

ASSESSMENT OF SENSORY PERCEPTION ALTERATION FOR PATIENTS RECEIVING ANTI NEOPLASTIC CHEMOTHERAPY

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ABSTRACT

Background: Alteration in sensory perception that occurs during anti neoplastic chemotherapy can seriously affect the health and nutritional status of patients, everyday life activities and recovery possibilities. **Aim:** This study aimed to assessment of sensory perception alteration for patients receiving anti neoplastic chemotherapy. **Subjects and method:** Across section study design using a mixed-methods study combining qualitative and quantitative approaches of data collection was adapted. A convenient sample from patients receiving anti neoplastic chemotherapy that were available within 6 months. The present study included a group of 100 Cancer patients receiving ACH. Data were collected through Sensory administrated questionnaire for quantitative data and interview schedule for qualitative data collection. **Results:** The majority of the patients in the study displayed alteration of taste perception reported the highest mean value (66.35) followed by sense of tactile perception alteration (57.54) then visual perception alteration(45.41) followed by hearing perception alteration (39.81) then sense of position perception alteration(37.97) and finally was sense of smell perception alteration (34.61) ,there are statistically significant relation between sense of vision and sense of tactile perception alteration with the starting date of ACH at p value < 0.05. Also, six themes were identified in the current study which reported that more than half of patients express taste perception alterations. **Recommendations:**conducting educational programs to improve patient's knowledge and a wariness regarding receiving of ACH. **Conclusion:** Sensory perception alterations during ACH are significant complaints of cancer patients. In addition to reducing life satisfaction, poor compliance and even decreased response to therapy.

Keywords: Antineoplastic Chemotherapy, nursing management, mixed methods, sensory perception alteration

INTRODUCTION

Cancer is a genomic disorder of the body's own cells that begin to proliferate and metastasize in an uncontrolled manner that ultimately harms the individual (*Moll, de Boer, Bouter, & Singh, 2019*).

Globally, Cancer is the second leading cause of death, and is responsible for an estimated 9.6 million deaths, in 2018 about 1 in 6 deaths is due to cancer. Approximately 70% of deaths from cancer occur in low and middle-income countries(*Bray et al., 2018*)

In Egypt, approximately 108,600 new cancer patients are diagnosed annually while approximately 72,300 cancer patients die each year (*Siegel, Miller, & Jemal, 2019*).

Antineoplastic chemotherapy (ACH) are used in conjunction with surgery and radiotherapy to restrain that growth with curative or palliative intention many of the side effects off ACH can be traced to damage to normal cells that divide rapidly and are thus sensitive to anti-mitotic drugs cells in the bone marrow, digestive tract, and hair follicles, they are used to curb this growth with curative or palliative purpose (*Stout & Sabo Wagner, 2019*).

Sensory perception alteration secondary to ACH is a shift in the quantity or pattern of incoming stimuli followed by a decreased, excessive, distorted or disabled response to stimuli such as those associated with the visual, auditory, tactile, gustatory, olfactory and kinesthetic responses of the patient to these stimuli that significantly affect the ability of an individual to communicate and work in an environment(*Brisbois, de Kock, Watanabe, Baracos, & Wismer, 2011*).

Significance of the study:

Patients receiving ACH for the treatment of cancer have dramatically lengthened life expectancy. While ACH greatly improved the prognosis for cancer-stricken individuals, there are also adverse physiological and perceptual consequences that accompany extended survival that can have a major impact on daily functioning and quality of life. These alterations in sensory perception can be both qualitative and quantitative which affect overall health, nutritional status, day-to-day living activities

and quality of life. Therefore, perception of possible sensory alterations in patients with cancer by nurses and other healthcare professionals is essential for decision taking about appropriate treatments that optimize medical care.

AIM OF STUDY:

To assess sensory perception alteration for patients receiving antineoplastic chemotherapy.

SUBJECTS AND METHOD:

Across section study design using a mixed-method research which combines qualitative and quantitative data collection approaches has been adapted. Qualitative research can provide a unique insight into individual's sensory perception experiences during chemotherapy that cannot be elicited through quantitative methods.

