Effect of Mind- Body Games on Symptoms Intensity and Quality of Life among Cancer Patients Undergoing Chemotherapy

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Abstract

Background Chemotherapy is the most common treatment used for cancer patients which causes a lot of side effects that have a negative impact on the patients `wellbeing. Using alternative therapy for patients with advanced cancer can improve the patients `symptom and quality of life. **Aim of the study:** The current study aimed to evaluate the effect of using mind-body games on symptoms intensity and quality of life among cancer Patients undergoing chemotherapy. **Design**: Quasi-experimental design. **Setting:** The study carried out at inpatient chemotherapeutic ward in Ismailia Teaching Oncology Hospital. **Subjects:** Quasi-experimental design. **Setting:** The study carried out at inpatient chemotherapeutic ward in Ismailia Teaching Oncology Hospital. **Subjects:** 60 patients were purposively selected to participate in the current study. **Tools:** Three tools were used to conduct this study. **Tool I:** A structured interview questionnaire included two parts which involved assessment of the socio- demographic data and medical history. **Tool II:** Edmonton Symptom Assessment System (ESAS). **Tool III:** Quality of Life Scale (QOLS). **Intervention:** Gaming group (practiced games) and control group. All study participants received the routine pain killer medications for pain management two times daily according permitted agency protocol for narcotics use. **Results:** Gaming group demonstrates decrease in symptoms intensity but not significant (p value =.653) and had no improvement in the quality of life compared with control group. **Conclusion:** practicing body- mind games decrease the intensity of symptoms among cancer patients undergoing chemotherapy (but, not significant). While, they had no effect on quality of life among cancer patients undergoing chemotherapy. **Recommendations:** Endorse gaming as one alternative medicine method parallel to conventional treatment for chemotherapy related symptoms.

Keywords: Cancer, Chemotherapy, Gaming, and Quality of Life.

1. Introduction

Cancer remains one of the leading causes of death worldwide and the number of cancer related deaths is expected to be over 16 million by 2040 all over the world. And more than 90% of all new cases of cancer are solid cancer types including breast, lung, colorectal, and prostate cancer. Patients often have a life expectancy of less than one year when solid cancer is incurable. In order that, palliative

anticancer treatment can maintain or improve quality of life and increase life expectancy**(Geijteman, et al., 2024)**.

According to the global cancer observatory report issued in 2020, the total number of newly diagnosed cancers in Egypt was 134,632 cases, with reported 89,042 deaths in 2020. the most prevalent malignancies in Egypt in 2020 were as follows: breast, hepatic, bladder, non-Hodgkin lymphoma, leukemia, cerebral, and central nervous system, and prostate, while the highest incidence malignancies were as follows: hepatic, breast, bladder, non-Hodgkin lymphoma (NHL), lung, leukemia, and prostate in order**(El-Kassas et al., 2025)**.

Chemotherapy regimens used for cancer treatment are immensely complex and cancer patients as the most susceptible population with little tolerance. Patients who are highly symptomatic either due to cancer or due to side effects of chemotherapy need more constant and increased duration of caregiving time as compared to those with mild symptoms. Hence, caregivers taking care of highly symptomatic cancer patients are more prone to psychological, physical, financial, and social reactions and the burden increases on them even further if they themselves are underprivileged with limited resources and/or are in poor health **(Mishra et al., 2021)**.

Chemotherapy is considered one of the principal modes of cancer treatments. Consequently, the most common adverse physical effects of antineoplastic therapy include general fatigue, cardiovascular disorders, decreased tolerance to exercise, weight fluctuations, osteopenia, myopathy, neuropathy, as well as damage to the central nervous system. These symptoms translate into a reduction in daily physical activity and may contribute to the development of anxiety disorders and stress, therefore lead to deterioration of sleep quality**(Zhou et al ., 2022)**.

Complementary and Alternative Medicine (CAM) has become increasingly popular among cancer patients. The prevalence of CAM use differs worldwide and depends on different sociodemographic and medical characteristics**(Nayak et al., 2017)**. It includes treatment methods such as homeopathy, acupuncture, chiropractic, aromatherapy, exercise therapy, kinesiotherapy, massage therapy, music therapy, image therapy, herbal therapy,

nutritional therapy, pressure therapy, energy therapy or meditation, nutritional supplements, or other methods. These therapeutic methods which are not common treatments and used regionally or generally are so diverse **(Musleh et al.,2015)**.

Mind-body exercise (MBE) has been associated with positive effects on quality of life, physical fitness, fatigue, sleep quality, depression, anxiety and body mass index. It is defined by the dictionary of cancer terms as "a form of exercise that combines body movement, mental focus, and controlled breathing to improve strength, balance, flexibility, and overall health". **(Singh, et al 2022)**.MBE is defined by the dictionary of cancer terms as **"**a form of exercise that combines body movement, mental focus, and controlled breathing to improve strength, balance, flexibility, and overall health**"**. MBE is considered to be a form of complementary therapy and has gained popularity in recent years **(Islami et al., 2021)**.

