# Investigation of Symptom Status, Body Perception Levels and Symptoms of Anxiety and Depression in Breast Cancer Patients Receiving Paclitaxel: A Prospective Longitudinal Study

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## Abstract

***Purpose:*** This study aimed to investigate symptom status, body perception level changes and the symptoms of anxiety and depression in breast cancer patients receiving Paclitaxel.

***Methods:*** This descriptive, and prospective study was conducted with 84 breast cancer patients receiving paclitaxel regimen. “Chemotherapy Symptom Assessment Scale (C-SAS)”, “Body Perception Scale (BPS)” and “Hospital Anxiety and Depression Scale (HADS)” were applied at five time points (T□, T□, T□, T□, T□). Data was analyzed using descriptive statistics, Wilcoxon, Friedman, Cochrane Q and Spearman’s correlation tests.

***Results:*** The frequency of needling and numbness in hands and feet, pain, and skin or nail changes significantly increased in the subsequent assessment points (T□, T□, T□, and T□) compared to the initial assessment (T□) ($p<0.05$). The mean scores of BPS significantly decreased at T□, T□, and T□ ($p<0.01$). The mean scores of the anxiety subscale of the HADS scale decreased at the T2, T3, and T4 ($p<0.01$), and the mean scores of the depression subscale significantly increased at the T3, T4, and T5 ($p<0.01$).

***Conclusions:*** The findings underscore the need for oncology nurses to provide comprehensive training sessions on effective symptom management, changes in body perception levels, and alleviation of the symptoms of anxiety and depression in breast cancer patients receiving paclitaxel. In this way, the physiological symptom burden that occurs in patients may be alleviated, and negative changes in body perception, anxiety and depression symptoms may be decreased.


## Introduction

Breast cancer (BC) is the most common type of cancer among women worldwide, causing significant rates of mortality and morbidity [1, 2]. In recent years, adjuvant and neoadjuvant systemic therapies have started to take an important place in BC treatment to reduce the associated mortality rate, in addition to the classical treatment methods such as surgery, chemotherapy, and radiotherapy [3].

Paclitaxel is frequently preferred during adjuvant and neoadjuvant therapies [4]. Paclitaxel is a taxane group drug and can be administered weekly (12 weeks) or every 21 days (four cycles) after four cycles of adriamycin–cyclophosphamide (AC) treatment in patients with early-stage BC [5–7]. With the increasing clinical use of paclitaxel in BC, it is reported that therapeutic response, survival, and disease-free survival rates have increased [6].

Paclitaxel often causes significant symptoms such as neutropenia, nausea, vomiting, diarrhea, oral mucositis, amenorrhea, alopecia, arthralgia, myalgia, peripheral neuropathy, skin and nail changes, liver and renal toxicity, and hypersensitivity reactions in BC patients depending on the number of cycles and the dose administered [5, 6]. Based on literature, nail changes [8], arthralgia and myalgia [9] and neurotoxicity [10] are frequently seen in patients with BC. In particular, during the weekly administered paclitaxel regimen, patients are found feeling uncomfortable due to arthralgia and myalgia, taste changes, peripheral neuropathy, fatigue, cognitive problems, and insomnia [11]. In addition, neurotoxicity is reported to be associated with the increasing cumulative dose of the paclitaxel [10]. Patients with BC receiving paclitaxel also experience anxiety, depression and decrease in body perception due to physiological effects of paclitaxel including alopecia, changes in sexual life, menstrual disorders, weight changes and changes in nails/skin [12–14].

Parallel to the increasing symptom status during the BC treatment, patients find it increasingly difficult to adapt to the treatment. Changes in physical, cognitive, and emotional statuses may also cause a decline in the body perception. [15]. Body perception in BC patients is negatively affected during the paclitaxel regimen as a result of edema, weight changes, alopecia, differentiation in skin color and nails, oral mucositis, menstrual cycle disorders and sexual life problems [16, 17]. At the same time, as in many cultures, imputed meanings related to aesthetic appearance, femininity, attractiveness, sexuality, and motherhood in Turkish culture makes the treatment process even more difficult for patients with BC [18, 19]. Several studies have also highlighted that chemotherapy and mastectomy, which have an important place in the BC treatment, negatively affect the body perception in BC patients [12, 13, 20].

Another clinical situation that needs to be considered is that emotional changes, including distress, anxiety, and depression in BC patients. During BC treatment, experienced symptoms, decrease in the body perception and increase in anxiety, patients have more difficulty coping with the treatment process, and they constitute a risky group for depression [16]. Previous studies conducted with BC patients reported that alopecia, weight changes, fatigue, and difficulties in sexual life are directly related to higher anxiety and depression levels in those undergoing surgery and chemotherapy [14, 21, 22]. Besides, numerous studies have emphasized that the anxiety levels are higher in the first year after a BC diagnosis [23], which gradually decrease during the treatment [24].

In the literature, no studies have been found that investigated changes in symptom status, body perception, and the symptoms of anxiety and depression prospectively in patients with BC scheduled to receive paclitaxel regimen. Therefore, this study aimed to determine the symptom

status, body perception changes, and the symptoms of anxiety and depression in patients with BC for a total of 12 weeks. It is assumed that determining the time intervals in which the risk of anxiety and depression become evident during the treatment may provide to plan comprehensive training programs and counseling sessions for BC patients and may reduce the symptom burden as well as the deterioration in body perception.

