the end of each session, the researchers gave a summary and took feedback. The duration of the study intervention continued for nine consecutive months.

The break phase:

After discharge from the hospital, nurses tried to maintain active communication with the women through video, telephone and other ways to give patients confidence to return to social life. Also, the control group of women was followed by telephone to avoid their dropping out of the study, but no care was provided to women during a break to prevent study bias.

Evaluation phase:

The effect of the nursing model based on Snyder's hope theory implementation will be evaluated by using the same format of pretest. Post-test was conducted for control group first then study group; this will done three months after educational session and six months follow up after the last educational session, all participants in both study and control groups will invited through telephone number to complete the post-test questionnaire. Also, according to the

principles of ethics in research, the members of the control group will provided by the educational booklet prepared by the researchers after completion of the study.

Statistical Design:

Prior to automated input, data were checked. Data tabulation and analysis were done using SPSS version 25 (Statistical Package for Social Sciences). The use of descriptive statistics was used (e.g., mean, standard deviations, frequencies, and percentages). Pearson correlation coefficients, independent t-tests, Fisher Exact Test and Chi-square tests were applied. For all of the statistical tests done, p -value > 0.05 which indicated no statistically significant difference, p -value ≤ 0.05 indicated a statistically significant difference, and p -value ≤ 0.001 indicated a highly statistically significant difference.

Results

Table (1): Shows personnel characteristics of studied women and clarifies that (48.1% & 51.9%) of both study and control groups respectively were in age group (40 <50 years) with a mean age of 38.66 ± 7.02 and 39.62 ± 8.15 years. Concerning level of education, it was clear that (55.6% & 51.9%) of both study and control groups respectively had secondary education. According to occupation (66.7% & 55.6%) of both study and control groups were housewives. Regarding residence, (59.3% & 51.9 %) of both study and control groups respectively lived in rural area. Additionally there was no statistically significant difference between both study and control groups regarding personal characteristics ($p > 0.05$) that reflected group homogeneity.

Table (2): Demonstrates that there was no statistical significant difference between the study and control groups regarding all items of knowledge about cervical cancer before intervention ($p > 0.05$). Meanwhile, a statistical significant improvement was observed in the study group compared with the control group after three and six months of intervention ($P \leq 0.05$).

Figure (1): Shows that 40.7% and 44.4% of women in both study and control groups had adequate knowledge regarding cervical cancer

before intervention. Meanwhile, at three and six months after intervention, 85.2% and 55.6% versus 81.5% and 48.1% of women in the study and control groups respectively had adequate knowledge regarding cervical cancer.

Table (3): Reveals that, there was no statistical significant difference in the mean score of the overall Herth Hope Index and its items between the two groups at pre intervention phase ($p > 0.05$). However, after three and six months of intervention, the mean score of the overall Herth Hope Index and its items in the study group were higher than the scores in the control group ($P \leq 0.001$).

Figure (2): Shows that 0.0% and 7.4% of women in both study and control groups had high hope-level regarding cervical cancer before intervention. Meanwhile, at three and six months after intervention, 33.3% and 7.4% versus 40.7% and 3.7% of women in the study and control groups respectively had high hope-level regarding cervical cancer.

Table (4): Reveals that, there was no statistical significant difference in the mean score of the overall cancer-related fatigue and its dimensions between the two groups at pre intervention phase ($p > 0.05$). However, after three and six months of intervention, the mean difference score for overall and dimensions of cancer-related fatigue in the study group were lower than the scores in the control group ($P \leq 0.001$). In the study group, the mean cancer-related fatigue before the intervention were 44.44±6.28 in terms of behavioural/severity, 40.92±4.39 in affective meaning, 39.07±6.36 in sensory, and 46.59±6.62 in cognitive/ mood. After three and six months of the intervention the mean score of cancer-related fatigue in its dimensions (behavioural/severity, affective meaning, sensory and cognitive/ mood) respectively, had decreased to 29.77±5.12 & 26.88±4.81, 27.03±5.04 & 25.55±5.43, 25.92±5.37 & 23.88±5.60, and 27.11±4.20 & 26.44±5.33.

Figure (3): Shows that 63.0% and 70.4% of women in both study and control groups respectively had sever fatigue regarding cervical cancer before intervention. Meanwhile, at three and six months after intervention, 37.0% and 63.0% versus 25.9% and 59.3% of women in the

study and control groups respectively had sever fatigue regarding cervical cancer

Table (5): Reveals that, there was no statistical significant difference in the mean score of the overall quality of life and its dimensions between the two groups at pre intervention phase ($p > 0.05$). However, after three and six months of intervention, the mean difference score for overall and dimensions of quality of life in the study group were higher than the scores in the control group ($P \leq 0.001$). In the study group, the mean quality of life before the intervention were 13.11±4.93 in terms of Physical well-being, 14.59±4.74 in social well-being, 11.59±4.20 in emotional well-being, and 11.18±4.23 in functional well-being. After three and six months of the intervention the mean score of cancer-related fatigue in its dimensions (Physical well-being, social well-being, emotional well-being and functional well-being) respectively, had increased to 23.74±1.91 & 24.18±5.12, 22.55±5.15 & 23.70±5.16, 20.66±1.79 & 22.37±1.59, and 19.85±1.97 & 22.51±1.22.