Setting:

This study was conducted in chemotherapy outpatient clinics at (Port-Said general hospital in Port-Said city).

Subjects

A convenient sample from patients undergoing ACH which was available within 6 months and approved as follows:

Inclusion criteria:

Patients were received antineoplastic chemotherapy for 6 months and were free from any disability such as hearing, visual disability

Exclusion criteria

- Patients were complained from diabetes mellitus, renal disease, neurological disorder, and liver disease,
- Patients with psychiatric disorders due to their possible chemosensory effects.

Data collection tools:

Data were collected via three tools

Tool (I): patients characteristic's questionnaire:

The researchers established a collection of questions concerning the history of the person and the characteristics of the Antineoplastic chemotherapy patients.

Personal data:

Personal data was collected using clinical records and included gender, age, marital status, and education level,

Medical history:

It was developed to assess medical history of the patient which represent an over view about general medical condition of the patient and consist of nine items such as type of cancer and site, presence and site of metastasis, number of chemotherapy cycles administered, chemotherapy schedule, type of chemotherapy.

Tool (II): Sensory information questionnaire:

It was adopted by Rhodes, McDaniel, Hanson, Markway, & Johnson, (1994)in English languageto assess sensory perception alteration and general experience for patient receiving antineoplastic chemotherapy. It was translated into Arabic language by researcher. It was composed of sex of sense perception alteration questionnaires:

(1) Visual perception alteration questionnaire:

It was composed of (14) questions related to patient's vision sense, eye movement, vision acuity, tearing, sensitivity to light, etching or burning sensation.....etc.

(2)Tactile perception alteration questionnaire:

It was composed of (15) questions related to patient's tactile sensory perception like, numbness and pain in both hands and feet.

(3)Balance perception alteration questionnaire:

It was composed of (10) questions related to patient's balance and gait like, ability walking, running, strength training, such as weight-bearing exercise.

(4)Smell perception alteration questionnaire:

It was composed of (10) questions related to sense of smell perception like, distorted ability to identify odors and odor perception without the presence of any odor and its effect on daily life activities.

(5) Taste perception alteration questionnaire:

It was composed of (18) questions related to patient's taste perception alteration.

(6) Hearing perception alteration questionnaire:

It was composed of (12) questions related to patient's hearing perception alteration assessment. The following items need to be **reverse coded** prior to data entry to keep on accuracy of data. Items as following:

- Can you focus on the direction of sounds or sound source?
- Can you determine the direction of sounds and different sounds?

▪ Scoring system:

All the participants completed the sensory information questionnaire

The tool consists of 6 sub-scales contain 9 items and is assessed on a Likert style scale of 5 points (1= never, 2= rarely 3= sometimes, 4= often, 5= always).

Tool (III) Sensory Perception:

A semi structured interview addressed sensory perception experience during Antineoplastic chemotherapy. Data were collected by asking the participants One question to reported characteristics of sensory perception alteration for patients receiving ACH *"can you tell me about any alterations you've got been experiencing with your sensory perception after receiving antineoplastic chemotherapy?"*

Qualitative analysis:

Thematic analysis was used to interpret the data, the researcher who conducted the interviews transcribed all the audio-recorded material. The researcher then repeatedly read the transcripts and used the method of color-coding to classify distinct concepts and categories related to research questions (*Braun & Clarke, 2006*).

Content Validity:

A jury group of seven experts ascertained the validity of the content, to make sure that the instruments used measuring what purpose to measure and check its translation. Changes were done according to the expert's opinions .

Reliability :

Cronbach's alpha test was used to check the reliability of the tool; the questionnaire's reliability was 0.956, the following tables display the results of the data collection tools' reliability study.

Field Work: Data were collected from January to June (2019).

The researcher interviewed the patients on different bases. The researcher describes the sheet to the patients and clarifies it, then wrote exactly what the patient said. The person in-depth interviews were held at the oncology department's conference room. Patients and researchers sat beside each other or face-to-face during the interviews. All the interview conversations were captured using a voice recorder. The researchers also took notes on the body language of patients as well as changes in their facial expression and movements. All the data gathered during the interviews have been kept confidential so that they can be used for analysis. The data collection time needed varied from 45 to 60 minutes.