The real or potential benefits arising from interventions involving mind-body therapeutic modalities take on particular importance in the light of the world-wide opiate crisis, which has highlighted the need to develop and understand the mechanisms of novel analgesic treatments. After that, we are beginning to understand the biological mechanisms of non-pharmacological pain relieving measures, with the development of sophisticated behavioral methodologies, non-invasive imaging techniques, multiple physiological endpoints, and the rigorous adherence to scientific method in both human and pre-clinical studies **(Bushnell, et al.,2021)**.

Gaming is interactive by nature; they engage players, provide immediate feedback, and allow players to make decisions and observe consequences. Serious games are games designed for a primary purpose other than pure entertainment. Serious games utilize a combination of interactive storytelling, plots, characters, and environments allowing players to craft their own experiences through the characters' lens. Serious games increase patients' immersion and engagement in healthcare education with more enjoyable, engaging, and motivational learning experiences that promote mastery through repetition. Previous study suggest that serious games are helpful for patients with cancer to have positive behavioral changes and better health outcomes **(Healy et al., 2022)**.

The concept of gaming has been applied

to education and training, rather than merely for entertainment purposes, resulting in what is known as "games" **(Sipiyaruk et al., 2018)**. Games have been considered important strategies for the promotion and development of skills for self-management of the signs and symptoms of various diseases. The educational content of serious games is usually designed to increase the knowledge related to health, in particular, adherence behaviors, expecting that these changes will lead to better health outcomes. As cancer is a chronic disease with increased prevalence worldwide, Self-care and self-management strategies are important to improve the results in the control and management of the disease. So, serious games are considered key complementary elements in health interventions to improve self-management of signs and symptoms**(Ferahtia et al, 2021)**.

Patients' quality of life is affected by specific factors related to the medical process, such as the specific treatment administered, the location or type of cancer and the secondary effects derived from each treatment, as well as sociodemographic factors such as patients' gender. Males tend to perceive higher quality of life than females. This difference may be caused by the different diagnoses in males and females, or the treatments administered. For instance, females may experience physical changes that can make them feel less attractive and feminine, thus reducing their quality of life. Assessing quality of life in cancer patients is key to successfully plan and control the treatment and therapeutic procedures, thus becoming a predictive factor for treatment thanks to its relation with higher quality of life and survival**(Fernandes et al., 2023)**.

Additionally, quality of life (QOL) is "an 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 concerns" **(Moreira et al., 2021).** Palliative Care (PC) aims to improve the QOL, alleviate the patients' and their families' suffering, facing problems associated with life-threatening diseases, through the prevention and relief of pain and other forms of physical, psychosocial and spiritual distress also it reduces unnecessary hospitalizations and use of healthcare services, as a result cost-saving public health intervention **(Osman et al., 2024).**

There is no doubt that the nursing is the largest profession within the cancer care

and healthcare workforce, and work in diverse settings throughout cancer care services, including practice, administration, research, education, policy, management and leadership .Oncology nurses and other healthcare professionals (e.g., oncologists, neuropsychologists, and occupational therapists) have critically important roles in caring for cancer survivors to help them successfully meet the self-management needs for those individuals experiencing cognitive symptoms. Knowledge regarding the potential benefits of mind – body games and breathing exercises on these symptoms is necessary to engage in evidence-based practice**(Singh et al., 2022)**.

Thus, the nurse helps relieve cancer related symptoms by administering symptoms-relieving interventions including both pharmacological and non-pharmacological approaches, assessing the effectiveness of those interventions, monitoring for adverse effects, and serving as an advocator for patients when the prescribed intervention is ineffective in relieving these symptoms. In addition, the nurse provides health education to the patient and family to enable them to manage the prescribed intervention themselves when appropriate **(Musleh et al., 2015)**.

Significance of the Study:

Palliative Care **(**PC) is important because it gives patients an option for symptoms and pain management which in turn enhance their quality of life. When patients are seriously ill, they understand the value of each day. So, the role of palliative care at the end of life is to relieve the suffering of the patient by the comprehensive assessment and treatment of physical, psychosocial, and spiritual symptoms patients' experience. As death approaches, the symptom burden upon the patient may worsen and require more aggressive palliation**(Farahat et al., 2020)**.

The real or potential benefits arising from interventions involving mind-body therapeutic modalities take on particular importance in the light of the world-wide opiate crisis, which has highlighted the need to develop and understand the mechanisms of novel analgesic treatments. After that, we are beginning to understand the biological mechanisms of non-pharmacological pain relieving measures, with the development of sophisticated behavioral methodologies, non-invasive imaging techniques, multiple physiological endpoints, and the rigorous

adherence to scientific method in both human and pre-clinical studies **(Bushnell et al., 2021)**.

The Aim of the study:

The current study aims to evaluate the effect of using mind- body games on symptoms intensity and quality of life among cancer patients undergoing chemotherapy.

Research objectives:

1. Assess cancer patients undergoing chemotherapy for symptoms intensity.
2. Assess quality of life among cancer patients undergoing chemotherapy.
3. Evaluate the effect of mind – body games on symptoms intensity and quality of life among cancer patients undergoing chemotherapy.