# Research Questions

- How do the symptom status change in BC patients during the paclitaxel regimen?
- How do body perception levels change in BC patients during the paclitaxel regimen?
- How do the symptoms of anxiety and depression change in BC patients during the paclitaxel regimen?

## Methods

# Study design and setting

This descriptive and prospective study was conducted between July 29, 2019 and June 15, 2020 at three centers located in XXX, Turkey. Participants were recruited from the outpatient clinics of the Departments of Clinical Oncology of the three local public hospitals. All patients selected for this study received a total of 12 paclitaxel infusions in the oncology outpatient clinic once a week, for a total of 12 weeks.

# Participants

The universe of the study consisted of patients with BC who received the first cure of the paclitaxel regimen in the daytime treatment units. The patients who met the inclusion criteria were included in the study without using any sampling method. Considering the correlation coefficient as 0.30 between the BPS and the HADS total scores, the sample size was calculated at least 84 patients with a power of 80% through the G Power 3.1.10 program. Patients aged between 18 and 65 years, who were diagnosed of BC and had completed four cycles of AC regimen prior to the paclitaxel regimen and all the 12 cycles of the paclitaxel were included in the study. Those who had communication problems, had a psychiatric diagnosis (major depression, etc.), had a different cancer diagnosis, were receiving radiotherapy, using relaxation techniques or antidepressants during the study, could not complete 12 cycles of the paclitaxel regimen, and were not willing to participate were excluded from the study. In this context, a total of 88 patients were assessed, four patients were excluded due to following reasons: did not want to continue the study (n = 2), could not be reached after the fourth cycle (n = 1) and did not want to receive her treatment due to fear of coronavirus-19 disease (COVID-19) (n = 1). Finally, this study was completed with 84 patients.

# Data Collection Tools

# Demographic and clinical information form

This form developed based on the literature [4, 5, 6, 25], and consisted of age, height, weight, body mass index, educational level, marital status, income level, employment status, whether having children or not, accompanying comorbidities, duration of BC diagnosis, BC stage, previous treatments, mastectomy status, people living together with, and residency in XXX.

# Chemotherapy Symptom Assessment Scale (C-SAS)

This scale was developed to determine the symptom status of cancer patients receiving chemotherapy treatment [19]. The Turkish version of the C-SAS was studied by Aslan et al. (2006) [18]. It includes 24 different symptoms that may occur during chemotherapy. Patients are asked to identify the status of experiencing each symptom as “yes”/”no”. Since each symptom is evaluated separately, the arithmetic mean values are not used in evaluating the scale scores. In the Turkish validity and reliability study of the scale, the Cronbach alpha coefficient was found as 0.82 [18, 19]. In this study, Cronbach’s alpha coefficient was calculated as 0.62.

# Body Perception Scale (BPS)

This scale was developed by Secord and Jourard (1953) [26]. It contains 40 five-point likert-type questions about body region or function. These 40 items include five assessment criteria related to each organ or body function (starting from 1 = “I do not like” to 5 = “I like very much”). Total score that can be obtained from the scale varies between 40 and 200. An increase in the total score indicates that a person’s satisfaction with the part or functionality that makes up his/her body increases. The Turkish validity and reliability study of the scale was conducted by Hovardaoğlu (1993) and the Cronbach alpha coefficient was found as 0.91 [27]. In this study, the Cronbach’s alpha coefficient value was calculated to be 0.84.

# Hospital Anxiety and Depression Scale (HADS)

HADS was developed by Zigmond and Snaith (1983) [28] to determine the risk status for anxiety and depression in patients with physical disorders, and its Turkish version was studied by Aydemir et al. (1997) [29]. It includes 14 questions and two sub-dimensions as anxiety and depression. Seven questions (odd numbered) measure anxiety (HAD-A) while the other seven questions (even numbered) measure depression (HAD-D). In the scale, questions are scored on a four-point Likert scale, each ranging from 0 to 3. The lowest score that a patient can get from each sub-dimension is 0, and the highest score is 21. As the total scores increase, patients are considered at risk for anxiety and depression. In the Turkish validity and reliability study of the scale, the Cronbach alpha coefficient was found as 0.85 and 0.77 for the anxiety and depression sub-dimensions, respectively [29]. In this study, the Cronbach's alpha coefficient values were calculated as 0.86 and 0.79 for the anxiety and depression sub-dimensions in this study, respectively.

# Data collection procedure

Baseline data ($T_1$) were collected on the day of the first paclitaxel infusion, before the first infusion was given, using the demographic and clinical information form, C-SAS, BPS, and HADS from the patients who met the inclusion criteria. The patients were prospectively followed by the principal investigator (PI) during the paclitaxel regimen for a total of 12 weeks. The C-SAS, BPS, and the HADS were reapplied to the patients by the PI at the end of the first cycle (first week - $T_2$), fourth cycle (fourth week - $T_3$), eighth cycle (eighth week - $T_4$), and twelfth cycle (twelfth week - $T_5$) during the paclitaxel regimen (Fig. 1).