Figure (4): Shows that 7.4% and 11.1% of women in study and control groups respectively had high quality of life regarding cervical cancer before the intervention. Meanwhile, at three and six months after intervention, 44.4% and 11.1% versus 55.6% and 14.8% of women in the study and control groups respectively had high quality of life regarding cervical cancer.

Table (6) Shows that, there was a highly statistically significant positive correlation between total hope score and total quality of life scores in both groups at pre intervention, post intervention and follow up phases ($P \leq 0.001$). On the other hand, there was a highly statistically significant negative correlation between total hope score and total cancer related fatigue score in both groups at pre intervention, post intervention and follow up phases ($P \leq 0.001$).

Discussion

Hope is the desire for good things to happen in women's life and is an important defense method in adapting to suffering in life. Cancer can cause sufferers to lose hope. Interventions to increase hope in cancer patients require interaction and system support so that they can provide enthusiasm and acceptance of the disease. Cancer-

related fatigue is a common symptom in women treated for cervical cancers. Fatigue highly affects health-related quality of life, as women with cervical cancer may become too tired to fully participate in daily life and activities, and to fill the roles they previously had. ⁽¹⁹⁾. Therefore, the current research aimed to evaluate effect of nursing model based on Snyder's hope theory on fatigue and quality of life among woman with cervical cancer.

Concerning personal characteristics, the results of current research revealed that, about half of both study and control groups were in age group (40 <50 years) with a mean age of 38.66 ± 7.02 and 39.62 ± 8.15 years respectively. Concerning level of education, it was clear that more than half of both study and control groups had secondary education. According to occupation, the results revealed that two thirds of the study group and more than half of control group were housewives. Regarding residence, about three fifth of the study group and more than half of control group lived in rural area. Additionally there was no a statistically significant difference between both study and control groups regarding personal characteristics ($p > 0.05$) that reflected group homogeneity.

These results agreed with **Hassan, et al.** ⁽⁸⁾ who stated that less than half of the studied women had secondary education and less than two thirds of women were housewives. As well as, **Ali et al.** ⁽²⁰⁾ clarified that less than half of the studied women had secondary education, less than two thirds are not working and less than half of the studied women from rural area. Moreover, the current results matched with **Zhou et al.**, ⁽²¹⁾ who found that slightly less than half of women their age ranged from (46-55) years old, slightly less than half of the studied women had secondary education and two-thirds were housewives.

Concerning studied women' knowledge regarding cervical cancer the current results

revealed that, there was no statistical significant difference between the study and control groups regarding all items of knowledge about cervical cancer before intervention. Meanwhile, a statistical significant improvement was observed in the study group compared with the control group after three and six months of intervention. As the results showed that more than two fifth of women in both study and control groups had adequate knowledge regarding cervical cancer before intervention. Meanwhile, at three and six months after intervention, more than four fifth and less than half versus most and more than half of women in the study and control groups respectively had adequate knowledge regarding cervical cancer. The improvement in total knowledge score after the intervention may be due to the positive effect of nursing model based on hope theory and its well-organized sessions. The study's topic was considered vital and sensitive to the studied women, so women were very interested and satisfied during the learning sessions.

The above-mentioned results agreed with **Ebu, et al.** ⁽²²⁾ who conducted a study to determine the effect of health education intervention on cervical cancer and screening perceptions of women in the Komenda, Edina, Eguafo, and Abirem (K.E.E.A) District in the Central Region of Ghana. The comparison of the mean differences between the pre-post-test scores for the intervention and control groups showed a statistically significant difference for knowledge of cervical cancer ($t = 6.22$, $df = 780$, $p = 0.001$). The result of the current research also congruent with **Said et al.** ⁽¹²⁾ who showed that, there was a highly statistical significant improvement regarding cervical cancer knowledge concerning meaning, types, risks, symptoms, diagnostic and treatment $P \leq 0.001$. As well as, the findings agreed with **Naregal et al.** ⁽²³⁾ who revealed that there was a significant difference between the two tests was tested using paired t-test the level of significant was highly ($p < 0.001$) indicated

that there was a significant difference in the knowledge of women on cervical cancer.

Hope provides the patients with an effective coping mechanism and assists them in different stages of their disease, from diagnosis to final stage and, as an essential element for coping and adaptation, has an important role in the process of recovery from cancer⁽²⁴⁾.

Concerning Herth Hope Index, the current results reveals that, there was no statistical significant difference in the mean score of the overall Herth Hope Index and its items between the two groups at pre intervention phase. However, after three and six months of intervention, the mean score of the overall Herth Hope Index and its items in the study group were higher than the scores in the control group. As the results showed that, none and minority of women in both study and control groups respectively had high hope-level regarding cervical cancer before intervention. Meanwhile, at three and six months after intervention, one third and none versus more than two fifth and minority of women in the study and control groups respectively had high hope-level regarding cervical cancer. The improvement in hope level after the intervention may be due to caring behaviors by nurses have been suggested to maintain and foster hope in women with cancer. Furthermore, the mechanism by which nursing intervention could influence the level of hope in cancer patients is that nurses encourage patients with cancer to construct and rebuild appropriate strategies to enhance hope. Additionally, nursing interventions may help women find meaning and purpose within a life-threatening illness, dictate the ability to cope with the disease in a meaningful way, and provide for the needs of cancer women.

The above-mentioned results agreed with **Xu et al.**⁽²⁵⁾ who applied nursing intervention plan based on symptom management theory among cancer patients

and clarified that before the intervention, there was no significant difference in the Herth Hope Index in terms of three dimensions between the two groups. After the intervention, the scores of both groups were significantly increased (all $P < 0.05$), while the scores of the Herth Hope Index in the intervention group were significantly more than those in the control group (all $P < 0.05$).