2. Subject and Method

Research design:

Quasi-experimental research design was used in this study.

Setting of the study:

The study was carried out at inpatient chemotherapeutic ward which consists of 27 beds on the third floor in Ismailia Teaching Oncology Hospital, Ismailia, Egypt.

Sampling size and technique:

Sample size was 60 patients were purposively selected to participate in the study, after they met the predetermined criteria (30 in the control group, 30 in the Breathing exercise group). The patients who had the following inclusion criteria were included in the current study: Patients who were fully conscious and cooperative. Patients` age (18 – 65) years. Patients who were confirmed diagnosis of advanced cancer (locally advanced or metastatic) at the third and fourth stage of cancer. Patients who were receiving chemotherapy treatment only during continuous chemotherapy infusion. Patients who take narcotics (tramadol) injections in a regular interval. Patients who had the ability to use their hands.

$$n = 2\left[\frac{(Z_{\propto/2} + Z_{\beta}) * \sigma}{\mu_1 - \mu_2}\right]^2$$

Dawson, 2004)

Where

n= sample size

Z α/2 = 1.96

Zβ = 0.84

σ = 3.72

μ1 = 2.92

μ2 = 4.48

n=60

Exercises group = 30

Control group = 30

Tools of data collection:

To achieve the aim of the study, three tools were used for data collection.

- **Tool I:** A structured interview questionnaire.
- **Tool II:** Edmonton Symptom Assessment System **(ESAS).**
- **Tool III:** Quality of Life Scale **(QOLS)**.

Tools of data collection:

Three tools were used for data collection to carry out this study, which included:

Tool I: A structured interview questionnaire was designed by the researchers based on relevant literature, which consisted of two parts: -

Part 1: Socio- demo graphic data of the participant (eg, name, age, occupation, educational level, economic status, marital condition, residence, and telephone number). **Part 2:** Medical data: It was comprised of questions such as clinical diagnosis, disease duration, type of advanced cancer, number of metastasized organs, present treatment, type of chemotherapy protocol, and numbers of chemotherapy cycles.

Tool (2): Edmonton Symptom Assessment Scale (ESAS) is a valid and reliable tool to assist in the assessment of nine common symptoms experienced by cancer patients. The ESAS is one of the key tools used by Saint Elizabeth Health Care for Oncology and Palliative Care clients. The original tool was designed by **(Bruera et al., 1991)**, developed by the Regional Palliative Care Program, Capital Health in Edmonton, Alberta (2004). Then revised by **(Watanabe et al., 2012)**. This tool was designed to assess pain, tiredness, drowsiness, nausea, and lack of appetite, shortness of breath, depression, anxiety, and well-being. One blank scale was used to assess an "other problem" as needed. Patients were rated for the severity of each symptom at the time of evaluation on a scale from 0 to 10, where 0 indicated the symptom was absent and 10 that it was of the worst possible severity. Based on the ESAS symptoms, following outcomes were obtained as following: Physical ESAS score: calculated as the sum of pain, fatigue, nausea, drowsiness, appetite, and dyspnea symptoms (ranging from 0 to 60), emotional ESAS

score: calculated as the sum of depression and anxiety symptoms (ranging from 0 to 20), and wellbeing ESAS (ranging from 0 to 10); The total ESAS score: calculated as the sum of all ten symptoms (ranging from 0 to 90).

Tool (3): Quality of life (QOL) measures have become a vital and often required part of health outcomes appraisal. For populations with chronic disease, measurement of QOL provides a meaningful way to determine the impact of health care when cure is not possible. It has been adapted for use in chronic illness groups **(Burckhardt& Anderson, 2003)**. Quality of Life (QOL) questionnaire version II was designed to assess the QOL of cancer patients, The tool scale had 41 items, general wellbeing (5 items), physical wellbeing (10 items), psychological wellbeing (8items), familial relationship (4 items), sexual and personal ability (2 items), cognitive wellbeing (3 items), economic wellbeing (3 items), optimism and belief (2 items), informational support (2 items), patient–physician relationship (1 item), and body image (1 item).

Scoring System

The items from the tool were scored direct and reverse direction to yield global QOL. Out of 41 items, 39 items were in Likert 4‑point scale that rated on a response scale of "not at all" (1) to "very much" (4). The remaining two items were on a 10-point semantic scale. For item 40 (on overall physical condition) and 41 (an overall QOL), the response option ranged from "very poor" (1) to "excellent" (10).

The total score of the whole tool consisted of a maximum score of 176 and a minimum score of 41. The author categorized the total score into five: Above 165 ‑very high QOL, 147–165 ‑ high QOL, 118–146 ‑ average QOL, 99–117 ‑ low QOL, and below 99 ‑ very low QOL. The higher score indicates better QOL among cancer patients **(Dubashi et al., 2011).**

Content Validity:

The study tool was subjected for content validity to a jury of 7 experts, in the field of medical surgical nursing (3 experts), oncology nurses (3), and clinical oncology (1 expert) to ascertain relevance and completeness then modifications were done accordingly.

