Journal of Innovations in Pharmaceutical and Biological Sciences (JIPBS)
ISSN: 2349-2759
Available online at www.jipbs.com

Research article

Exploring patient's perceptions of cancer chemotherapy side effects

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Key words: Cancer; Chemotherapy; Side effects; Fatigue; Perceptions.

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Abstract

Cancer chemotherapy has been always associated with a bad reputation among healthcare providers, patients and their families mainly due to their associated side effects. The objectives of the present study were to identify and rank the incidence of the most disturbing cancer chemotherapy side effects and to assess patient's perceptions of these side effects as the treatment progresses. A cross-sectional interview-based survey was conducted in the Medical Oncology Outpatient clinic at King Abdulaziz Medical City, Riyadh, Saudi Arabia. The sample size realized as 100 participants and they reported mucositis, nausea or vomiting and fatigue as the most troubling side effects followed by hair loss, dry mouth, unpleasant taste and constipation. However, the rank of these side effects changed as they proceeded through their treatments. The majority of the disturbing side effects significantly diminished in most patients. However, fatigue significantly increased as the chemotherapy progressed, which could limit the participants' ability to work or perform everyday activities of life. Although most of the participants expressed a high level of satisfaction of the quality of information they received prior to their cancer treatment, they were concerned about the distressing nature of the treatment and the potential deterioration in their quality of life due to the chemotherapy side effects. It is therefore important to improve the communication between health-care providers and patients to identify those side effects of concern to patients to reduce their expected burden and ultimately succeed in achieving the cancer therapy outcome.

Introduction

Cancer chemotherapy side effects and toxicities have always been a major concern for patients and their families. If intolerable, the side effects could cause a discontinuation of the chemotherapy due to a decreased quality of life (QoL) or a sense of discomfort[1,2]. In the Saudi Arabian Cancer Incidence and Survival Report 2007, it has been reported that there are more than 12,000 newly diagnosed cancer cases annually[3]. The overall incidence was 52.3 per 100,000, slightly higher in women than men. In addition, in a recent cross-sectional survey conducted in the Northern Region of the Kingdom of Saudi Arabia, most of the patients presented with an advanced stage of disease [4]. Cancer caused 10% of the total deaths in Saudis causing increased concern among the general population and an increased burden on healthcare providers[5]. It is important to identify the most disturbing side effects of cancer chemotherapy and to explore factors affecting patient's QoL when receiving cancer chemotherapy. Such factors could be crucial for the assessment and management of the therapeutic regimen strategies.

A benefit-harm assessment has always been a key factor in guiding the prescription of medication. A certain level of risk could be accepted as necessary to achieve the benefit of the medication. In the past, patients were not involved in the decisions related to their therapeutic regimen. However, recently patients have been actively engaged in the decision making process of their healthcare[6]. The patient's decision of whether to receive chemotherapy and their opinions and preferences in addition to the disease factors have all been considered in establishing the therapeutic plan for example selecting a convenient adjuvant therapy to reduce the risk of cancer recurrence[7]. At present, most oncology panel recommendations for cancer management is made based on the collateral discussions with patients and their families [8]. Appropriate education and counselling about their condition should always be provided to patients to improve the chances of a positive outcome.

Side effects associated with cancer chemotherapy have already been recognized, such as nausea and vomiting with cisplatin, cardiotoxicity with anthracyclines, neuropathy with vinca alkaloids, pulmonary fibrosis with bleomycin, etc. However, the severity of these side effects varies between patients. The objectives of the present study were to identify and rank the incidence of the most disturbing side effects of contemporary cancer chemotherapy from the perspective of cancer patients and to investigate patient's

perceptions about the cancer chemotherapy side effects as the treatment progresses.