The result of the current research supported by **Lei et al.**⁽²⁶⁾ who reported that, there was no statistically significant difference in Herth Hope Index score and positive response/negative response in simplified coping style questionnaire (SCSQ) scores between the control and study group ($p > 0.05$) before intervention. After intervention, Herth Hope Index score and positive response in SCSQ scores of the study group were higher than those of the control group ($p < 0.05$), and then negative response in SCSQ scores of the study group was lower than that of the control group ($p < 0.05$). The results of the current study also agreed with **Hernandez et al.**⁽²⁷⁾ who examined the effect of compassion-based therapy on patients undergoing treatment for gynecological cancer and showed that psychological therapies play an important role in helping patients in accepting the disease. They also reported that the intervention increased their self-compassion and control over stress in cancer treatment

As well as, **Dehghani and Khodabakhshi-koolae**⁽²⁸⁾ evaluated the effectiveness of group-based hope therapy on the quality of life and resilience of addicted women and showed that this intervention could increase hope and quality of life of the participants, leading to increased self-confidence and encouraging the actualization of their potentially positive abilities. Moreover, **Mirzazadeh and Pirkhaefi**⁽²⁹⁾ examined the effect of creativity therapy in promoting hope and happiness in women with gynecological cancer and showed that, providing purposeful

programs can promote hope and happiness in these women.

Fatigue is a very frequent and common symptom in cancer patients, with an incidence ranging between 80 and 100%. It is a short- and long-term side effect of most anti-cancer treatments and a consequence of cancer itself, with an onset that may occur at any stage of the cancer disease, from its diagnosis to many years after treatment ends.⁽³⁰⁾

Regarding cancer related fatigue; the results of the current study revealed that, there was no statistical significant difference in the mean score of the overall cancer-related fatigue and its dimensions between the two groups at pre intervention phase. However, after three and six months of intervention, the mean difference score for overall and dimensions of cancer-related fatigue in the study group were lower than the scores in the control group. As the results showed that, less than two thirds and about three fifth of women in both study and control groups respectively had sever fatigue regarding cervical cancer before intervention. Meanwhile, at three and six months after intervention, more than one third and less than two thirds versus about one quarter and about three fifth of women in the study and control groups respectively had sever fatigue regarding cervical cancer. The lower level of fatigue after the intervention may be due to the strategies the women adopted to deal with fatigue, such as physical activity or altered sleep/wake rhythms. The nurses also believed that family support was very important to these women and emphasized their involvement in the care process.

The above-mentioned results agreed with **Lei et al.**⁽²⁶⁾ who evaluate the effect of high-quality nursing model based on hope theory in cancer patients and reported that, there was no statistically significant difference in visual analogue scale score, chronic pain self-efficacy scale score and cancer fatigue

scale score between the control and study group ($p > 0.05$) before intervention. Conversely, the visual analogue scale and cancer fatigue scale scores in the study group were lower than those in the control group ($p < 0.05$), and chronic pain self-efficacy scale score in the study group was higher than that in the control group after intervention ($p < 0.05$). Also, the results of the current study agreed with **Imelda et al.**⁽³¹⁾ who analyses the effectiveness of physical exercise in the treatment of chemotherapy in cervical cancer against fatigue reduction. The findings reported that there was an effect of physical exercise on fatigue level in the intervention group ($p = 0.000$; $p < 0.05$). Physical exercise during cancer treatment has a beneficial effect on general fatigue that can increase daily activities.

The results also matched with the study done by, **Elshahat et al.**⁽³²⁾ who applied fatigue nursing guidelines on oncology patient and reported that, the fatigue severity at baseline assessment was sever by mean of $\pm SD 7.77 \pm 1.45$ then it decreased at one-month after fatigue nursing care guidelines to 4.76 ± 1.95 to be moderate while. it raised slightly again after the three-month of the nursing care guidelines implementation but still moderate level fatigue with means of 6.03 ± 1.73 . There were highly significant differences between fatigue intensity at baseline assessment and both at one month and at three months from applying the fatigue nursing care guidelines with P- value of < 0.001 . Moreover, the results of the study done in Indonesia by **Werdani**⁽³³⁾ mentioned that most of the cancer patients had severe fatigue and the researcher defined severe fatigue as the fatigue felt by the patients for the last 24 hours that disrupts their activity, worsens their mood, and prevents interaction with others, so the enjoyment of life is interrupted.

The above-mentioned results supported the first study hypothesis which stated that Women who receive nursing care based on

Snyder's hope theory will exhibit less level of fatigue compared to those in the control group.

Cancer pain makes the patients suffer from both psychological and physical torture, and also affect their rest, thus reducing the life quality of patients with cervical cancer. Concerning quality of life; the results of the current study revealed that, there was no statistical significant difference in the mean score of the overall quality of life and its dimensions between the two groups at pre intervention phase, as the two groups had lower quality of life. This might be due to women with cancer face multiple adversities within their illness, including both the physical impact of the disease, such as pain and discomfort, and treatment, as well as the psychological aspects of the knowledge of having a potentially life-threatening illness, which thereby causes poor quality of life during cancer treatment. The current findings agreed with findings of **Gilani et al.** ⁽³⁴⁾ who showed that the total score of quality of life of patients was 20.97 ± 1.29 . Moreover, in the regression model, a significant relationship was observed between the type of treatment and patients' quality of life scores and those patients who had neoadjuvant therapy plus surgery ($\beta = -17.45$, $P = 0.02$) and those who received brachytherapy ($\beta = -14.86$ and $P = 0.09$) had a significantly lower quality of life score.