Reliability of the Tool:

Quality of Life Scale (QOLS) designed and validated by **Dubashi, Vidhubala, Cyriac, & Sagar, (2011),** with a reliability of

Cronbach's alpha 0.90 and split half reliability 0.80 (using alpha coefficient and Guttmann split half reliability method). Test-retest method was 0.86 for the second instrument **(Gómez et al., 2013)**.

Pilot study

After preparing the study tools, a pilot study was conducted on 10% of the predetermined sample size (n=6) to test the clarity and applicability of the tools. It aimed to estimating the time needed to complete the questionnaire. The sample shared in a pilot study was excluded from the total number.

Ethical considerations:

Ethical approval number **(176 / 9-2022)** was obtained from the Research Ethics Committee of the Faculty of nursing – Suez Canal University. Acceptance and informed consent were obtained from each participant. Participation in this study was voluntary. Each participant had the right to withdrawal from the study at any time without any consequence. Confidentiality of the data collected has been maintained. The results are used as a component of the necessary research for doctorate thesis, as well as for future publication and education. The topic of this study would not touch religious, ethical, moral and culture issues among participants.

Field work:

Once permission to carry out the study was obtained from the responsible authorities at Ismailia teaching oncology hospital. Permission from the head of Medical and Surgical Nursing department of the Faculty of Nursing, Suez Canal University. Ethical approval number (176 / 9-2022) obtained from the Research Ethics Committee of the Faculty of Nursing, Suez Canal University. Data collection was extended over a period of eight months from March 2023 to the end of October 2023. It was collected in the morning shift from 9 am to 12 pm. Acceptance and written informed consent was obtained from each participant. Participation in this study was voluntary. Each participant had the right to withdrawal from the study at any time without any consequences. Confidentiality of the data collected has been maintained. The results are used as a component of the necessary research for doctorate thesis, as well as for future publication and education. The study did not touch religious, ethical, moral and cultural issues of participants.

Implementation phase:

The study conducted during two consecutive chemotherapy cycles for three

sessions as follows; **The initiative and first session** the researcher met each participant who fulfilled the research inclusion criteria individually to explain the aim and nature of the study and get their approval to participate in the study prior to data collection, sorted, assigned each participant randomly to one of the three studied groups alternatively. The researcher educated each participant how to practice mind- body games, collected socio-demographic and clinical data, and assessed all participants using **ESAS,** and **QOL** scales for assessing pain, tiredness, nausea, drowsiness, appetite, and shortness of breath, depression, and anxiety, plus quality of life.

The Study sample was divided into two groups:

- **The control group** took narcotics injection (tramadol) twice daily according to the permitted agency protocol for narcotics use.
- **The gaming group (study)** attended bed session for (30 minutes) with the researcher consisting of three mind- body games; each game lasted for (10 minutes) besides taking narcotics injection (tramadol), then the researcher repeated it during the second day.

Method of Practice the phone Games

1. The patient used mind – body games in the bed or chair as preferred.
2. The games consisted of three mind-body games (Ludo - Subway - Solitaire), each game lasted for (10 minutes) the session games (30 minutes) consisted of three games each game lasted for 10 minutes.

Comparison between the two groups were done (pre- post-test) to evaluate pain, tiredness, drowsiness, nausea, lack of appetite, shortness of breath, depression, anxiety, and well-being, and quality of life using **ESAS,** plus **QOL** scales.

The first game: Solitaire

Solitaire is quite an easy card game to play, and you can play it on your own with just one pack of 52 cards.

The aim of the game: The aim of the game is to make four piles of cards, one for each suit, sorted into order by the numbers on the cards.

Set up

- Shuffle the pack and mix the cards up
- Place seven cards face-down in a line, next to each other
- Turn up the card on the left
- Place six cards on top of the six that are already face down
- Turn up the left card of the second row Repeat this until you only put one card down, and turn this up
- Place the deck on one side

Steps of the game play

- Place any aces in the bottom row into one of four foundation piles above the rows.
- Turn over the top card of the deck.
- Attempt to place the card in an appropriate spot.
- Cards must switch between red and black.
- Cards must be in order (K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3, 2, A).
- The goal is to move all cards into the foundation piles.
- Foundation piles must all be the same suit (spades, clubs, hearts, and diamonds).
- Foundation piles must be in order (A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K).
- You can move an appropriate card to the foundation piles at any time.

The second game: Subway Surfers

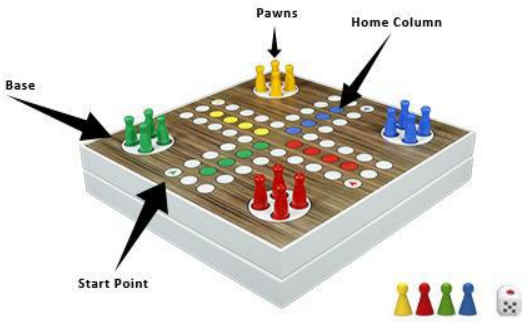
Steps of the game play

- Subway Surfers has super easy game play to learn, however it can be tough to master the game. As explained inside the intro, the goal is always to skate as long as you can while accumulating as many cash as you can. The perspective when playing is that your character is moving away from you, so you will be managing him from that point of view also.
- While you happen to be running, you can alter tracks by swiping left or right. Swiping left of the screen can

cause you to transition tracks to the left, as the reverse will occur when swiping to the right.