Administrative design:

An official letter was addressed to the managers of the study hospitals by the dean of the Faculty of Nursing, Port-Said University. Written permission to conduct the research was obtained from the director of each facility and the managers of the selected hospitals' out patients clinics after describing the purpose of the study.

Ethical Consideration:

Consent was obtained from patients upon confidentiality and privacy clarification of the intent of the study. The researcher shall preserve anonymity of samples, may choose to participate or not and shall have the right to withdraw from the study without penalty at any time.

Statistical design:

Data sets obtained in different body postures were coded and transformed into coding sheets. So, used this following statistical measure as number and percent distribution of the studied data for each patient were calculated. Organizing, tabulating and statistically analyzing the collected data (Statistical Kit for the Social Sciences, version 21, SPSS Inc. Chicago, IL, USA); all data were in categorical manner, and frequency, standard

and mean deviation and percent distribution were calculated. T-test and a nova test were used to test the relation between the study variables. For interpretation of results, the p value ≤ 0.05 was considered significant level in some tables. Meanwhile, the p value ≤ 0.001 was considered highly significant

RESULTS:

Table (1): shows that, the mean age of studied patients was 50.56 year with the range of (20-60) years old. Moreover, educational background of the patient was varied 33.0 % of the patients did not read or write 29.0% had secondary school or equal (high school diploma), 9.0% completed some college

Table (2): Illustrates that, 47.0% of studied patients start treatment within 6 months to less than 1 year after discovering the disease. 63.0% of patients receive the second phase of ACH. Almost 71.0% of patients received treatment dose every (21) days.

Table (3): Demonstrate that, the mean of patients complain from acidic taste was (4.60) which represent the highest mean of taste perception alteration followed by an abnormal sensitivity to bitter with mean (4.58), then nausea and vomiting represent (4.46) followed by complain of drugs which interfere with sense of taste with mean(4.33). Also, mean of dry mouth was (4.00). Most of patients have a difficult with eating meat with mean (4.00). In addition to, an abnormal sensitivity to sour with mean (4.05).

Table (4): Illustrate that, nausea related to cooking odor have a great mean between patients and represent (4.27) followed by refusing to eat some of food because of its smell (4.14). Like sense of taste perception alteration, specific drugs interfere with the sense of smell perception with mean (3.82) and these changes effect on appetite with mean (3.76).

Table (5): Show that, mean burning sensation of patients receiving ACH was to be (4.10) followed by mean double vision since start was to be (4.28) then mean difficult with seeing distant objects was to be (3.16) and mean painful eye with movement was to be (3.31).

Table (6): Illustrate that, mean upset by the high votes to be 4.27. Mean respond negatively to loud noise to be 4.12. Mean distracted by thin sounds, such as fluorescent lights 3.43 followed by mean of asking others not to speak or make noise to be 3.91.

Table (7): Shows that, mean tingling to be 4.33. Mean numbness to be 3.94. Mean Pain when touching cold things to be 3.37. Mean Problems with performing manual tasks to be (3.99). Mean feeling of stepping on sand was (3.55), mean Feel of coldness in hands/feet/fingers (3.55). Mean Sensations of pins/needles in arms/legs was (3.92).

Table (8): Illustrate that, mean dizziness during daily activities to be (4.45). Mean difficulty walking or climbing stairs to be (4.13) followed by, mean rock whilst sitting to be (3.67). And the mean effect of ACH on work and daily activities to be 4.03.

Table (9): Represent that, there are statistically significant relation between sense of vision and sense of tactile perception alteration with the starting date of ACH at p value < 0.05. While, there is no statistically significant relation between sense of smell, taste, and hearing perception alteration with the starting date of ACH at p value > 0.05.

Table (10): Represent that, there are statistically significant relation between sensory perception alterations with Age at p value < 0.05.

Table (1): Distribution of the studied patients according to personal characteristics (n=100)

Sex	Frequency	Percentage
Male	39	39.0
Female	61	61.0
Educational level		
No read or write	33	33.0
Read and write	7	7.0
College education	9	9.0
Primary	19	19.0
Preparatory	3	3.0
Secondary and equal	29	29.0

Table (2): Distribution of the studied patients according to medical and family history (n=100).