# Statistical analysis

Data analysis was performed using "IBM Statistics 23.0" statistical package program. Descriptive statistics (mean, median, standard deviation, minimum, maximum, percentage, and frequency) were used in the evaluation of the socio-demographic data. Data were analyzed for normality using Shapiro Wilk Test. The Cochran's Q test was used to determine the changes in the frequency of symptoms. Since the BPS and HADS data were not normally distributed, Pearson's correlation test was used to determine the relationship between the two scales. The Friedman Test and the Wilcoxon test were used to examine the changes in BPS and HADS scores as per the paclitaxel cycles. When a statistically significant difference was found, the advanced post-hoc test (Bonferroni test) was utilized to determine the assessment point (T□, T□, T□, T□, or T□) that caused the difference. The statistical significance value was set at $p < 0.05$ in the study.

# Ethical considerations

Ethical approval was obtained from XXX University Non-Interventional Clinical Research Ethics Committee, and institutional permissions were obtained from hospital administrations. All information was collected in accordance with the Declaration of Helsinki. Informed consent forms were obtained from all the patients included in the study. The PI gave information to the patients about the importance, purpose, and contributions of the study in the first interview received the contact numbers of the patients and applied the data collection tools using a face-to-face interview technique.

## Results

The descriptive characteristics of the patients are given in Table 1. The majority of the sample had completed primary school (60.7%) and did not work (73.8%); however, half of the patients reported having a mid-level income. The great majority of participants were married (85.7%) and had children (89.3%). 47.6% of the patients had stage-2 BC, 77.4% had undergone breast surgery and chemotherapy treatments before, and 26.2% had come from other cities to receive their scheduled treatment. The big majority of patients (94%) lived with their family, and nearly half (45.2%) of those had at least one additional chronic disease. The mean age of patients was 49.57±8.14 years. The mean value of the body mass index was 29.49±5.50, and the average number of children was 2.14±1.04. The mean time of diagnosis was 5.51±1.66 months; the time since diagnosis was 3–6 months in 81% of the patients.

Changes in symptom frequency among the patients were prospectively evaluated at five different time points (T□, T□, T□, T□, and T□) during the 12-week paclitaxel regimen (Table 2). When the symptoms of nausea and vomiting (after treatment), constipation, weight loss or weight gain, changes in appetite, problems with the eyes, feelings of extraordinary fatigue, headaches, anxiety or distress, pessimism and sadness, changes in sexual life, and changes in the menstrual cycle were compared with symptom statuses of the baseline assessment (T□), a significant decrease was observed in the aforementioned symptoms in all the subsequent measurements (T□, T□, T□ and T□) ($p<0.05$). Besides, the frequency of feeling needling, numbness, and pain in the hands and feet increased in the subsequent assessments (T□, T□, T□ and T□) compared to the baseline assessment (T□) ($p<0.05$). In addition, according to the baseline assessment ($T_1$) and the assessment at the end of the first cycle ($T_2$), the increase in the frequency of sleep disturbances in the fifth assessment ($T_5$) cycle remained statistically significant ($p<0.05$). Finally, the frequency of skin and nail changes gradually increased from T2 to T5 ($p<0.05$). However, the differences between the measurements ($T_1$, T□, T□, T□, T□) were not statistically significant in terms of nausea and vomiting (before treatment), diarrhea, dyspnea, signs of infection, bleeding or bruising, hair loss, weakness, and problems with the mouth and throat ($p>0.05$).

Regarding the changes in the mean BPS scores of the patients during the paclitaxel regimen, the corresponding scores were 137.75±13.72 at T□, 130.53±14.62 at T□, 132.33±12.01 at $T_3$, 129.59±12.62 at $T_4$, and 124.07±10.43 at T□ (Table 3). When comparing the changes in the mean scores of the BPS, the corresponding scores decreased in T□ compared to T□, increased in T□ compared to T□, and decreased again in T□ compared to T□, and in T□ compared to T□. Among these changes, the reductions between T□–T□, T□–T□, and T□–T□ were found to be statistically significant (p<0.05). In addition, in paired comparisons, the reductions between T□–T□, T□–T□, T□–T□, and T□–T□ measurements were statistically significant (p<0.05).

During the paclitaxel regimen in this study, the mean scores of the HAD-A sub-dimension were 6.60±4.74 at T□, 5.63±3.86 at T□, 4.47±3.33 at $T_3$, 4.17±3.01 at T□, and 4.29±3.15 at T□. When Table 4 is examined, it can be seen that the mean scores of the HAD-A decreased in T□ compared to T□ and T□ and in T□ and T□ compared to T□; the mean scores increased in T□ compared to $T_4$. The reductions between T□–T□ and T□-T□ assessments were statistically significant (p<0.05). Also, the reductions between the T□–T□, T□–T□, T□–T□, and T□–T□ measurements were statistically significant based on the paired comparison tests (p<0.05).

The changes in the mean scores of the HAD-D sub-dimension based on the paclitaxel cures are presented in Table 4. Accordingly, it was found to be 6.00±4.16 at T□, 5.64±3.37 at $T_2$, 6.13±3.65 at T□, 6.90±3.23 at T□, and 7.44±2.85 at T□. When Table 4 is examined, it can be seen that the mean depression scores decreased in T□ compared to T□, increased in T□ compared to T□ and T□, and increased again in $T_3$ and $T_5$ compared to T□. Among these changes, the reductions between T□–T□ and T□–T□ were found to be statistically significant (p<0.05). In addition, the differences between the T□–T□, T□–T□, T□–T□, and T□–T□ measurements were statistically significant based on paired comparisons (p<0.05).