- Other critical controls are leaping and rolling. These controls function exactly like the course changing, except for swiping top to bottom. Swipe upwards to hop and swipe downwards to roll.
- These settings would be the basic way to play Subway Surfers additionally; the video game will not vary considerably outside of this.
- Coins are accumulated automatically while you move over these and will not vary considerably outside of this.
- Games will not vary considerably outside of this.
- Coins are accumulated automatically while you move over these and will enable you to obtain brand new characters and power ups we will go over later.
- There are several different ways to connect to the missions while you play the game, so let's cover every one of them to ensure you understand specifically how to use them.
- The objectives tab is available in the primary menu in the game within the upper left spot of the screen. Another way of getting at the missions is by hitting the pause button while playing. The pause option is within the upper left while playing a level.
- Missions, when completed, shall be displayed once you are finished with a level. Types of quests are generally "Gather Five hundred coins" and numerous others. Daily levels are also available and could be completed once a day to receive a unique award. All you need to do will be to pause the level while playing then look within the Daily Task information to find out what you need to do in to get the reward.

The third game: Ludo



- From two to four players begin by placing their pawns on the same - colored bases. Each takes turns

throwing the dice, and the player with the highest roll plays first. The players to the left follow in turn going clockwise. On each player's turn, the player rolls the dice to determine a move. The goal of the game is to move all four of the players' pawns clockwise once around the board, into the own home column.

Rules of Movement

- To begin, a player must roll a six to move a pawn out of the base and onto the start position. That pawn is then in play. The player cannot make any other moves until at least one pawn is in play. If a player has a pawn or pawns in play, they can move any one of their pawns 1 to 6 spaces along the path according to the number they roll.

Rules of the 6's.

- If a six is rolled, the player can choose either to move a pawn out of his base onto the start position or move a pawn that is in play.
- Anytime a six is rolled, the player gets an extra roll after his move.
- If a six is rolled three times in a row, the player loses his turn.
- If a player's pawn lands on an opponent's pawn the opponent's pawn is sent back to their base where he must roll a six again in order move it out onto the starting circle.
- If a player lands in a space occupied by one of his own pawns. That space becomes blocked. A blocked space cannot be passed or landed on by an opponent's pawn.

When a player's pawn has reached the home column of its own color, the pawn continues it moves toward the center to its home columns. When a player dice roll lands its pawn on the home column, that pawn has completed its journey. A piece can only be moved to the home pawn with an exact roll. The first player to have all four of his pawns finish their journeys wins. The remaining players continue the game to determine the runners-up.

Evaluation phase:

It was during chemotherapy cycle throughout three times daily, for three consecutive days of intervention (practicing games) and observation for (control group) by the end for each participant was evaluated for

symptom intensity and quality of life using tool II and tool III.

Statistical Analysis:

The collected data was coded, organized, categorized, tabulated, computerized and analyzed using statistical package of the social sciences (SPSS) software version 24.

3. Results

Table (1) shows the demographic data among the studied groups. Shows that (35%) of the study participants their age ranged from 50-65 years. Regarding sex, there were (61.66) of the study participants were male. Regarding marital status, 73.33% of the study participants were married. Regarding monthly income, there were (63.33%) of the study participants had income ranged from 2000 to 4000 LE. Regarding education, 41.66% of the study participants had graduated from secondary education. Regarding occupation, there were (36.66%) the study participants were employees.

Table (2) shows the clinical diagnosis for the studied groups. The table illustrates the highest number of patients (28) with percentage of (46.66%). We were diagnosed with gastrointestinal cancer. While the lowest number of patients (3) with percentage of (5%) were diagnosed with lung cancer. Without statistically significant differences between the studied groups.

Table (3) shows the number of chemotherapy cycles among the studied groups. The table shows that the highest number of the studied groups (66.66%) were received from 5 to 8 chemotherapy cycles. Without any statistically significant differences between the studied groups.

Table (4) illustrates the type of chemotherapy protocols utilized among the studied groups. The table illustrates that the highest frequencies (30%) through the studied groups received folfox4/ folfox6 protocols. Without statistically significant differences between the studied groups.

Table (5) shows that the quality of life among the studied groups throughout the study phases. The table depots that there was gradual decrease in the mean scores in the control group through the study phases pre, post1, and post2 phases as105.67±7.66, 98.10±7.38, and 97.73±7.67 respectively, while in the gaming group, there were gradual decrease in the mean scores through the study

phases pre, post1, and post2 phases as108.43±7.56, 103.73±8.06, and 103.70±7.75 respectively.