Phase of antineoplastic chemotherapy used	Frequency	Percentage
First phase	33	33.0
Second phase	63	63.0
Starting time of ACH		
From 6 months to less than 1 year	47	47.0
From 1 year to less than 3 years	39	39.0
From 3 years to less than 5 years	14	14.0
Chemotherapy schedule		
Every 15 days	29	29.0
Every 21 days	71	71.0

Table (3): Sense of taste perception alteration distribution (n = 100)

Taste perception alteration	Mean ± SD
A food tastes different than it used to	4.12 ± 1.03
A persistence bad taste in the mouth	4.30 ± 0.96
Feel nauseated and vomiting	4.46 ± 0.70
Difficulty tasting sweetness	2.94 ± 1.35
Difficulty tasting saltiness	2.39 ± 1.21
Difficulty tasting sourness	4.05 ± 0.96
Difficulty tasting bitterness	4.58 ± 0.89
Decreased of appetite.	3.93 ± 0.91
Felling of dry mouth	4.0 ± 1.01
Bothered by the smell of food	2.28 ± 1.37
Do you suffer from acidic taste	4.60 ± 0.83
Difficulty eating meat	4.00±0.724
Drug interfere with sense of taste	4.33±0.804
Difficulty eating hot food	2.76 ± 1.16

Table (4): Means of sense of smell perception alteration on studied patients (n = 100)

Smell Perception Alteration	Mean ± SD
A food smells different than it used to	3.81 ± 1.13
Have abnormal sensitivity to odor	3.41 ± 1.1
Specific drugs interfere with sense smell perception	3.82 ± 1.03
Refuse to eat some foods because of their smell	4.14 ± 0.95
Feel nauseous or faint because of the smell of cooking	4.27 ± 1.04

Table (5): Means of sense of visual perception alteration on studied patients (n = 100)

Visual perception alteration	Mean ± SD
Difficulty seeing distant objects	3.16 ± 1.34
Burning sensation with treatment	4.10 ± 1.28
Spots moving in front of your eyes	3.20 ± 1.22
Double vision since start treatment	4.28 ± 0.99
Difficulty with vision at night	2.68 ± 0.91
Halos around objects	3.05 ± 1.19
Tearing after treatment	3.84 ± 1.24
Loss of sight even for minutes or seconds	2.80 ± 0.91
Painless spots in the center of vision	2.92 ± 1.10
Painful sensation during eye movement	3.31 ± 1.21

Table (6): Means of sense of hearing perception alteration on studied patients (n = 100)

Hearing Perception Alteration	Mean ± SD.
Upset by the high voice	4.27 ± 1.06
Refuse to go to public places such as theaters and parks	3.61 ± 1.11
Distracted by thin sounds, such as fluorescent lights, refrigerators, heaters	3.43 ± 1.08
Respond negatively as a loud noise to things that bother you	4.12 ± 0.91
Have a problem understanding what people mean when they say something	2.54 ± 1.03
Ask others not to sing, speak, or make noise	3.91 ± 0.90
Focus on the direction of sounds or sound source	3.95 ± 0.72
Determine the direction of sounds and different sounds	3.98 ± 0.78
Have any ringing, or full ears ringing	2.96 ± 1.38

Table (7): Means of tactile perception alteration on studied patients (n = 100):

Tactile Perception Alteration	Mean ± SD.
Tingling in your extremities	4.33 ± 1.03
Numbness sensation in your extremities	3.94 ± 1.12
Balance problems due to lack of feeling in the legs / feet	3.7± .954
Experienced decreased touch sensitivity	3.91 ± 1.16
Sensations of pins / needles at its worst in arms / legs	3.92 ± 1.11
Complain from grasping small objects (e.g., handling coins, holding a pen)	3.54 ± .892
Feeling as stepping on sand	3.55 ± 1.02
Problems performing manual tasks	3.99 ± 1.02
Cramps in hands/feet	4.27 ± 0.95
Hot / burning sensations at its worst in the hands / feet	3.64 ± 1.00
Sensations of electric shock	3.65 ± .967

Table (8): Means of balance and gait perception alteration on studied patients (n= 100).