Experimental

Study Design

The current study is a cross-sectional interview questionnaire-based survey. Written informed consent was obtained from all participating patients before enrolling in the study. All consenting newly diagnosed cancer patients attending the Medical Oncology Outpatient clinic at King Abdulaziz Medical City, Riyadh, Saudi Arabia, were requested to complete a questionnaire about their preconceived ideas and opinions about the effectiveness and side effects of cytotoxic chemotherapy. The questionnaire was adopted from Lennes *et al.* (2013)[9], which was reviewed by an expert oncologist at King Abdulaziz Medical City for his opinion about its ability to achieve the research aims. The interviews were conducted by two Pharm. D. students trained in interviewing techniques. The interviewers had no prior knowledge of the patient's diagnosis or prescribed treatment. No unrelated personal data were gathered. Upon subsequent visits to the chemotherapy clinic, cancer patients who received chemotherapy within the four-week period before study entry were asked to identify all side effects which, from their perspective, could be attributed to their current chemotherapy. A set of cards naming all side effects of chemotherapy drugs was shown to the patient one card at a time. The five most disturbing side effects were ranked in a descending order. The study was conducted from December 2015 to May 2016. Infants and elderly patients with advanced or terminal disease status were excluded. This study has been reviewed and approved by the Institutional Review Board at King Abdullah International Medical Research Center, Riyadh, Saudi Arabia. (Reference number: IRBC/763/15).

Both descriptive and statistical analyses were performed using SPSS (version 20.0) and GraphPad Prism (version 6.01) statistical software packages. Statistical significance was considered at $p<0.05$.

Results and Discussion

Results

A total of 110 cancer patients were approached while waiting to attend the chemotherapy clinic and asked to participate in this study. Nine patients declined to join the study due to their current psychological stress and/or physical tiredness. The sample size realized as 101 cancer patients. During the study, one patient refused to return the completed questionnaire due to a concern to share his medical complaints. Table 1 displays the general demographic characteristics of the sample. The majority was female (60%, n=60). The mean age of participants was 53.26 ± 15.25 years (55.83 ± 18.26 for males and 51.55 ± 12.75 for females). In terms of diagnosis, several malignancies were diagnosed including breast carcinoma (29%), gastrointestinal carcinoma (25%), and hematological carcinoma (13%). The most common comorbidities in the sample were diabetes (31%) and hypertension (24%), 48% had no co-morbidities. It is noteworthy that only 14 participants (14%) had a family history of cancer where one or more of their close relatives had been diagnosed with cancer.

The sample, on average, selected 10 side effects which, from their perspective, were attributable to their current chemotherapy (range 5-19 side effects). More than 70% of the sample reported mucositis, nausea or vomiting and fatigue, while 50-70% reported hair loss, dry mouth, unusual or unpleasant food taste and constipation side effects. Figure 1 shows the percentage of all reported side effects arranged in descending order.

Table 1. General Characteristics of the Participating Patients (n=100)

Variable	Value
Age in years	
Mean ± SD	53.26 ± 15.25
Median (Range)	54 (17-85)
Gender n (%)	
Male	40 (40.0%)
Female	60 (60.0%)
Education level n (%)	
Illiterate	29 (29.0%)
Primary education	27 (27.0%)
Secondary education	25 (25.0%)
Tertiary education	19 (19.0%)
BMI n (%)	
< 18.5 (underweight)	4 (4%)
18.5-24.9 (healthy weight)	33 (33%)
25-29.9 (overweight)	37 (37%)
>30 (obesity)	26 (26%)
Smoking n (%)	8 (8.0 %)

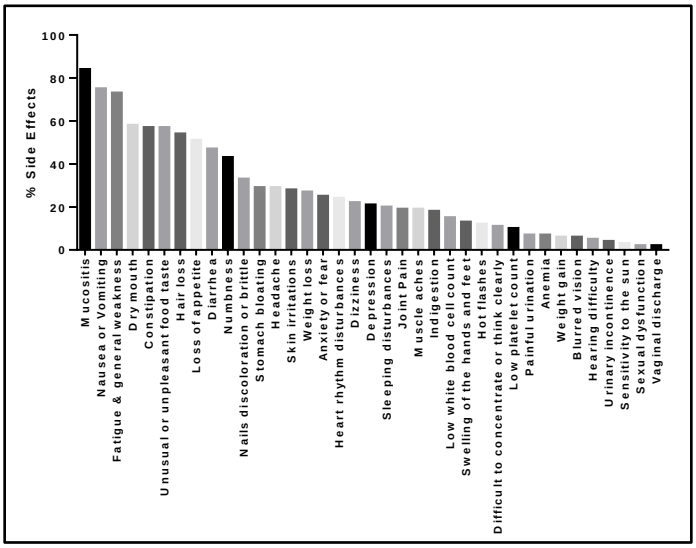

Figure 1. Percentage of chemotherapy side effects in the participating patients arranged in descending order