## Discussion

In this prospective study, we investigated the symptom status, body perception level changes and the symptoms of anxiety and depression in BC patients receiving Paclitaxel treatment using 5 different measurement points. While frequency of symptoms nausea-vomiting, fatigue, headaches, anxiety-distress decreased, needling, numbness, pain in the hands and feet, sleep disturbances, and skin-nail changes increased during the paclitaxel regimen. Similar to our findings, neuropathy, skin and nail toxicities, and arthralgia and myalgia were frequently reported in patients receiving paclitaxel regimen [8, 30, 31, 32]. A study evaluating the symptom status before and after the treatment in BC patients also reported that anxiety decreased, and pain increased [33]. Bao et al. (2016) [34] confirmed that 58.4% of the BC patients receiving taxane chemotherapy had numbness in their hands and feet. In contrast to the present study, Azim et al. (2011) showed that women receiving adjuvant therapy had more serious sexual problems compared to those receiving other treatments [35]. In the current study, BC patients receiving paclitaxel regimen after four cycles of AC chemotherapy were followed within the scope of the standard paclitaxel regimen used only in the treatment of early-stage BC. Due to the high side effect profile of the AC cycle, many symptoms were found to be quite high at the beginning of the cycle and relatively lower at the end of the first cycle. The researchers assumed that the gradual decrease in the symptom frequency perceived by the BC patients in the later stages of adjuvant paclitaxel courses in the study sample could be due to easier tolerance for the paclitaxel therapy as against for the systematic and aggressive chemotherapy protocol, including the AC treatment.

This study also evaluated the changes in body perception levels during the paclitaxel regimen. Based on the findings, the body perception scores of the patients were found to be highest at T□, and lowest at $T_5$. Similarly, Villar et al. (2017) found that the body perception levels of the breast cancer patients receiving chemotherapy decreased in the last evaluation compared to the first evaluation [33]. Two studies carried out in Brazil and Israel reported that the body perception levels of breast cancer patients receiving chemotherapy decreased by 74.8% and 80.9%, respectively [36, 37]. In a systematic review conducted by Paterson et al. (2016), the body perception of breast cancer patients was negatively affected in 35 out of the 36 studies [14]. It is presumed that the changes in symptom status such as alopecia, skin and nail changes, and neuropathic pain in breast cancer patients during the paclitaxel regimen might be influential on the perceived negative changes in body perception. These conditions may lead to a significant decrease in the body perception levels over time.

Another important finding of this study was that the mean scores of the HAD-A subscale decreased in the first four measurements ($T_1$, $T_2$, $T_3$, and $T_4$) and relatively increased in the last measurement ($T_5$). Similarly, Villar et al. (2017) reported that the anxiety levels decreased significantly following the chemotherapy and radiotherapy treatments in breast cancer patients [33]. Moreira & Canavarro (2010) also concluded that the anxiety levels of breast cancer patients decreased during the period following surgery and chemotherapy [22]. Bergerot et al. (2017) stated that the anxiety levels of the cancer patients were highest on the first day and lowest on the last day of chemotherapy [38]. Considering all the findings of the studies, higher anxiety levels in the patients before the paclitaxel regimen may be related to the initiation of a new chemotherapy regimen and the uncertainties that may be experienced during the process. The decrease in the anxiety levels of the BC patients over time may be due to the relatively lower and moderate symptom severity during the paclitaxel regimen, and the improvement of physiological and psychological, individual coping strategies along with the increase in knowledge of and experience related to BC and its treatment.

We have also examined the changes in depression scores. Accordingly, the depression scores decreased at the end of $T_2$ compared to $T_1$ and gradually increased at $T_3$, $T_4$, and $T_5$. Confirming the findings of this study, Byar et al. (2006) had earlier reported that depression levels were low at the beginning and increased as the treatment progressed in BC patients receiving adjuvant chemotherapy [39]. Oh & Cho (2020) also stated that while the depression rate was 4% in South Korean BC patients before the chemotherapy started, it reached 30% after the chemotherapy [40]. Considering all the results, the lower levels of of depression at the end of the first cycle and the higher levels as the course progressed may be related to the symptoms, the lack of comprehensive management of these symptoms, and the changes in body perception and anxiety levels following 12 weeks of paclitaxel regimen. The increase in the symptoms of depression at the end of the treatment may be attributed to the uncertainties in the prognose and the treatment options to be continued.

## Limitations

Since the treatment hours were at the same time in all the three study centers, some patients were missed and could never include in the study. Another limitation is that the first, fourth, eighth, and the twelfth (end of cure) assessments of 36 patients were compulsorily completed via phone interviews due to the announcement of the COVID-19 pandemic and the suspension of research in hospitals in Turkey as March 2020.

## Conclusions

To the best of our knowledge, this is the first study evaluating BC patients receiving paclitaxel in terms of symptom statutes, body perception levels, and anxiety and depression symptoms at five different time points during the paclitaxel protocol. This study showed that a comprehensive follow-up of BC patients by oncology nurses becomes important to alleviate the symptoms, improve body perception and decrease the anxiety and depression. In this context, the nurses should simultaneously evaluate the changes in the symptom status, body perception levels, and the anxiety-depression symptoms during the paclitaxel regimen, and should take precautions early enough, and thus make important contributions to the patients.