After three and six months of intervention, the current results showed that the mean difference score for overall and dimensions of quality of life in the study group were higher than the scores in the control group. As the results showed that, about one tenth of women in both study and control groups had high quality of life regarding cervical cancer before the intervention. Meanwhile, at three and six months after intervention, less than half and about one tenth versus more than half and more than one tenth of women in the study and control groups respectively had high quality of life

regarding cervical cancer. The improvement of quality of life after intervention may be due to the hopeful feeling has positive correlation with components like mental health, positive mood, vitality and happiness of life, and solving problems and can predicts them and, in fact, has a direct impact on individual performance.

The results of the current study agreed with **Beltran et al.** ⁽³⁵⁾ who evaluate and compare quality of life and sexual functioning and satisfaction between cervical cancer survivors and healthy women in a Spanish population. The results reported that the quality of life of cervical cancer survivors were worse in almost all parameters analyzed compared to the control group. As well as, **Molaei et al.** ⁽³⁶⁾ who analyzing the effect of hope-based group therapy on the cancer patients' quality of life in Urmia Imam Khomeini educational therapeutic center reported no statistical difference between the average scores of functional areas before the intervention between two groups, while the mean scores of two groups was significant after intervention. Another study conducted by **Howell et al.** ⁽³⁷⁾ confirmed that the training sessions of hope based group therapy significantly increase the performance and perceived well-being and health of patients.

The above-mentioned results supported the second study hypothesis which stated that women who receive nursing care based on Snyder's hope theory will exhibit better quality of life compared to those in the control group.

Concerning correlation between studied variables, the results of the current study revealed that, there was a highly statistically significant positive correlation between total hope score and total quality of life scores in both groups at pre intervention, post intervention and follow up phases. The results of the current study agreed with **Lei et al.** ⁽⁵⁾ who reported that the level of patients' hope is closely related to their quality of life,

and patients' hope level can be increased through hope nursing. The results also agreed with **Zhao et al.** ⁽²⁾ who indicated that resilience, hope, optimism, self-esteem, and self-efficacy were positively correlated with quality of life in patients with cancers. A systematic review of 33 articles by **Nierop-van Baalen et al.** ⁽³⁸⁾ indicated that hope was positively correlated with quality of life in cancer patients. Patients who had high hope reported higher life satisfaction and better health conditions as compared to those with low hope. The review also noted that symptom burden and mental fatigue were negatively correlated with hope

The results of the current study revealed that there was a highly statistically significant negative correlation between total hope score and total cancer related fatigue score in both groups at pre intervention, post intervention and follow up phases. These results are due to the higher the women' level of hope, the easier it is to take positive coping style when facing with illness, thereby prompting women to overcome difficulties, relieving stress and fatigue. The results of the current study agreed with **Amarsheda and Bhise** ⁽³⁹⁾ who showed that there was strong correlation of fatigue with the subscale scores of quality-of-life measurement and very strong correlation with the total score. There was moderate correlation between fatigue and functional capacity measured by 6-minute walk test. The results of the current study agreed with **Fischer et al.** ⁽⁴⁰⁾ who mentioned that among cancer patients, higher overall hope has been related to less depression, anxiety, fatigue, and pain.

Conclusion

The findings of current research concluded that the nursing model based on Snyder's hope theory has good application effect in woman with cervical cancer. It guided patient to actively face the problems, reduce level of fatigue and improve the

quality of life. Additionally, the total hope-level regarding cervical cancer and overall dimensions of quality of life in the study group showed significant improvement in three and six months post intervention compared to pre intervention while in the control group there was minimal improvement. Also, three and six months after the intervention the level of fatigue was significantly decreased in the study group compared with control group. As a result, both the study's aim and the hypotheses were supported.

Recommendations: based on research findings it was recommended that:

1. All women with cervical cancer should receive printed booklets and brochures containing component of Snyder's hope theory and how to apply it. These booklets should be kept in all obstetrics and gynecological units.
2. Conducting educational program for women diagnosed with cervical cancer to help them to cope with fatigue and improve quality of life.

Further researches:

1. Developing special training program to the maternity and oncology nurses regarding nursing model based on Snyder's hope theory to create a collaborative plan of care and coordinate its components.
2. To ensure more generalization of the results, replication of the study on large representative probability sample is recommended

Acknowledgments

The researchers thank the women who participated in the study for the advancement of nursing science.

Table (1): Distribution of the studied women in both study and control groups according to personal characteristics (n=54)

Variables	Study group n=27		Control group n=27		FET/X ²	P-value
	No	%	No	%		
Age (years)						
< 30 year	3	11.1	3	11.1	0.66 [€]	0.94 ^{ns}
30 < 40 years	9	33.4	7	25.9		
40 <50 years	13	48.1	14	51.9		
≥ 50 years	2	7.4	3	11.1		
Mean ± SD	38.66±7.02		39.62±8.15		t=0.465	0.644 ^{ns}
Educational level						
Primary education	7	25.9	5	18.5	1.06	0.58 ^{ns}
Secondary education	15	55.6	14	51.9		
University education	5	18.5	8	29.6		
Occupation						
Working	9	33.3	12	44.4	0.70	0.40 ^{ns}
Housewife	18	66.7	15	55.6		
Residence						
Urban	11	40.7	13	48.1	0.30	0.57 ^{ns}
Rural	16	59.3	14	51.9		

X² (Chi-square test); [€] Fisher Exact Test; t= independent t test; ^{ns} no statistical significant difference (p > 0.05)

Table (2): Distribution of the studied women in both study and control groups regarding knowledge about cervical cancer before the intervention, three and six months after the intervention (n=54).