The sample was divided into two groups according to chemotherapy cycles they received; Group (A) (n=60) consisted of all newly diagnosed patients who have received one or two cycles within the four-week period before study entry and Group (B) (n=40) participants who received at least three or more cycles. Consequently the severity ranking of the most disturbing side effects changed. Patients in Group (A) ranked nausea or vomiting as the most troubling side effect followed by mucositis and hair loss compared with Group (B) which ranked hair loss and fatigue highest followed by mucositis, nausea or vomiting and dry mouth. Table 2 displays the proportions of the most disturbing side effects according to the number of chemotherapy cycles received. The proportion of the most frequent side effects particularly constipation, nausea or vomiting, unusual or unpleasant food taste, loss of appetite, significantly reduced as the treatment progressed (Figure 2). It should be noted that of this list, only nausea or vomiting was reported by the majority of the sample as a disturbing side effect. Fatigue and general weakness significantly increased by 20% with the progress of chemotherapy. The difference for mucositis, hair loss and dry mouth between Groups A and B was not significant. Interestingly, other frequent side effects such as constipation, unusual or unpleasant food taste and loss of appetite, which were among the most frequent but not reported as disturbing side effects, declined in group B patients by 22%-28%.

The percentage of participants reporting most common side effects by their characteristics is shown in Table 3. There were statistically significant differences by age and gender. Loss of appetite and fatigue were significantly more reported among younger participants (<55 years) than older ones; p = 0.017 for both side effects. Also, unpleasant food taste and fatigue were significantly more reported among female participants than males; p = 0.048 and p = 0.004, respectively. No significant differences in reported side effects were observed by BMI category.

The analysis of the participants' perceptions regarding the efficacy and anticipated side effects of the chemotherapy they received or expected to receive, indicated that the majority (92%, n=92) reported receiving sufficient information about the purpose of their treatment from their oncologist when they signed consent for the chemotherapy. In terms of the quality of information received regarding their cancer diagnosis, available cancer therapies and the goals of their treatment, 54% reported very good, 38% good, 6% just satisfied and 2% were unsatisfied. The majority (62%) reported that they discussed the possible benefits and the expected side effects of their chemotherapy and 65% received printed handouts with information about cancer chemotherapy drugs and their side effects.

Table 2. Incidence of the Most Common Side Effects as Reported by Participants

Most frequent side effects	Group A % (n)	Group B % (n)	Difference# %	P (chi-square)
Constipation	68.3 (41)	40.0 (16)	-28.3	0.005**
Nausea or Vomiting	85.0 (51)	60.0 (24)	-25.0	0.005**
Unusual or unpleasant food taste	66.7 (40)	42.5 (17)	-24.2	0.017*
Loss of appetite	60.0 (36)	37.5 (15)	-22.5	0.027*
Mucositis	88.3 (53)	77.5 (31)	-10.8	0.15
Dry mouth	60.0 (36)	55.0 (22)	-7.5	0.62
Hair loss	53.3 (32)	55.0 (22)	+1.7	0.87
Numbness	43.3 (26)	42.5 (17)	+1.7	0.93
Fatigue & general weakness	60.0 (36)	80.0 (32)	+20.0	0.036*

Negative symbol (-) indicates a decrease in the incidence; Positive symbol (+) indicates an increase in the incidence. Statistically significant * when P < 0.05, ** when P < 0.01

Table 3. Percentage of Participants Reporting the Most Common Side Effects by their Characteristics.