Balance perception alteration	Mean \pm SD
Rock whilst sitting	3.67 \pm 1.05
Have difficulty walking or climbing stairs.	4.13 \pm 0.87
Suffer from dizziness during daily activities	4.45 \pm 0.76
Difficulty in holding objects	3.84 \pm 1.04
Tire easily after sitting or lying in the same position for a while	3.83 \pm 0.90
Difficulty changing position from sitting down to lying on the ground	3.84 \pm 0.95
Affect your work or daily activities	4.03 \pm 0.86

Table (9): Relation between start date of ACH and sensory perception alteration (n = 100).

Sensory perception alteration Starting date of ACH	Visual perception alteration	Tactile perception alteration	Smell perception Alteration	Taste perception alteration	Hearing perception alteration
From 6 months to less than 1 year	48.10 \pm 14.21	68.09 \pm 22.62	58.83 \pm 11.23	64.82 \pm 10.06	55.50 \pm 8.74
From 1 year to less than 3 years	60.62 \pm 15.90	79.97 \pm 13.77	63.14 \pm 11.58	67.31 \pm 9.13	59.08 \pm 10.90
From 3 years to less than 5 years	64.41 \pm 16.61	85.27 \pm 17.61	64.46 \pm 10.70	67.14 \pm 8.20	60.12 \pm 10.99
(p)	($<0.001^*$)	(0.002^*)	(0.117)	(0.439)	(0.151)

*statistically significant at p value < 0.05

p: p value for association between different categories

Table (10): Relation between age and Sensory Perception Alteration (n = 100)

Anova Table	F	Sig
Visual Perception Alteration *		.001
Age	92.184	
Tactile Perception Alteration*		.001
Age	87.283	
Balance, Position Perception Alteration *		.002
Age	93.531	
Smell Perception Alteration*		.002
Age	56.008	
Taste Perception Alteration *		.001
Age	63.437	
Hearing perception Alteration*		.050
Age	74.479	

F: F for ANOVA test

p: p value for association between different categories

*: Statistically significant at $p \leq 0.05$

Qualitative findings of the recent study:

Analysis findings of the recent study yielded 8 subthemes. These were grouped appropriately into 6 major themes: impact on taste, smell, vision, hearing, tactile and balance sensory perception. The process of aligning these themes, and their accompanying subthemes, can be seen in more detail in (table11). The first two themes concerned with nutritional alterations and its effects on patient's health, these changes subsequently affected their physical wellbeing. The second two themes (Hearing, balance perception) concerned with maintaining the internal balance of the body. Each theme is discussed in detail using the data extracted from the qualitative studies and supported if necessary, by quotations.

Table 11: Themes and subthemes identified across the research study

Themes	Subthemes group
Impact on sense of taste perception	Lack of appetite The five-basic taste qualities sweet, salt, bitter, and sour tastes
Impact on sense of smell perception	Nausea and vomiting
Impact on sense of tactile perception	Tingling and numbness
Impact on sense of balance perception	Falling
Impact on sense of hearing perception	Ringling Vertigo
Impact on sense of vision perception	Tearing, Double vision

Impact of ACH on taste perception alteration:

Alteration in taste perception may be characterized as unique to particular foods or beverages, or as all foods taste the same. For some patients, a food or a drink may have a changed taste, while for others, the foods involved may differ.

The five basic taste qualities sweet, salt, bitter, and sour tastes:

Approximately 25% of patients in the current study made it clear that changes in perception influenced *sugar, salt, bitter, and sour tastes*. Patients differed according to which senses of taste were affected; some patients could not tolerate sweet food or drink, while others preferred sweet tastes.

Many found much of the food too salty, while others couldn't even taste salt at all. Also

listed were alterations in bitter and sour tastes but not as frequently as alterations in salt and sweet tastes.

▪ ***Lack of appetite:***

About 32% reports reduced liking of specific foods or reduced enjoyment of eating. Another patients state that *'Juice tastes sharp, have drunk it though it does not taste nice'*. Some patients reported that *'A persistent underlying feeling of nausea affects my sense of taste'*. Most patients complain of nausea or something they have never experienced before. *'The taste of water that was described as musty, sweet or like iron'* was oftenspontaneously reported by patients.