Items	Groups	Before intervention	3 months after intervention	6 months after intervention	X ₁ ² P-value	X ₂ ² P-value	X ₃ ² P-value
		Correct answer No. (%)	Correct answer No. (%)	Correct answer No. (%)			
Meaning of cervical cancer	Study	10 (37.0)	22 (81.5)	21 (77.8)	0.30	6.57	5.08
	Control	12(44.4)	14 (51.9)	13 (48.1)	0.58 ^{ns}	0.01*	0.02*
Types of cervical cancer	Study	7 (25.9)	20 (74.1)	21 (77.8)	0.35	4.90	9.16
	Control	9 (33.3)	12 (44.4)	10 (37.0)	0.55 ^{ns}	0.02*	0.002*
Risk factors of cervical cancer	Study	11 (40.7)	23 (85.2)	21 (77.8)	0.07	6.95	6.31
	Control	12 (44.4)	14 (51.9)	12 (44.4)	0.78 ^{ns}	0.008*	0.01*
Symptoms of cervical cancer	Study	12 (44.4)	24 (88.9)	22 (81.5)	0.30	7.47	6.57
	Control	10 (37.0)	15 (55.6)	13 (48.51)	0.58 ^{ns}	0.006*	0.01*
Associated psychological symptoms	Study	8 (29.6)	22 (81.5)	20 (74.1)	0.33	6.57	7.50
	Control	10 (37.0)	13 (48.1)	10 (37.0)	0.56 ^{ns}	0.01*	0.006*
Methods of screening	Study	11 (40.7)	21 (77.8)	22 (81.5)	0.07	5.08	7.94
	Control	10 (37.0)	13 (48.1)	12 (44.4)	0.78 ^{ns}	0.02*	0.005*
Diagnosis of cervical cancer	Study	10 (37.0)	23 (85.2)	20 (74.1)	0.33	9.82	6.13
	Control	8 (29.6)	12 (44.4)	11 (40.7)	0.56 ^{ns}	0.002*	0.01*
Complications of cervical cancer	Study	9 (33.3)	24 (88.9)	23 (85.2)	0.08	8.88	9.82
	Control	10 (37.0)	14 (51.9)	12 (44.4)	0.77 ^{ns}	0.003*	0.002*
Prevention of cervical cancer	Study	9 (33.3)	22 (81.5)	20 (74.1)	0.30	9.42	3.81
	Control	12 (44.4)	11 (40.7)	13 (48.51)	0.40 ^{ns}	0.002*	0.05*
Treatment of cervical cancer	Study	11 (40.7)	24 (88.9)	23 (85.2)	0.67	7.47	5.68
	Control	14 (51.9)	15 (55.6)	15 (55.6)	0.41 ^{ns}	0.006*	0.01*

X² (Chi-square test) ^{ns} no statistical significant difference (p > 0.05) *A statistical significant difference (P ≤ 0.05)

X₁² Comparison between the study and control groups before intervention

X₂² Comparison between the study and control groups at 3 months after intervention

X₃² Comparison between the study and control groups at 6 months after intervention

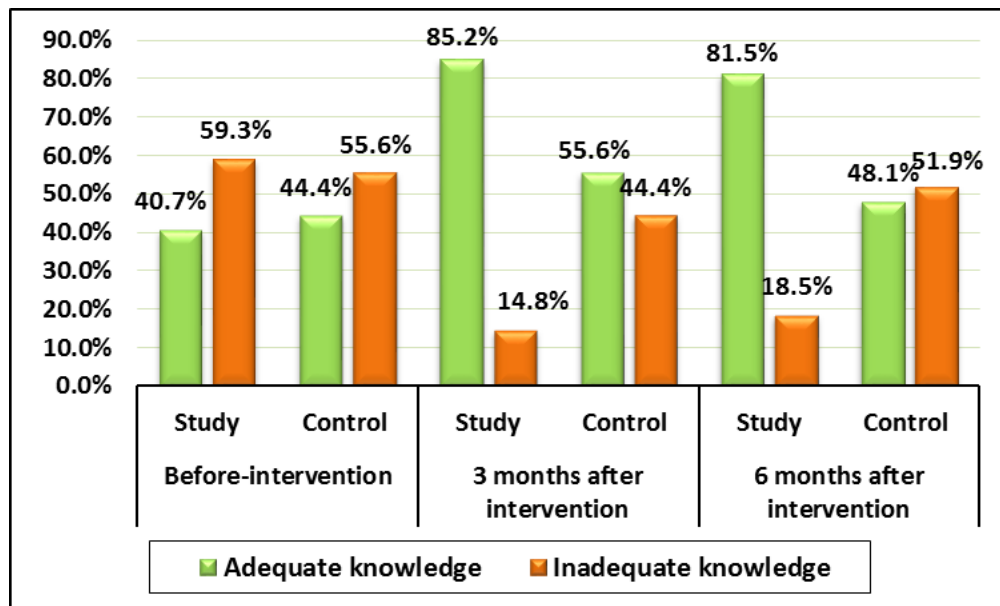


Figure (1): Distribution of studied women' total knowledge score regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