Side effects	Age (years)		Gender		BMI	
	<55 (n = 53) %	55+ (n = 47) %	Female (n = 60) %	Male (n = 40) %	Normal (n = 37) %	Overweight/ Obese (n = 62) %
Constipation	56.6	57.4	60.0	52.5	45.9	64.5
Nausea or Vomiting	77.4	72.3	76.7	72.5	75.7	74.2
Unusual/unpleasant food taste	58.5	55.3	65.0*	45.0	54.1	59.7
Loss of appetite	62.3*	38.3	55.0	45.0	48.6	53.2
Mucositis	83.0	85.1	86.7	80.0	83.8	85.5
Dry mouth	58.5	57.4	58.3	57.5	56.8	59.7
Hair loss	56.6	51.1	60.0	45.0	56.8	53.2
Numbness	35.8	51.1	36.7	52.5	48.6	38.7
Fatigue & general weakness	83.0*	61.7	83.3*	57.5	67.6	75.8

*p<0.05 (significant); based on the chi-square test.

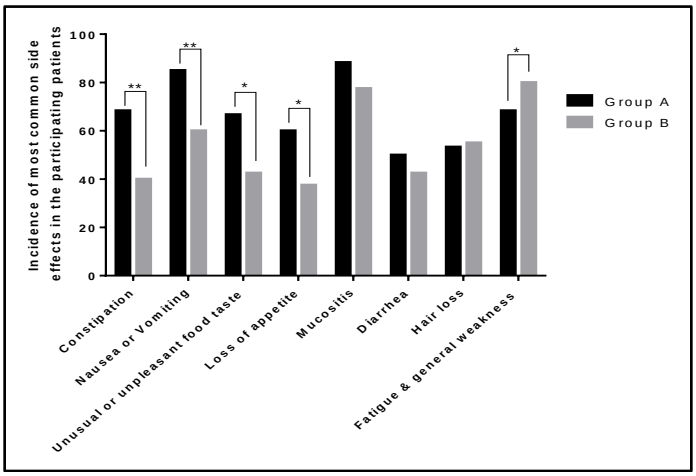

Figure 2. Percentage of Chemotherapy Side Effects as Reported by Participants, Arranged in Descending Order. * P < 0.05, ** P < 0.01

Interestingly, 42% of the participants believed that the chemotherapy will eventually cure their illness, while 53% of participants assumed that the therapy could be adjuvant or at least prolong their lives and 3% thought they are receiving a therapy for palliative purposes. The majority of the participants (95%) made the treatment decision in consultation with their oncologists with 92% accompanied and assisted by a member of their families, a relative or a friend in making the decision regarding their chemotherapy.

Participants reported a mean of 3.59±2.7 distress due to their current condition measured on a 0 to 10 scale (0 indicating no distress and 10 maximum distress). Their primary cause of distress was their cancer prognosis and possible chemotherapy side effects. More than 50% of the participants reported some difficulty with strenuous physical activity but they were able to walk and do light house-work or office-work. At least 63% of participants expressed a need for intimate support being diagnosed with cancer, whether as a good listener or an adviser on how to deal with such a crisis.

Discussion

The participants in the current study described numerous side effects due to their chemotherapy. Mucositis, nausea or vomiting and fatigue were the most frequent and disturbing side effects, followed by hair loss, dry mouth, unusual or unpleasant food taste and constipation. These side effects were frequently reported by most patients receiving cancer chemotherapy[10]. Though several studies reported a wide variation in the range of side effects attributed to chemotherapy, the prevalence of the side effects was inconsistent [11,12]. Contrary to a study done by Sun *et al.* (2005) reporting an increase in the incidence of chemotherapy-induced nausea and vomiting in patients with ovarian cancer[13], the current study showed a decrease in the incidence of the most frequent side effects, particularly nausea and vomiting with the progress of the chemotherapy. This could be due to differences in the sample characteristics of both studies. The decrease in the incidence of nausea and vomiting in the current study may be due the adjuvant therapy used to alleviate the side effect. Many studies have demonstrated an efficient approach to prevent or treat chemotherapy side effects[14-16].

However, the incidence rate of fatigue and general weakness was significantly increased in the participants after receiving more than three cycles of chemotherapy, supporting the claim that the physiological symptoms of cancer chemotherapy could be corrected or controlled by adjuvant drugs. For example, erythropoietin is successfully used to control the anemic side effect in cancer patients[17]. Similarly, nausea and vomiting related side effects of chemotherapy are managed with corticosteroid, metoclopramide or ondansetron[18].