## Declarations

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**Availability of data and material:** The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

**Code availability:** Not applicable

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**Consent to participate:** Informed consent was obtained from all individual participants included in the study.

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**Conflicts of interest**: The authors declare they have no conflict of interest.

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## Tables

**Table 1.** Participants' characteristics (n=84)

| Variable | Category | Number (n) | Percent (%) |
|---|---|---|---|
| **Educational Level** | Primary school | 51 | 60.7 |
| | Middle School | 10 | 11.9 |
| | High school | 19 | 22.6 |
| | Associate / License | 4 | 4.8 |
| **Marital Status** | Single | 12 | 14.3 |
| | Married | 72 | 85.7 |
| **Income Level** | Low | 40 | 47.6 |
| | Middle | 42 | 50.0 |
| | High | 2 | 2.4 |
| **Employment** | Not working | 62 | 73.8 |
| | Working | 22 | 26.2 |
| **Having a Child** | Absent | 9 | 10.7 |
| | Present | 75 | 89.3 |
| **People that Living Together** | Alone | 5 | 6.0 |
| | With family | 79 | 94.0 |
| **Residency in XXX** | Yes | 62 | 73.8 |
| | No | 22 | 26.2 |
| **Comorbidities** | Present | 38 | 45.2 |
| | Absent | 46 | 54.8 |
| **Breast Cancer Stage** | Stage 1 | 10 | 11.9 |
| | Stage 2 | 40 | 47.6 |
| | Stage 3 | 34 | 40.5 |
| **Previous Treatments** | Chemotherapy | 19 | 22.6 |
| | Surgery and Chemotherapy | 65 | 77.4 |
| **Mastectomy Status** | No | 21 | 25.0 |
| | Yes | 63 | 75.0 |
| **Variable** | **Min** | **Max** | **X±SD*** |
| **Age** | 29 | 64 | 49.57±8.14 |
| **BMI** | 17.92 | 46.48 | 29.49±5.50 |
| **Duration of Breast Cancer Diagnosis (months)** | 3 | 12 | 5.51±1.66 |
| **Number of children** | 0 | 4 | 2.14±1.04 |

