Original Research

THE EFFECTS OF CHEMOTHERAPY-INDUCED ALOPECIA ON CANCER PATIENTS' DISTRESS

Phan Thien Long[1,2], Pham Tang Tri Tue[1,2], Pham Thi Bich Loan[1,2], Dang Hoang Duc[1,2], Huynh The Minh[1,2], Ho Xuan Dung[1,2*]

ABSTRACT

Background: *Hair is a human characteristic, which has an important role in presenting the individual gender, race, nation, social interaction as well as mental and physical health status. Chemotherapy-induced alopecia (CIA), which has an incidence of 65%, is known to be one of the most psychological shocks among cancer patients. Chemotherapy-induced Alopecia Distress Scale (CADS) created by a group of Korean scientists is a new tool developed to evaluate alopecia's effects on patients' mentality. It is necessary to investigate the effects of alopecia on cancer patients and to understand the demands of patients in coping with CIA. However, to our knowledge, this is a topic that is still lacking objective and scientific evidence in Hue, Vietnam. Therefore, we conducted the study to describe the alopecia characteristics of patients treated with chemotherapy, and to identify the distress level of cancer patients using CADS and the preference of patients to deal with the alopecia.*

Methods: *A cross-sectional study was conducted on 56 cancer patients undergoing chemotherapy at the Oncology department of Hue University of Medicine and Pharmacy Hospital from 01/12/2020 to 25/03/2021. The hair loss grade was assessed by CTCAE and the level of distress was evaluated by CADS. Statistical analysis was performed in Microsoft Excel 2016 and the R 3.6.0 program.*

Results: *The mean age of patients in our study was 56.48 ± 10.244. Of all 56 patients, the majority of participants were female (69.6%), married (82.1%), and had above-average economic status (67.9%). Breast cancer patients accounted for the highest percentage with 39.3%. Most of the patients were in grade III (32.1%) and grade IV (39.3%). Our study revealed that 82.1% of patients having hair loss at grade 2 according to CTCAE 5.0. Evaluating by CADS showed that 87.5% of participants experienced low distress. Hat/ headscarf and wig were the most popular coping strategy against the CIA (66.1% and 35.7%, respectively). Scalp cooling is a new method that can prevent the CIA effectively. A proportion of 41.1% was willing to try the scalp cooling systems.*

Conclusions: *Alopecia grade 2 accounted for the majority of patients in our study (82.1%). This was a symptom that should be concerned, however, our study revealed that the alopecia's effects were not so serious among patients in the study. Most of the patients did not worry about chemotherapy - induced alopecia (89.3%), and 87.5% of participants experienced low distress, while there was still a proportion of 12.5% with higher distress. To cope against alopecia, many feasible coping strategies have been used by patients, including hat/ headscarf or wig.*

Keywords: *Alopecia, Chemotherapy, Distress, Cancer, CADS, Scalp cooling.*

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I. BACKGROUND

Hair is a human characteristic that has an important role in presenting the individual gender, race, nation, social interaction as well as mental and physical health status, especially to females [1, 2]. Chemotherapy-induced alopecia (CIA), which has an incidence of 65%, is known to be one of the most psychological shocks among cancer patients but it is still underestimated by physicians. The incidence of alopecia as a side effect is approximately 80% in antimicrotubule agents (paclitaxel, docetaxel, vinorelbine), > 60% in alkylators (cyclophosphamide, busulfan), and 10% - 50% in antimetabolites (methotrexat, capecitabine) [3]. Alopecia commonly occurs 1 - 2 weeks after chemotherapy and usually accompanies hair loss in different sites. This symptom rapidly progresses and will be recovered over 1 - 2 months after completing chemotherapy [4]. A recent multicentre study in 13 European countries found that patients with hair diseases were more anxious, depressed, and experienced a lower quality of life [5]. A similar result was concluded in a study by Meredith L.C showing that there was a strong correlation between alopecia and low quality of life [6]. According to Saraswat, the CIA affected the social life of 72% of patients, caused low self - esteem in 58.6% of patients, and there was a portion of 18.9% feel that hair loss was a visible reminder of cancer [7]. Another study found that alopecia was a visibly distressing feature, making people around easily recognize a cancer patient [8]. Due to the listed psychological and social burdens, alopecia could be a barrier to patient's treatment adherence. Some patients may refuse chemotherapy if there is a risk of hair loss [3]. To evaluate the impact of CIA on patients' mentality, a group of Korean authors developed the Chemotherapy-induced Alopecia Distress Scale (CADS) which has been used in many pieces of research in the same field and proved to have a high accuracy [9 - 11].