Table (6) reveals the symptoms intensity assessment among the groups studied throughout the study phases. The table shows that there was gradual decrease in mean scores of the Edmonton symptoms assessment scale in the control group through the study phases pre, post1, and post2 as 45.63±10.64, 45.27±10.73, and 45.27±10.45 respectively. While, in the gaming group, there were gradual increase but, not the same as in the breathing group through the study phases pre, post1, and post2 as 44.13±9.32, 45.08±9.44, and 46.10±9.33 respectively. Without any statistically significant differences between the control and the gaming groups.

4. Discussion

This chapter is devoted to discuss the findings related to the effect using mind- body games on symptoms intensity and quality of life among cancer patients undergoing chemotherapy. To achieve the aim of the current study, the following hypotheses were formulated as:

Participants' socio - demographic characteristics and medical data, and its correlational findings.

The present study findings revealed that there were no statistically significant differences between the study and the control groups in all demographic data which means that all study groups were homogenous groups.

Through 60 cancer patients selected 30 as gaming group, and 30 as control group with cancer and met the inclusion criteria as more than one- half of the all study participants were over 50 years old and this finding was parallel to **Werdani & Prasetya., (2021)** who found that most of patients were more than 50 years old. otherwise, these results were in a contrast with **Stöcker & Mehnert., (2023)** in study entitled "Utilization of complementary and alternative medicine (CAM) by women with breast cancer or gynecological cancer" who found that most of patients were less than 50 years old. And **Naeem et al., (2024)** who conducted study to evaluate the Use of complementary and alternative medicine by cancer patients in Colombia and found that the average age 59.6 years old, and nearly two – third of the subjects were female.

Regarding the sex of the study`s participants, nearly one- third studied

participants were men. This might be explained by the increase in susceptibility of this age group to cancer. This finding was congruent with **Krajc et al., (2023)** and **Bo et al., (2021)** who revealed that the majority of the patients in both groups who had studied were men, married, and had a mean age of 52 years. In addition to **Eid et al., (2022)** noticed that the age of patients was more than 60 years, and more than half of them were male. Additionally, **Liu et al., (2024)** who found that two- third of the study subjects were men while the only one – third were women.

Dissimilarity, these findings were in a contrast with **Souza et al., (2024)** on study entitled "Effects of Chemotherapy on Fatigue levels and Quality of life in Cancer patients" which showed that more than two- third of the study subjects were female.

Regarding income, nearly two-thirds of the study subjects had monthly income ranging from two to four thousand pounds. Moreover, there was a correlation between monthly income and incidence of cancer. This finding could be interpreted from the researcher's point of view as the less income, the more subjective to cancer. Moreover, most of patients depended on the state`s expense system and the health insurance to be treated from cancer and received chemotherapy which considered the most expensive drugs.

Regarding marital status, more than two-thirds of the study subjects were married. while, **Krajc et al., (2023)** had another point of view on study conducted on marital status and survival in cancer patients and suggested that better survival was observed in married patients when compared to unmarried (single, never -married, divorced/separated, and widowed) all over in addition to the cancer-specific survival, resulting in the findings of his review can motivate physicians, oncologists, and other healthcare professionals to be aware of the importance of patients' social relations, especially in the identified sub-group. Otherwise **Ghaleche &Yazdani., (2022)** found that most study subjects had high optimism scores. It is presumably caused by marital status because most of the subjects who were married had a better support system than those without marital ties.

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Regarding the occupation, more than one-third of the study subjects were employees, while less than one- eighteenth were retired in the study subjects. This could be attributed to an elevated level of job stress, potentially resulting from the negative impacts of cancer treatment like fatigue, pain, depression, and anxiety (**Bo et al., 2021)**

In relation to education, nearly half of the study subjects through the three study groups have secondary degree and university education. Indeed, research indicates that higher levels of education are associated with a decreased likelihood of death from cancer and this helped in participation of the study, acquiring health teaching and interpreting the presented knowledge. These findings were on the same line with **Souza et al., (2024)** on study done to evaluate relationship between educational level and survival of patients with cancer and the multifactorial survival analysis showed that patients survived longer with increasing education (university and above vs. elementary school and below.

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In relation to education, nearly half of the study subjects through the three study groups have secondary degree and university education. Indeed, research indicates that higher levels of education are associated with a decreased likelihood of death from cancer and this helped in participation of the study, acquiring health teaching and interpreting the presented knowledge. These findings were on

the same line with **Souza et al., (2024)** on study done to evaluate relationship between educational level and survival of patients with cancer and the multifactorial survival analysis showed that patients survived longer with increasing education (university and above vs. elementary school and below.

Regarding clinical diagnosis, the most prevalent diagnosis were gastro-intestinal cancers, nearly half of the study subjects had gastro-intestinal cancer. This could be due to the spreading of unhealthy dietary habits, which may contribute in a huge increase in the incidence of gastro-intestinal cancers, especially colon cancer. The results were in accordance with **Chen et al., (2021)** who found that colorectal cancer was the fourth leading cause of cancer death in both men and women younger than 50 years in the late1990s but is now first in men and second in women.

Concerning the type of chemotherapy, nearly one-third of the participants of the control group received folfirinix protocol, more than one-third of the participants of the gaming group received folfox protocol.