* X±SD=Mean, Standard Deviation, BMI: Body Mass Index

**Table 2.** The Changes in Chemotherapy Symptom Assessment according to paclitaxel cycles (n=84)

| Variable | Status | T1 | | T2 | | T3 | | T4 | | T5 | | P value | Q | Difference Between End of Cure Measurements |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (n) | (%) | (n) | (%) | (n) | (%) | (n) | (%) | (n) | (%) | | | |
| **Nausea-vomiting before treatment** | Present | 2 | 2.4 | 2 | 2.4 | 2 | 2.4 | 1 | 1.2 | 0* | 0 | p=0.934 | 0.429 | - |
| | Absent | 82 | 97.6 | 82 | 97.6 | 82 | 97.6 | 83 | 98.8 | 84 | 100 | | | |
| **Nausea after treatment** | Present | 75 | 89.3 | 19 | 22.6 | 10 | 11.9 | 7 | 8.3 | 10 | 11.9 | **p<0.001** | 188.960 | T1-T2 (p<0.001, Q=0.667)<br>T1-T3 (p<0.001, Q=0.774)<br>T1-T4 (p<0.001, Q=0.774)<br>T1-T5 (p<0.001, Q=0.810) |
| | Absent | 9 | 10.7 | 65 | 77.4 | 74 | 88.1 | 77 | 91.7 | 74 | 88.1 | | | |
| **Vomiting after treatment** | Present | 19 | 22.6 | 3 | 3.6 | 1 | 1.2 | 0* | 0 | 0* | 0 | **p<0.001** | 29.200 | T1-T2 (p<0.001, Q=-0.190)<br>T1-T3 (p<0.001, Q=-0.214) |
| | Absent | 65 | 77.4 | 81 | 96.4 | 83 | 98.8 | 84 | 100 | 84 | 100 | | | |
| **Constipation** | Present | 44 | 52.4 | 31 | 36.9 | 21 | 25.0 | 15 | 17.9 | 15 | 17.9 | **p<0.001** | 43.461 | T1-T3 (p<0.001, Q=0.274)<br>T1-T4 (p<0.001, Q=0.345)<br>T1-T5 (p<0.001, Q=0.345)<br>T2-T4 (p<0.001, Q=0.190)<br>T2-T5 (p=0.026, Q=0.190) |
| | Absent | 40 | 40.7 | 53 | 63.1 | 63 | 75.0 | 69 | 82.1 | 69 | 82.1 | | | |
| **Diarrhea** | Present | 15 | 17.9 | 3 | 3.6 | 10 | 11.9 | 10 | 11.9 | 10 | 11.9 | 0.052 | 9.385 | - |
| | Absent | 69 | 82.1 | 81 | 96.4 | 74 | 88.1 | 74 | 88.1 | 74 | 88.1 | | | |
| **Pain** | Present | 35 | 41.7 | 59 | 70.2 | 54 | 64.3 | 58 | 69.0 | 64 | 76.2 | **p<0.001** | 33.026 | T1-T2 (p<0.001, Q=0.286)<br>T1-T3 (p=0.006, Q=0.226)<br>T1-T4 (p<0.001, Q=0.274)<br>T1-T5 (p<0.001, Q=0.345) |
| | Absent | 49 | 58.3 | 25 | 29.8 | 30 | 35.7 | 26 | 31.0 | 20 | 23.8 | | | |
| **Dyspnea** | Present | 5 | 6.0 | 6 | 7.1 | 6 | 7.1 | 6 | 7.1 | 6 | 7.1 | 0.997 | 0.154 | - |
| | Absent | 79 | 94.0 | 78 | 92.9 | 78 | 92.9 | 78 | 92.9 | 78 | 92.9 | | | |
| **Signs of** | Present | 2 | 2.4 | 3 | 3.6 | 3 | 3.6 | 3 | 3.6 | 3 | 3.6 | 0.991 | 0.286 | - |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **infection** | Absent | 82 | 97.6 | 81 | 96.4 | 81 | 96.4 | 81 | 96.4 | 81 | 96.4 | | | |
| **Bleeding or bruising** | Present | 1 | 1.2 | 0* | 0 | 2 | 2.4 | 0* | 0 | 1 | 1.2 | 0.717 | 0.667 | - |
| | Absent | 83 | 98.8 | 84 | 100 | 82 | 97.6 | 84 | 100 | 83 | 98.8 | | | |
| **Pins and needles in hands, feet** | Present | 24 | 28.6 | 20 | 23.8 | 38 | 45.2 | 57 | 67.9 | 74 | 88.1 | **p<0.001** | 111.957 | T1-T4 (p<0.001, Q= 0.393)<br>T1-T5 (p<0.001, Q= 0.595)<br>T2-T3 (p=0.003, Q= 0.214)<br>T2-T4 (p<0.001, Q= 0.440) |
| | Absent | 60 | 71.4 | 64 | 76.2 | 46 | 54.8 | 27 | 32.1 | 10 | 11.9 | | | T2-T5 (p<0.001, Q= 0.643)<br>T3-T4 (p=0.018, Q= 0.226)<br>T3-T5 (p<0.001, Q= 0.429)<br>T4-T5 (p<0.005, Q= 0.202) |
| **Problems with the skin or nails** | Present | 68 | 81.0 | 55 | 65.5 | 63 | 75.0 | 72 | 85.7 | 79 | 94.0 | **p<0.001** | 30.481 | T2-T4 (p=0.003, Q= 0.202)<br>T2-T5 (p<0.001, Q= 0.286)<br>T3-T5 (p=0.006, Q= 0.190) |
| | Absent | 16 | 19.0 | 29 | 34.5 | 21 | 25.0 | 12 | 14.3 | 5 | 6.0 | | | |
| **Hair loss** | Present | 84* | 100 | 0* | 0 | 3 | 3.6 | 2 | 2.4 | 7 | 8.3 | p=0.148 | 3.818 | - |
| | Absent | 0 | 0 | 84 | 100 | 81 | 96.4 | 82 | 97.6 | 77 | 91.7 | | | |
| **Problems with the mouth and throat** | Present | 65 | 77.4 | 52 | 61.9 | 54 | 64.3 | 57 | 67.9 | 59 | 70.2 | p=0.058 | 9.117 | - |
| | Absent | 19 | 22.6 | 32 | 38.1 | 30 | 35.7 | 27 | 32.1 | 25 | 29.8 | | | |
| **Change in appetite** | Present | 72 | 85.7 | 41 | 48.8 | 54 | 64.3 | 44 | 52.4 | 43 | 51.2 | **p<0.001** | 33.990 | T1-T2 (p<0.001, Q= 0.369)<br>T1-T3 (p=0.039, Q= 0.214) |
| | Absent | 12 | 14.3 | 43 | 51.2 | 30 | 35.7 | 40 | 47.6 | 41 | 48.8 | | | T1-T4 (p<0.001, Q= 0.333)<br>T1-T5 (p<0.001, Q= 0.345) |
| **Losing or gaining weight** | Present | 50 | 59.5 | 12 | 14.3 | 34 | 40.5 | 32 | 38.1 | 37 | 44.0 | **p<0.001** | 33.368 | T1-T2 (p<0.001, Q= 0.452) |
| | Absent | 34 | 40.5 | 72 | 85.7 | 50 | 59.5 | 52 | 61.9 | 47 | 56.0 | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | T1-T4 (p<0.005, Q= 0.214)<br>T2-T3 (p=0.004, Q= -0.262)<br>T2-T4 (p=0.012, Q= -0.238)<br>T2-T5 (p=0.001, Q= -0.298) |
| **Problems with the eyes** | Present | 51 | 60.7 | 7 | 8.3 | 15 | 17.9 | 16 | 19.0 | 29 | 34.5 | **p<0.001** | 75.139 | T1-T2 (p<0.001, Q= 0.524)<br>T1-T3 (p<0.001, Q= 0.429)<br>T1-T4 (p<0.001, Q= 0.417)<br>T1-T5 (p=0.001, Q= 0.262)<br>T2-T5 (p=0.001, Q= -0.262) |
| | Absent | 33 | 39.3 | 77 | 91.7 | 69 | 72.1 | 68 | 81.0 | 55 | 65.5 | | | |
| **Fatigue** | Present | 84* | 100 | 68 | 81.0 | 73 | 86.9 | 74 | 88.1 | 75 | 89.3 | p=0.332 | 3.412 | - |
| | Absent | 0 | 0 | 16 | 19.0 | 11 | 13.1 | 10 | 11.9 | 9 | 10.7 | | | |
| **Feeling exceptionally tired** | Present | 66 | 78.6 | 10 | 11.9 | 20 | 23.8 | 10 | 11.9 | 20 | 23.8 | **p<0.001** | 123.529 | T1-T2 (p<0.001, Q= -0.655)<br>T1-T3 (p<0.001, Q= -0.536)<br>T1-T4 (p<0.001, Q= -0.655)<br>T1-T5 (p<0.001, Q= -0.536) |
| | Absent | 18 | 21.4 | 74 | 88.1 | 64 | 76.2 | 74 | 88.1 | 64 | 76.2 | | | |
| **Difficulty sleeping** | **Present** | 35 | 41.7 | 35 | 41.7 | 41 | 48.8 | 42 | 50.0 | 51 | 60.7 | **p=0.016** | 12.169 | T1-T5 (p=0.027, Q= 0.190)<br>T2-T5 (p=0.027, Q= 0.190) |
| | **Absent** | 49 | 58.3 | 49 | 58.3 | 43 | 51.2 | 42 | 50.0 | 33 | 39.3 | | | |
| **Headaches** | **Present** | 48 | 57.1 | 26 | 31.0 | 40 | 47.6 | 30 | 35.7 | 32 | 38.1 | **p=0.001** | 18.491 | T1-T2 (p=0.001, Q= 0.262)<br>T1-T4 (p=0.018, Q= 0.214) |
| | **Absent** | 36 | 42.9 | 58 | 69.0 | 44 | 52.4 | 54 | 64.3 | 52 | 61.9 | | | |
| **Feeling anxious or troubled** | **Present** | 61 | 72.6 | 47 | 56.0 | 44 | 52.4 | 48 | 57.1 | 43 | 51.2 | **p=0.008** | 13.673 | T1-T3 (p=0.021, Q= -0.202)<br>T1-T5 (p=0.011, Q= -0.214) |
| | **Absent** | 23 | 27.4 | 37 | 44.0 | 40 | 47.6 | 36 | 42.9 | 41 | 48.8 | | | |
| **Feeling** | **Present** | 52 | 61.9 | 38 | 45.2 | 34 | 40.5 | 39 | 46.4 | 43 | 51.2 | **p=0.015** | 12.289 | T1-T3 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **pessimistic, upset** | **Absent** | 32 | 38.1 | 46 | 54.8 | 50 | 59.5 | 45 | 53.6 | 41 | 48.8 | | | (p=0.011, Q= -0.214) |
| **Change in sexual life** | **Present** | 54 | 64.3 | 0* | 0 | 5 | 6.0 | 5 | 6.0 | 1 | 1.2 | **p<0.001** | 129.542 | T1-T3 (p<0.001, Q= 0.543) T1-T4 (p<0.001, Q= 0.583) T1-T5 (p<0.001, Q= 0.631) |
| | **Absent** | 30 | 35.7 | 84 | 100 | 79 | 94.0 | 79 | 94.0 | 83 | 98.8 | | | |
| **Change in the menstrual cycle** | **Present** | 46 | 54.8 | 1 | 1.2 | 2 | 2.4 | 1 | 1.2 | 1 | 1.2 | **p<0.001** | 160.280 | T1-T2 (p<0.001, Q= -0.536) T1-T3 (p<0.001, Q= -0.524) T1-T4 (p<0.001, Q= -0.536) T1-T5 (p<0.001, Q= -0.536) |
| | **Absent** | 38 | 45.2 | 83 | 98.8 | 82 | 97.6 | 83 | 98.8 | 83 | 98.8 | | | |