By many disadvantages on patients' life, there have been different coping strategies against alopecia, including wearing hats, headscarves, and wigs. In some countries, scalp cooling is a new method proved to reduce alopecia conditions in 30-80% of patients. Moreover, faster recovery of hair volume after chemotherapy in patients applying scalp cooling was also reported [12, 13]. It is necessary to investigate the effects of alopecia on cancer patients as well as to understand the demands of patients in coping with CIA. However, to our knowledge, this problem has not been well reported scientifically in Hue, Vietnam. Therefore, we conducted the study to describe the alopecia characteristics of patients treated with chemotherapy, and to identify the distress level of cancer patients using CADS and the preference of patients to deal with the CIA.

II. MATERIALS AND METHOD

2.1. Participants and methods

A cross-sectional study was conducted on 56 cancer patients treated with chemotherapy at the Oncology department of Hue University of Medicine and Pharmacy hospital from 01/12/2020 to 25/03/2021.

2.2. Study tools and data analysis

The hair loss grade was assessed by National Cancer Institute Common Terminology Criteria for Adverse Events (NCI CTCAE), version 5.0. Alopecia at grade I is defined as hair loss of < 50% of normal for that individual that is obvious only on close inspection and does not require a wig; and that of alopecia at grade II is Hair loss of > = 50% of normal for that individual that is readily apparent to others [14]. The level of distress was evaluated by CADS, which is based on 4 domains including physical, emotional, daily activity, and social relationship. This grading system constitutes 17 items measured on a scale from 0 to 3, and the maximum total score is 51. The higher score indicates more distress due to the CIA. Following the total score, patients were classified into 2 groups: High anxiety (> = 14) and low anxiety (0 - 13) [9].

Data were collected by questionnaire, interview, and medical records. Statistical analysis was performed in Microsoft Excel 2016 and the R 3.6.0 program.

III. RESULTS

3.1. Patients population

From January 2020 to March 2021, fifty-six patients met the inclusional criteria with ages from 28 to 79 years old, mean: 56.48 ± 10.244. The characteristic description was shown in the **Table 1** below.

Table 1: General characteristics

Characteristics	Number (N = 56)	Percentage (%)	Characteristics	Number (N = 56)	Percentage (%)
Gender			Religion		
Male	17	30.4	Yes	28	50.0
Female	39	69.6	No	28	50.0
Marital status			Diagnosis		
Single	6	10.7	Breast cancer	22	39.3
Married	46	82.1	Lung cancer	10	17.9
Divorced/separated, widowed	4	7.1	Ovary cancer	6	10.7
Economic status			Stomach cancer	6	10.7
Poor household	14	25.0	Lympho node cancer	3	5.4
Near-poor household	4	7.1	Other	9	16.0
Above-average	38	67.9	Stage		
Education			I	1	1.8
Illiterate	8	14.3	II	15	26.8
Literacy/primary school	30	53.6	III	18	32.1
Secondary school and above	18	32.1	IV	22	39.3

Table 1 shows the demographic and medical profile. The major of participants was female (69.6%). The male per female ratio was approximately 1: 2.3. Breast cancer was the most common cancer, which was accounted for 39.3% of patients. The proportions of patients at stage III and IV were highest at 26.8% and 39.3% respectively. Most of the participants' economic status was aboveaverage (67.9%), however, there were still many patients who are in poor (25.0 %) and near-poor households (7.1%). There was 82.1% of patients living with their spouses.