Table (3): Comparison of the mean scores of Herth hope index regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

Items	Groups	Range of Possible Scores	Before intervention	3 months after intervention	6 months after intervention	t-test 1 P-value	t-test 2 P-value	t-test 3 P-value
			Mean ± SD	Mean ± SD	Mean ± SD			
Positive outlook on life	Study	1-4	1.96 ± 0.80	3.00 ± 0.91	3.33 ± 0.83	0.17	5.79	7.41
	Control		1.92 ± 0.78	1.74 ± 0.65	1.88 ± 0.57	0.86 ^{ns}	0.000**	0.000**
Presence of goals	Study	1-4	1.85 ± 0.86	3.14 ± 0.90	3.25 ± 0.98	0.75	6.04	5.47
	Control		1.70 ± 0.54	1.77 ± 0.75	2.00 ± 0.67	0.45 ^{ns}	0.000**	0.000**
Feel all alone	Study	1-4	1.88 ± 0.50	2.96 ± 0.93	3.37 ± 0.83	1.39	5.63	5.75
	Control		1.70 ± 0.46	1.62 ± 0.79	2.14 ± 0.71	0.16 ^{ns}	0.000**	0.000**
See the possibilities in the midst of difficulties	Study	1-4	1.74 ± 0.71	3.11 ± 0.93	3.22 ± 0.80	1.53	7.70	6.85
	Control		1.48 ± 0.50	1.48 ± 0.57	1.85 ± 0.66	0.13 ^{ns}	0.000**	0.000**
Faith that comforts	Study	1-4	1.62 ± 0.74	2.92 ± 1.03	3.14 ± 1.19	0.64	5.16	5.02
	Control		1.51 ± 0.50	1.62 ± 0.79	1.81 ± 0.68	0.52 ^{ns}	0.000**	0.000**
Scared about the future	Study	1-4	1.62 ± 0.62	2.70 ± 0.66	3.11 ± 1.01	0.49	5.36	4.61
	Control		1.70 ± 0.46	1.59 ± 0.84	2.00 ± 0.73	0.62 ^{ns}	0.000**	0.000**
Recall happy/joyful times	Study	1-4	1.55 ± 0.80	3.18 ± 0.87	3.22 ± 0.93	1.23	6.83	7.21
	Control		1.33 ± 0.48	1.62 ± 0.79	1.66 ± 0.62	0.22 ^{ns}	0.000**	0.000**
Deep inner strength	Study	1-4	1.44 ± 0.50	2.96 ± 1.01	3.29 ± 0.77	1.74	4.23	8.50
	Control		1.22 ± 0.42	1.85 ± 0.90	1.59 ± 0.69	0.08 ^{ns}	0.000**	0.000**
Give and receive caring/love	Study	1-4	1.44 ± 0.57	2.96 ± 0.93	3.14 ± 0.90	0.97	6.73	7.96
	Control		1.29 ± 0.54	1.40 ± 0.74	1.55 ± 0.50	0.33 ^{ns}	0.000**	0.000**
A sense of direction	Study	1-4	1.25 ± 0.44	3.11 ± 0.93	3.29 ± 0.99	1.40	6.56	6.98
	Control		1.11 ± 0.32	1.55 ± 0.69	1.74 ± 0.59	0.16 ^{ns}	0.000**	0.000**
Each day has potential	Study	1-4	1.29 ± 0.54	3.22 ± 0.93	3.25 ± 0.85	1.18	6.21	7.69
	Control		1.14 ± 0.36	1.74 ± 0.81	1.62 ± 0.68	0.24 ^{ns}	0.000**	0.000**
Life has value and worth	Study	1-4	1.25 ± 0.54	2.92 ± 0.91	3.00 ± 1.07	0.31	7.95	6.17
	Control		1.22 ± 0.36	1.29 ± 0.54	1.59 ± 0.50	0.75 ^{ns}	0.000**	0.000**
Overall score	Study	12-48	18.66 ± 5.03	36.22 ± 9.72	38.66 ± 4.85	1.23	7.71	13.57
	Control		17.22 ± 3.37	19.33 ± 5.90	21.48 ± 4.44	0.23 ^{ns}	0.000**	0.000**

t= independent t-test; ^{ns} no statistical significant difference (p > 0.05); **A high statistical significant difference (P ≤ 0.001)

T-test 1 Comparison of mean scores between the study and control groups before intervention

T-test 2 Comparison of mean scores between the study and control groups at 3 months after intervention

T-test 3 Comparison of mean scores between the study and control groups at 6 months after intervention