Participants' perceptions of cancer chemotherapy have been investigated to identify factors that may influence a successful outcome of cancer management. According to Colagiuri *et al.* (2013), patient's preconceptions of cancer chemotherapy might dramatically influence the occurrence of their side effects such as nausea, vomiting, fatigue, and psychological stress, which was associated with reduced QoL[19]. The current study has shown a substantial change in patient's concerns of cancer chemotherapy side effects; from constipation, nausea or vomiting, unusual or unpleasant food taste, loss of appetite and mucositis as the most troubling side effects to fatigue and general weakness, which was ranked highest as the most disturbing side effect of cancer chemotherapy. This could be due to the successful management of disturbing side effects as patients proceeded through their treatment. However, the participants' focus changed to a concern regarding their ability to work, participate in social activities and family duties due to fatigue, which has significantly increased in the majority of the participants as they progressed with their chemotherapy. The results are consistent with recent studies, reporting the same trend in patient's perceptions of chemotherapy side effects, from physiological symptoms to psychosocial difficulties [20-22]. Hair loss remained a cause for concern in all cancer patients. Thus, fatigue and hair loss could play a major role in restraining cancer patient's integration in the daily activities at work and home. Several additional factors have been reported that could affect patient's perception of cancer chemotherapy side effects including emotional distress, marital status, advanced age, gender barriers, family support, education level and negative thought to the anticipating treatment [23-25].

Mulders *et al.* (2008) reported a discrepancy in the perceptions of cancer disease and cancer chemotherapy between health-care providers and patients [26]. Patients were mostly anxious due to fear of metastases and chemotherapy side effects, whereas health-care providers had either overestimated or underestimated these concerns. This could result in inappropriate or inadequate communication between patients and their health-care providers which may adversely impact cancer treatment,

extend patient suffering and a deterioration in the patient's QoL.

Although the majority of the participants in the current study were satisfied with the quality of information they received concerning their cancer diagnosis and therapy at the beginning of their treatment, they reported a moderate distress status. This could be due to a deficit in communication between patients and their health-care providers during subsequent chemotherapy sessions, as only 62% actually discussed the anticipated chemotherapy side effects with their health-care providers. They were primarily concerned about the anticipated side effects and their deteriorating physical status, which may prevent them from accomplishing their daily routine and activities. Previous studies reported that approximately half of the patients receiving cycle 6 considered quitting cancer chemotherapy due to the intolerable side effects, though only a few informed their health-care providers[27-29].

Patient expectations of side effects may offer an opportunity to provide an appropriate intervention or supportive care as an important part of cancer therapy to reduce the burden of these side effects. It is pivotal to develop a system to encourage communication between patients and their health-care providers to identify the most disturbing side effects in cancer patients, which may occur immediately, after some days or weeks after initiating the chemotherapy. It is essential for health-care providers to ask patients about their symptom experience or a change in their symptoms prior to administering chemotherapy regimens. The information is essential to improve supportive care measures and providing optimal care to avoid any future complications.

There are several limitations in the present study. The small sample size (n=100) have been enrolled due to time constrains, limiting our ability to perform adequate subgroup analyses. Further assessment of the QoL of participants could be plausible using the European Organization for Research and Treatment of Cancer Quality of Life (EORTC QLQ-C30) Questionnaire, which was developed specifically for cancer patients.

Conclusion

In conclusion, the results of the current study highlight the importance of recognizing the severity and occurrence of the most disturbing chemotherapy side effects. Such data is crucial for improving patient awareness about cancer and the potential toxicity of chemotherapy which may influence the treatment plan. Evaluating possible changes in patient's perceptions regarding cancer chemotherapy adverse events and the potential consequences on QoL may have a major impact on the ultimate cancer therapy outcome. In addition, proper communication and establishing a good relationship between cancer patients and their health-care providers are important, to ensure that patient's complaints and preferences are taken in consideration during the planning of therapeutic regimens.

Acknowledgment

Authors would like to thank Dr. Abdulrahman Al Ghamdi and Dr. Shatha Al Halwan from the Pharmaceutical Care Departmentat King Abdulaziz Medical City as well as the whole team in the Oncology Department (Unit 62), for their indispensable assistance in facilitating patient interviews and data collection.

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