3.2. Characteristics of CIA

Among the subjects of the study, CIA level was graded into grade I and grade II due to CTCAE. Patients' feeling and consequences of hair loss were also documented (shown in **table 2**)

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Table 2: Characteristics of CIA and feelings of patients

Characteristics	Number (N = 56)	Percentage (%)
CIA level		
Grade I (< 50%)	10	17.9
Grade II (> 50%)	46	82.1
Counseled about CIA before initiating the therapy?		
Yes	48	85.7
No	8	14.3
Patient's feeling about CIA		
I am fine with the side effects	50	89.3
I want to discontinue the therapy due to hair loss	2	3.6
Issues faced due to hair loss		
Causing low self-esteem	7	12.5
I feel my spouse/friends/children are avoiding me due to hair loss	1	1.8
I feel more of a cancer patient due to hair loss	3	5.4
I feel less confident when I talk to others	21	37.5
Sharing with family and friends		
Yes	24	42.9
No	32	57.1

Alopecia grade II by CTCAE was dominant in cancer patients having chemotherapy with 82.1%. Most of the patients were counseled about CIA before starting the treatment (85.7%). Of all 56 patients, 89.3% do not concern about hair loss condition, and only 3.6% want to discontinue the therapy due to hair loss. The most common consequence of hair loss was less confidence in communication with a proportion of 37.5%. There was 57.1% of patients not sharing their status with their families and friends.

3.3. Anxiety level evaluated by CADS

The Chemotherapy-induced Alopecia Distress Scale - CADS was used to evaluate the anxiety level caused by CIA **(Table 3)**.

Table 3: Anxiety level due to CIA

| Anxiety level	Number (N = 56)	Percentage (%)
High (> 13)	8	12.5
Low (0 - 13)	48	87.5

The majority of patients experienced a low anxiety level (87.5%). The higher anxiety level occurred to only 12.5% of participants.

3.4. CIA coping strategies

The coping strategies against the CIA could be active, passive, or both. Active coping includes steps to prepare before CIA occurring, such as changing in appearance, or asking for help from relatives and

friends; passive coping constitutes: acceptance, avoidance, and ignoring the alopecia condition. Patients also can combine different methods.

The active method was chosen by a higher percentage of patients with 78.6% compared to 21.4 % by passive way **(Figure 1)**.
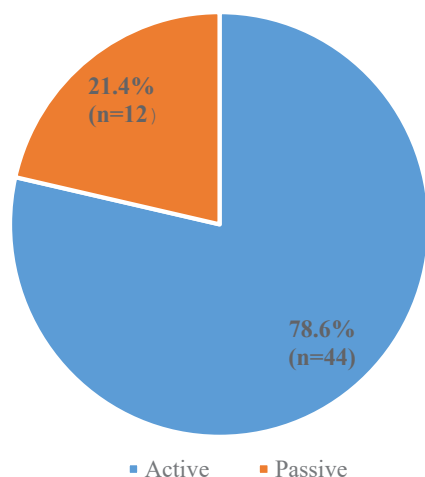

Figure 1: Coping strategies in patients with CIA

Scalp cooling is an interference method, helping improve the CIA condition, and it has been utilized in many countries but remains unknown in Vietnam. Therefore, we conducted counsel on the pros and cons of this therapy in improving CIA for all participants.

A proportion of 41.1% patients was willing to try the scalp cooling systems **(Table 4)**.Wearing hats/headscarves, wigs, and shaving are methods that patients usually use to cope with hair loss and arranged in descending order by preference (66.1%, 35.7%, and 28.6% respectively) **(Figure 2)**.

Table 4: Patients' opinion to scalp cooling

Desire to use scalp cooling?	Number	Percentage (%)
Yes	23	41.1
No	33	58.9
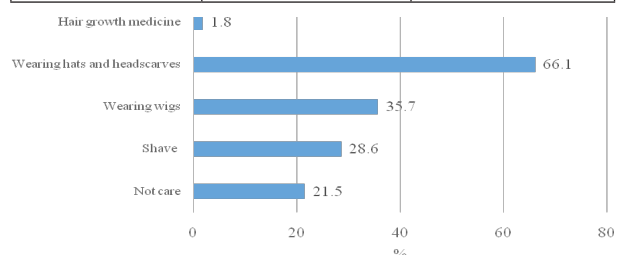
Figure 2: Coping methods against CIA

IV. DISCUSSION
4.1. Characteristics of CIA

The major of participants were female (69.6%) and suffered from breast cancer (39.3%). This result was similar to the study by Rini Wills (2020) on anxiety in patients having CIA, which showed 70.7% and 48% of patients were female and breast cancer patients, respectively [11]. Many previous pieces of research indicated that breast cancer was one of the most popular types of cancer all around the world as well as in Vietnam. According to the recent record of GLOBOCAN 2020, female breast cancer has now surpassed lung cancer as the leading cause of global cancer incidence in 2020 (11.7%) and ranked third for cancer incidence in Vietnam (11.8%) [15]. Therefore, a high proportion of breast cancer recorded in both studies is interpretable.