T□: before cure, T□: end of 1st cure, T□: end of 4th cure, T□: end of 8th cure, T□: end of 12th cure, Q= Cochran Q test (Bonferroni Correction)

* Since the value on the boxes are "0", it could not be included in the statistical analysis.

**Table 3.** The mean scores of Body Perception Scale according to paclitaxel cycles (n=84)

| Measurement | Min | Max | X±SD | Test Statistics | Difference |
|---|---|---|---|---|---|
| T□ | 92 | 185 | 137.75±13.72 | **p<0.001*** | T□-T□ (p<0.001**, Z=-5.164) |
| T□ | 95 | 180 | 130.53±14.62 | | T□-T□ (p=0,002**, Z=-3.155) |
| T□ | 104 | 163 | 132.33±12.01 | | T□-T□ (p<0.001**, Z=-6.009) |
| T□ | 104 | 185 | 129.59±12.62 | | T□-T□ (p<0.001**, Z=-4.111) |
| T□ | 102 | 159 | 124.07±10.43 | | T□-T□ (p=0.008**, Z=-2.671) |
| | | | | | T□-T□ (p<0.001**, Z=-5.679) |
| | | | | | T□-T□ (p<0.001**, Z=-4.691) |

T□: before cure, T□: end of 1st cure, T□: end of 4th cure, T□: end of 8th cure, T□: end of 12th cure, X±SS= Mean, standard deviation, *Friedman Test, **Wilcoxon Test