(B) Analyses of the study hypotheses.

Regarding the total quality of life, there were statistically significant decreases in studied subjects through the control group and the gaming groups at the post intervention phases (post1- post2) compared to pre-intervention phase. But the only statistically significant improvement was among intervention phases (post1- post2).

Also, these findings were consistent with **Kim et al., (2021)** who suggested that feasibility and potentiality of the use of smartphone mobile games for patients with breast cancer receiving chemotherapy. Education using a mobile game led to better patient education, and better quality of life compared with conventional education. Mobile games can be used as easy, fun, and effective measures for patient education and have the potential to improve treatment outcomes.

moreover, the study results were parallel to those finding in study conducted by **Fazelniya et al., (2017)**, entitled “The Impact of an Interactive Computer Game on the Quality of Life of Children Undergoing Chemotherapy” and aiming at evaluating the effect of interactive computer game on the quality of life of children undergoing

chemotherapy and proved that computer games seem to be effective as a tool in influencing and improving the quality of life of children undergoing chemotherapy.

On the same context, the study results were congruent with **Ghazisaeidi, Safdari, Goodini, Mirzaiee, & Farzi ., (2017)** on study entitled " Digital games as an effective approach for cancer management: Opportunities and challenges " and showed that In cancer management domain, digital games are as an effective medium for health education and intervention, disease self-management training, attention distraction to relieve pain, enhance clinical outcomes, improvements in lifestyles, quality of life and physical and psychosocial activity promotion when active participation and behaviour rehearsal are required for cancer patient.

Regarding Edmonton Symptoms Assessment, the current study results showed that there was no significant improvement among the control group, and there was an improvement among the gaming group at post intervention phases (post1- post2).

The study results were on the same line with **Farahat et al., (2020)** who conducted study entitled "Effect of a palliative nursing interventions on symptoms intensity among patients with advanced cancer" The study findings showed a decrease in the total intensity of symptoms at post-test and follow up tests as the palliative nursing intervention had a positive effect on reducing symptoms intensity among advanced cancer patients.

Furthermore, these results agreed with study entitled by "Routine cancer treatments and their impact on physical function, symptoms of cancer-related fatigue, anxiety, and depression" done by **Grusdat et al., (2022)** and its main findings provided evidence that women with breast cancer showed reduced physical function, mental health, and symptoms of fatigue after breast cancer diagnosis with significant deterioration following treatment.

Additionally, the study results were congruent with the findings of study conducted by **Kim et al., (2021)** who proved that the Web-based game properties of immersivity, attention-maintaining properties of stories, engaging properties of interactivity, and behavior-change technology may improve

health-related behaviors and habits in patients with breast cancer. Several video games have been created to distract people from acute or chronic pain.

Moreover, the results` findings were in the same context with **Ghazisaeidi, et al., (2017)** who concluded that cancer management domain, digital games are as an effective medium for health education and intervention, disease self-management training, attention distraction to relieve pain, enhance clinical outcomes, improvements in lifestyles, and physical and psychosocial activity promotion when active participation and behavior rehearsal are required for cancer patient. In spite of potential benefits of new technology, sometimes people confront various challenges such as social isolation, unusual anxiety, and disorder in physiological times of body, low physical activities, decrease academic performance, increase aggressive behavior, and physical pain. These problems can be partly overcome by proper planning, good design, and usage of suitable and continuous monitoring.

5. Conclusion:

The following conclusion was drawn from the previously mentioned study findings, that," Effect of Mind- Body Games on Symptoms Intensity and Quality of Life among Cancer Patients Undergoing Chemotherapy" decrease (but, not significant) the intensity of symptoms among cancer patients undergoing chemotherapy. While, practicing mind- body games had no effect on quality of life among cancer patients undergoing chemotherapy.

6. Recommendations:

Based on the findings of the present study, the following recommendations were suggested:

1. It is essential for incorporate complementary and alternatives medicine in Medical-Surgical Nursing curriculum to update knowledge for further utilization in nursing practice.
2. Endorse complementary and alternatives therapy methods as a part of nurses in services training.
3. Replication of research study is recommended with using a larger sample size and randomly selected from different geographical areas in Egypt in order to provide a more accurate and broader representation of this group of patients in

Egypt.

4. Comparative study between other complementary and alternative methods should be done to evaluate the effect of these methods in symptoms` management or improving quality of life.

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Table (1): Socio- Demographic data among the studied groups (N=60).