In our study, alopecia was classified according to CTCAE, and the percentage of grade II was 82.1% of total patients at different stages of chemotherapy. In another study, Choi EK also researched breast cancer patients, however, its participants completed the chemotherapy without recurrence or metastasis of cancer, and the alopecia was classified into 3 grades: (mild) hair characteristics is the same as before, (moderate) patchy hair loss or regrowing hair, and (severe) no hair at all. Severe hair loss happened in 57.2% of patients, following by a moderate grade with 21.7%. [10]. Overall, both studies agreed that the more severe alopecia grade had the higher percentage.

Fromtable 2 with questions assessing patients' attitudes to hair loss, 89.3% of patients in our study were fine with alopecia condition (N = 56) while only 3.6% felt that it was the worst side effect and could cause them to stop therapy. The most popular issue due to alopecia in this study was less confidence in communication with only 37.5%. According to Saraswat (2019), 56.4% (N = 179) of patients felt that hair loss was the worst side effect of chemotherapy, and the most common issue is low self-esteem due to hair loss with 58.6% [7]

The active coping with alopecia was dominant in this study, and the same result was reported by

Borg and Kennedy with 67% of patients choosing active coping [11, 16]. The most prevalent methods were using hats/headscarves, and wigs, with 66.1% and 35.7% respectively. Hats or headscarves are inexpensive and easily approachable. The patients can afford it or charity organizations can create programs to support them.

Scalp cooling is a method that was developed in the 1970s and experimented in many European nations. The main mechanism of this therapy in CIA prevention is decreasing blood delivered to hair follicles, therefore decreasing the amount of drug that is absorbed and metabolized there. In every chemotherapy cycle, scalp cooling contains a gel that would be cooled at -15 to - 40°F, and then it would be used by patients before starting until the end of the therapy. Although there are some concerns about the risk of cancer metastasis to the scalp, many clinical studies showed that the metastasis rate to this site was rare, let alone the cooling factor [17]. A recent study by Shruk Kate reported the hair preservation rate was 31% of participants with some negligible side effects such aschills (7%) and chills with headache (6%) [18]. In this study, all patients were counseled the pros and cons of the CIA improvement by scalp cooling, and there was 41.4% of patients willing to try this therapy.

4.2. The anxiety level due to CIA

Physical, emotional, activity, and relationship are 4 aspects assessed by Chemotherapy - induced Alopecia Distress Scale (CADS). While using the same scale and in similarity to the sample (age, sex ratio, dominant cancer type), the proportion of patients with high anxiety levels in our research was much lower than that of 2 other studies: 12.5% (N = 56) compared to 55.3% (N = 168) as found by Choi EK (2014), and 59.3% (N = 150) as found by Rini Wills (2020) [10, 11].

In the study by Rini Wils, a significant relation between the alopecia related distress level and the gender of the patient was revealed (P = 0.04) [11]. This relationship was also annouced in the previous studies that female cancer patients were supposed to experience higher risk of psychosocial symptoms due to hair loss and related issues included in the domains of the CADS [19, 20]. It is likely that women pay more attention to their appearance than men, and they tend to express the emotion better, while men's emotional expressivity is usually restricted by social barriers, which may affect the psychosocial evaluating results [21]. Although there was a high proportion of female patients (69.6%), the high level of distress in our study remained at 12.5 % only, and we did not found the statistical correlation between gender and distress level.

We supposed that the decisive difference is the character traits of the Vietnamese. As the characteristics of CIA presented in table 2, 89.3% of the patients felt fine with this side effect. This finding was consistent with the anxiety level evaluated by CADS with 87.5% of the patients experienced the lower anxiety level. Moreover, there was no known evidence of the relationship between chemotherapy-induced alopecia and distress among cancer patients in Vietnam, this could be a question to be studied in the future.

V. CONCLUSIONS

Alopecia was a problem that should be concerned among cancer patients previously reported, however, our study revealed that the alopecia's effects were not so serious. To cope with this problem, many feasible coping strategies were preferred by patients, including hats/headscarves or wigs. Scalp cooling therapy should be further studied in Vietnamese patients to become a potential solution.

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