**Table 4.** The mean scores of anxiety and depression sub-dimension of HADS according to paclitaxel cycles (n=84)

| | Measurement | Min | Max | X±SD | Test Statistics | Difference |
|---|---|---|---|---|---|---|
| Anxiety | T□ | 0 | 20 | 6.60± 4.74 | p<0.001* | T□-T□ (p=0.038**, Z=-2.072) |
| | T□ | 0 | 17 | 5.63± 3.86 | | T□-T□ (p<0.001**, Z=-4.012) |
| | T□ | 0 | 14 | 4.47±3.33 | | T□-T□ (p<0.001**, Z=-4.616) |
| | T□ | 0 | 12 | 4.17±3.01 | | T□-T□ (p<0.001**, Z=-3.988) |
| | T□ | 0 | 17 | 4.29±3.15 | | T□-T□ (p=0.003**, Z=-2.939) |
| | | | | | | T□-T□ (p=0.003**, Z=-2.981) |
| | | | | | | T□-T□ (p=0.001**, Z=-3.213) |
| Depression | T1 | 0 | 18 | 6.00± 4.16 | p<0.001* | T□-T□ (p=0.027**, Z=-2.215) |
| | T2 | 0 | 18 | 5.64± 3.37 | | T□-T□ (p=0.002**, Z=-3.162) |
| | T3 | 0 | 14 | 6.13±3.65 | | T□-T□ (p=0.001**, Z=-3.476) |
| | T4 | 1 | 16 | 6.90±3.23 | | T□-T□ (p<0.001**, Z=-4.355) |
| | T5 | 0 | 15 | 7.44±2.85 | | T□-T□ (p=0.002**, Z=-3.029) |
| | | | | | | T□-T□ (p=0.018**, Z=-2.368) |

T□: before cure, T□: end of 1st cure, T□: end of 4th cure, T□: end of 8th cure, T□: end of 12th cure, X±SS= Mean, standard deviation, *Friedman Test, **Wilcoxon Test

## Figures

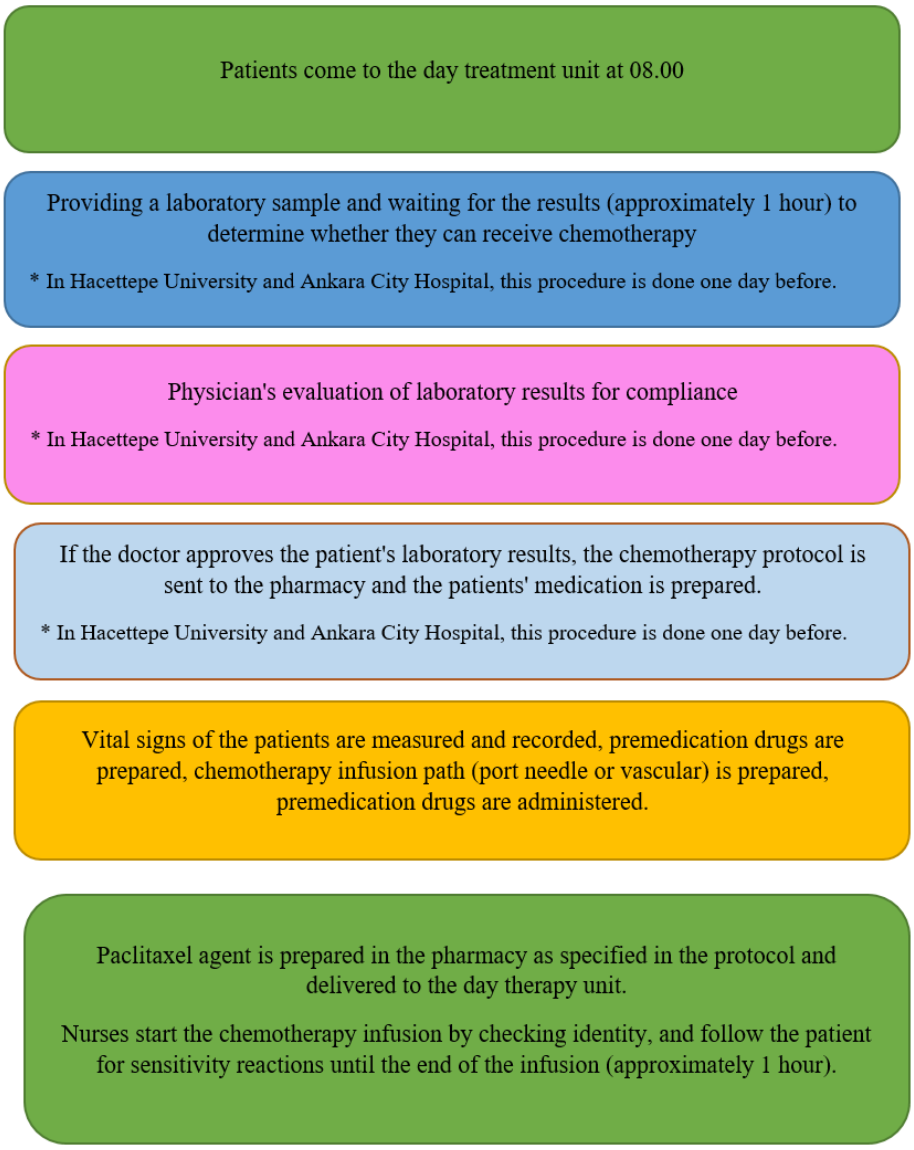


**Figure 1**

Steps to apply the paclitaxel regimen