Items	Control Group (N=30)		Games group (N=30)	
	N	%	N	%
Age (years)				
(18:25) years	5	16.67%	4	13.33%
(26:39) years	7	23.33%	8	26.67%
(40:49) years	8	26.66%	7	23.33%
(50:65) years	10	33.33%	11	36.66%
Sex				
Male	17	56.67%	20	66.67%
Female	13	43.33%	10	33.33%
Marital Status				
Single	1	3.33%	0	0.00%
Married	22	73.33%	22	73.33%
Divorced	5	16.67%	4	13.33%
Widowed	2	6.67%	4	13.33%
Income				
Less than 2000	2	6.67%	6	20.00%
2000:4000	21	70.00%	17	56.67%
4000:6000	5	16.67%	2	6.67%
6000:8000	1	3.33%	4	13.33%
More than 8000	1	3.33%	1	3.33%
Education				
Illiterate	6	20.00%	8	26.67%
Primary	4	13.33%	5	16.67%
Secondary	13	43.33%	12	30.77%
University	7	23.33%	5	16.67%
Occupation				
Housewife	7	23.33%	5	16.67%
Employee	12	40.00%	10	33.33%
Not working	2	6.67%	8	26.67%
Retired	3	10.00%	3	10.00%
Free business	6	20.00%	4	13.33%

Table (2): Clinical Diagnosis of the studied groups (N=60).

Clinical Diagnosis	Control (n=30)		Games (n=30)	
	N	%	N	%
Breast	3	10.0%	3	10.00%
Lung	2	6.67%	1	3.33%
Gastrointestinal	12	40.00%	16	53.33%
Urinary Tract	2	6.67%	4	13.33%
Leukemia and Lymphoma	4	13.33%	2	6.67%
Genital Organs	4	13.33%	1	3.33%
Others (skin, myeloma, tongue)	3	10.0%	4	13.33%

Table (3): The number of chemotherapy cycles of the studied groups (N=60)

Number of chemotherapy cycles	Control (n=30)		Games (n=30)	
	N	%	N	%
1-4 cycles	2	6.67%	1	3.33%
5-8 cycles	24	80.00%	16	53.3%
More than 8 cycles	4	13.33%	13	43.33%

Table (4): Type of chemotherapy Protocol of the studied groups (N=60).

Type of chemotherapy protocol	Control (n=30)		Games (n=30)	
	N	%	N	%
ABVD	1	3.33%	0	0.00%
FLOT	2	6.67%	1	3.33%
Folfirin/Folfirinox	8	26.67%	7	23.33%
Folfox/Folfox4/Folfox6	7	23.33%	11	36.67%
Gem Platinium	5	16.67%	4	13.33%
MAID	1	3.33%	2	6.67%
R-CHOP	1	3.33%	2	6.67%
Taxains	2	6.67%	1	3.33%
Others	3	10.0%	2	6.67

Table (5): Quality of life throughout the study phases among the studied groups (N=60).

Total quality of life	Test of significance *p*-value		
	Control (n=30)	Games (n=30)	
Pre			
- Min. – Max.	85.00-117.00	91.00-121.00	
- Mean ± SD	105.67±7.66	108.43±7.56	
- SEM	1.40	1.38	$F_{(df=2)}$=1.169
- 95% CI of the mean	102.81-108.53	105.61-111.26	*p*=.315 NS
- 25th Percentile – 75th Percentile	102.00-113.00	103.00-113.00	
Post 1			
- Min. – Max.	78.00-110.00	86.00-118.00	
- Mean ± SD	98.10±7.38	103.73±8.06	$F_{(df=2)}$=33.394
- SEM	1.35	1.47	*p*<.001*
- 95% CI of the mean	95.34-100.86	100.72-106.74	
- 25th Percentile – 75th Percentile	94.00-105.00	98.00-110.00	
Post 2			
- Min. – Max.	77.00-111.00	88.00-119.00	
- Mean ± SD	97.73±7.67	103.70±7.75	$F_{(df=2)}$=40.746
- SEM	1.40	1.41	*p*<.001*
- 95% CI of the mean	94.87-100.60	100.81-106.59	
- 25th Percentile – 75th Percentile	94.00-104.00	99.00-108.00	

Table (6): symptoms intensity assessment throughout the study phases of the studied groups (N=60).

Edmonton Symptoms Assessment Scale (range 0-90)	Test of significance p-value		
	Control (n=30)	Games (n=30)	
Pre - Min. – Max. - Mean ± SD - SEM - 95% CI of the mean - 25th Percentile – 75th Percentile	27.00-67.00 45.63±10.64 1.94 41.66-49.61 36.00-56.00	31.00-61.00 44.13±9.32 1.70 40.65-47.61 36.00-55.00	$F_{(df=2)}$=0.431 p=.651 NS
Post 1 - Min. – Max. - Mean ± SD - SEM - 95% CI of the mean - 25th Percentile – 75th Percentile	26.00-66.00 45.27±10.73 1.96 41.26-49.27 35.00-56.00	31.00-64.00 45.08±9.44 1.72 41.55-48.60 38.00-55.00	$F_{(df=2)}$=0.446 p=.641 NS
Post 2 - Min. – Max. - Mean ± SD - SEM - 95% CI of the mean - 25th Percentile – 75th Percentile	27.00-64.00 45.27±10.45 1.91 41.37-49.17 35.00-56.00	33.00-65.00 46.10±9.33 1.70 42.62-49.58 38.00-55.00	$F_{(df=2)}$=0.897 p=.412 NS
Test of significance p-value	$F_{(df=2)}$=3.145 p=.050 NS	$F_{(df=2)}$=0.429 p=.653 NS	

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