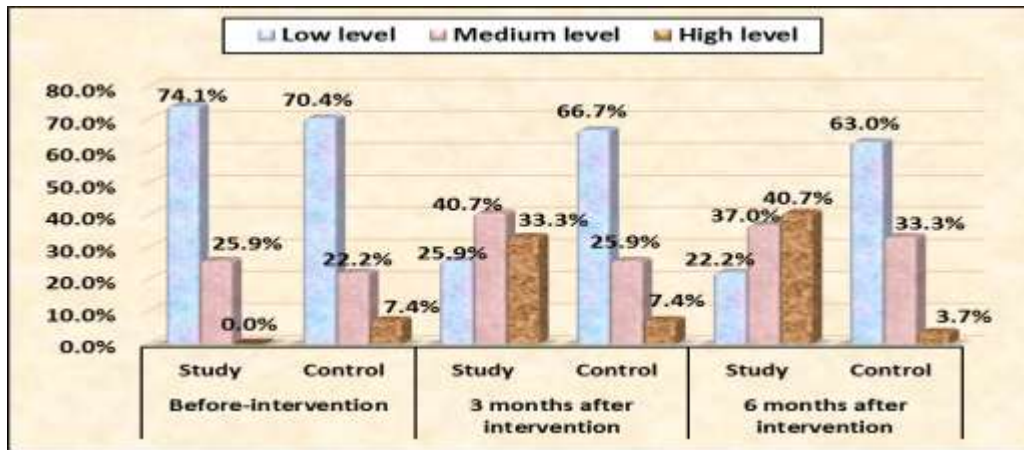


Figure (2): Distribution of studied women' total hope-level regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

Table (4): Comparison of the mean scores of cancer-related fatigue in both groups before the intervention, three and six months after the intervention (n=54).

Dimensions	Range of Possible Scores	Study group	Control group	t-test	P value
		n=27	n=27		
		Mean ±SD	Mean ±SD		
Total behavioural /severity (6 items)					
Before-intervention	0-60	44.44±6.28	42.66±6.07	1.05	0.29 ^{ns}
3 months after the intervention		29.77±5.12	45.55±6.71	9.71	0.000**
6 months after the intervention		26.88±4.81	46.00±6.15	12.7	0.000**
Total affective meaning (5 items)					
Before-intervention	0-50	40.92±4.39	40.00±5.88	0.65	0.51 ^{ns}
3 months after the intervention		27.03±5.04	39.25±6.15	7.97	0.000**
6 months after the intervention		25.55±5.43	40.18±6.12	9.29	0.000**
Total sensory (5 items)					
Before-intervention	0-50	39.07±6.36	38.14±7.09	0.50	0.61 ^{ns}
3 months after the intervention		25.92±5.37	37.59±6.25	7.34	0.000**
6 months after the intervention		23.88±5.60	37.96±6.24	8.71	0.000**
Total cognitive/ mood (6 items)					
Before-intervention	0-60	46.59±6.62	43.48±6.19	1.78	0.08 ^{ns}
3 months after the intervention		27.11±4.20	45.92±6.62	12.4	0.000**
6 months after the intervention		26.44±5.33	45.33±6.22	11.9	0.000**
Total score					
Before-intervention	0-220	171.03±15.85	164.29±19.06	1.41	0.16 ^{ns}
3 months after the intervention		109.85±16.20	168.33±17.56	12.71	0.000**
6 months after the intervention		102.77±17.88	169.48±16.16	14.3	0.000**

t= independent t-test ^{ns} no statistical significant difference (p > 0.05) ******A high statistical significant difference (P ≤ 0.001)

T-test 1 Comparison of mean scores between the study and control groups before intervention

T-test 2 Comparison of mean scores between the study and control groups at 3 months after intervention

T-test 3 Comparison of mean scores between the study and control groups at 6 months after intervention

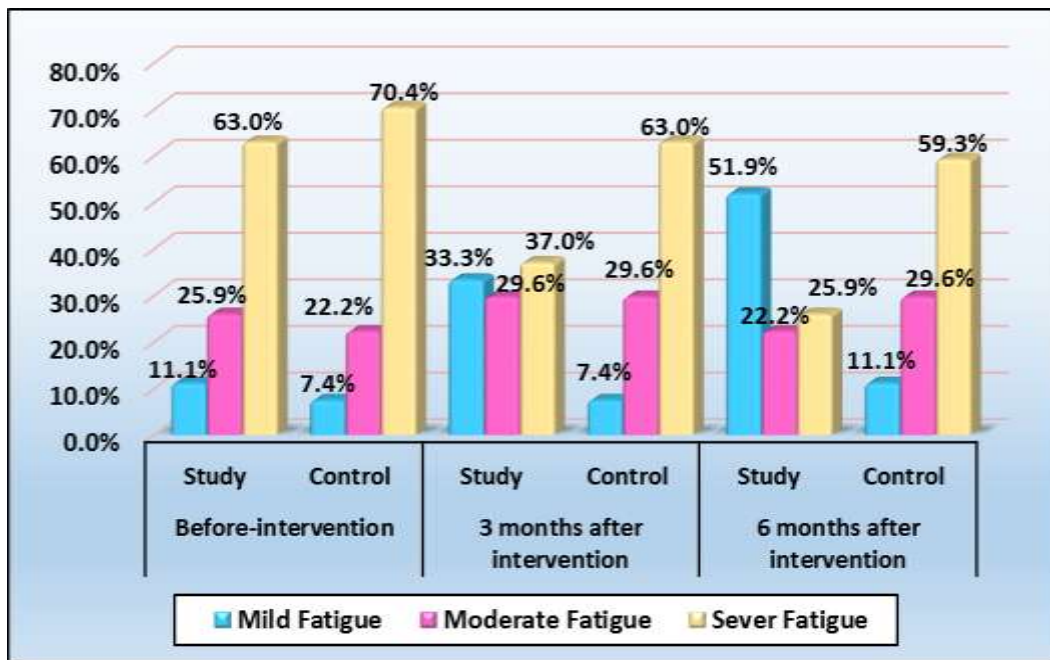


Figure (3): Distribution of studied women' total fatigue score regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

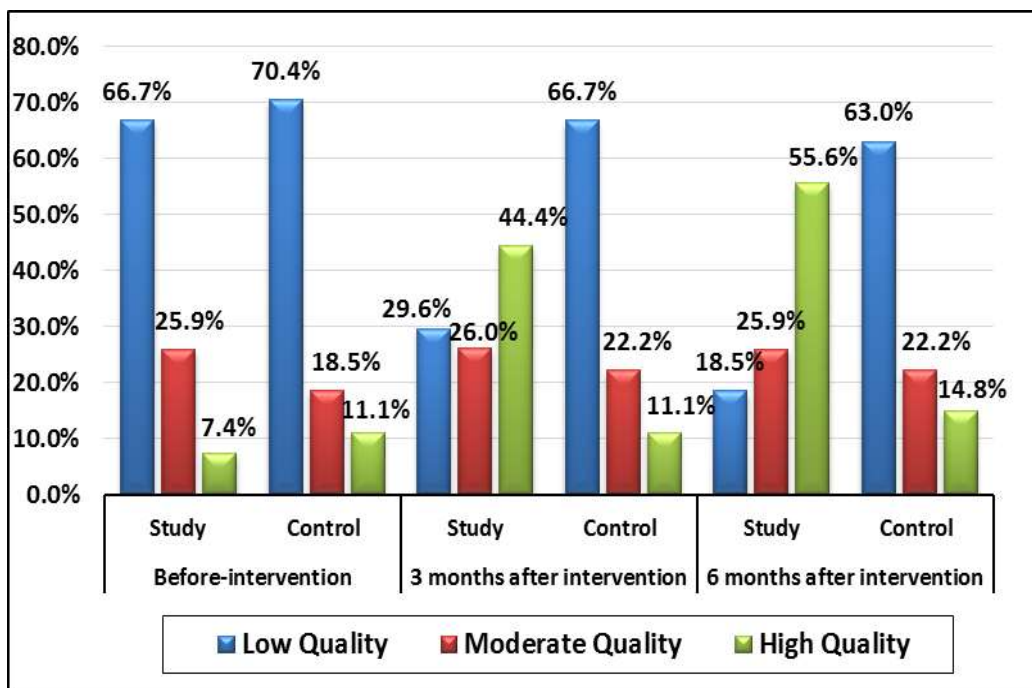


Figure (4): Distribution of studied women' total quality of life regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

Table (5): Comparison of the mean scores of quality of life regarding cervical cancer in both groups before the intervention, three and six months after the intervention (n=54).

Dimensions	Range of Possible Scores	Study group n=27	Control group n=27	t-test	P value
		Mean ±SD	Mean ±SD		
Total Physical well-being (7items)					
Before-intervention	0-28	13.11±4.93	13.55±4.96	0.33	0.74 ^{ns}
3 months after the intervention		23.74±1.91	14.11±5.39	8.74	0.000**
6 months after the intervention		24.18±5.12	14.96±2.80	8.19	0.000**
Total social well-being (7 items)					
Before-intervention	0-28	14.59±4.74	12.14±5.30	1.78	0.08 ^{ns}
3 months after the intervention		22.55±5.15	15.40±7.03	4.25	0.000**
6 months after the intervention		23.70±5.16	15.29±3.13	7.23	0.000**
Total emotional well-being (6 items)					
Before-intervention	0-24	11.59±4.20	12.62±3.62	0.97	0.33 ^{ns}
3 months after the intervention		20.66±1.79	12.37±4.18	9.47	0.000**
6 months after the intervention		22.37±1.59	13.77±2.97	13.21	0.000**
Total functional well-being (7 items)					
Before-intervention	0-28	11.18±4.23	12.11±3.74	0.85	0.39 ^{ns}
3 months after the intervention		19.85±1.97	12.88±3.46	9.06	0.000**
6 months after the intervention		22.51±1.22	14.07±3.18	12.8	0.000**
Total score					
Before-intervention	0-108	50.55±12.97	54.37±14.42	1.02	0.31 ^{ns}
3 months after the intervention		84.81±8.33	56.77±20.11	6.69	0.000**
6 months after the intervention		92.77±10.69	58.11±10.62	11.94	0.000**

t= independent t-test ^{ns} no statistical significant difference (p > 0.05) **A high statistical significant difference (P ≤ 0.001)

T-test 1 Comparison of mean scores between the study and control groups before intervention

T-test 2 Comparison of mean scores between the study and control groups at 3 months after intervention

T-test 3 Comparison of mean scores between the study and control groups at 6 months after intervention

Table (6): Correlation between total hope score and total score of cancer related fatigue as well as quality of life at pre intervention, post intervention and follow up phases (n=54)

Variables	Total hope score											
	Control group n= 27						Study group n= 27					
	Pre-intervention		Post-intervention		Follow-up		Pre-intervention		Post-intervention		Follow-up	
	r	P value	r	P value	r	P value	r	P value	r	P value	r	P value
Total cancer related fatigue	-.441-	.000**	-0.410-	.000**	-.511-	.000**	-.408-	.000**	-.634-	0.000**	-.632-	.000**
Total quality of life	.389	.000**	.384	.000**	.403	.000**	.461	.000**	.554	0.000**	.393	.000**

**A high statistical significant difference (P ≤ 0.001)

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