Approximately 55 % of patients said: *I can eat but I have no enjoyment from it*. Some patients explain this, saying: *"I did not like those foods. But the worst thing was that I did not like the taste of meat and fish,* 'Another patient said, *'If I start feeling a little nauseated, I'm prone to the smells around me.'* Most patients suffer from underweight since the beginning of ACH and the desire not to eat at all.

Impact of ACH on smell perception alteration:

Alteration the perception of the smell will lead to malnutrition weight loss, and possibly prolonged morbidity of adverse effects caused by ACH, decreased quality of life, poor compliance, and even reduced therapy response.

Nausea and vomiting:

The majority of patients suffer from nausea and fainting due to some odors, such as cooked food in general and some detergents and perfumes, they reported that they became suffering from alteration in the sense of smell, as they became could not tolerate some smells, such as spices and sliced fish.

Some of patients reported that *" I hated some of the perfumes which I was using"*

Approximately 35% of patients think that *'Everything smells like chemotherapy for a period. I smell a musty smell at home that my husband doesn't, and I feel nauseous about the smell I'm used to.'*

Impact of ACH on visual perception alteration:

The retina is one of the most active metabolic tissues in the body, making it a prime targ

et for unwanted side effects of ACH.

- **Tearing:**

About 75% of patients in the recent study reported that, "*My eyes are always tearful for no reason with a burning sensation and I can't open them in morning*".

- **Double vision:**

Also, some patients complain from mild to moderate pain with eye movement and vision loss moderate to severe eye pain worse with light exposure. About mainly half of patients said that *my eyes are always have double vision and painful spots*.

Impact of ACH on tactile perception alteration:

Tactile perception alteration is a serious problem which affect daily living activities, almost of patients complain from numbness, tingling and sever peripheral pain

- **Tingling and Numbness:**

More of patients expressed that they complain from numbness, tingling, abnormal touch sensations, or cold sensitivity. Pain is often reported and may be described *as burning, freezing, shock-like, or electric*.

A bout more than half of patients stated that, "*my hands always have numbness, tingling, I can't hold any glass like, tea or milk*."

Impact of ACH on Balance perception alteration:

Falls are a significant health problem for cancer patients which represent the leading cause of injury and death for some patients. People who receive ACH are more likely to fall compared with those who do not receive cancer treatment.

- **Falling:**

Almost of patients complain from dizziness during daily activities, about 60% of patients reported that they complain from falling, tire easily after sitting or lying in the same position.

Majority of patients said that "*With a sense of being unable to do household chores at all times, especially the inability to climb the ladder or go to personal events because of permanent dizziness*". About 15% of patients said that "*I always felt like falling with me*

because of dizziness and shivering in my body, and after the treatment started, I was very dizzy and fell to the ground”.

Impact of ACH on hearing perception alteration:

Hearing perception alterations are a major health issue, particularly for patients receiving ACH, which is associated with substantial morbidity including psychological, social, occupational, academic and health-related outcomes.

▪ **Ringing and Tinnitus:**

About less than quarter of patients in the recent study complain from inability of hearing well than before and cannot focus on the direction of sounds or sound source.

DISCUSSION:

Study of sensory perception alterations for patients receiving antineoplastic chemotherapy is important for oncology nurse to set a realistic goal to meet the challenges inherent in caring for those patients and improve their quality of life. Such sensory alterations in perception are major cancer patients' problems such as fatigue, weight loss and probably a prolonged morbidity of adverse effects caused by chemotherapy (*Drareni et al., 2019*).

Moreover, assessment of sensory perception alterations is needed for patients with cancer because of the profound impact of the disease on their functions and wellbeing, along with the associated high resources use. Additionally, study data evaluation will theoretically assist medical decision-makers and assist policy planners in deciding the distribution of medical resources between various cancer therapies and through ACH response.

While cancer diagnosis is stressful at any stage of life, the current findings showed that age between 40-60 years, which may explain why most of the cancer patients receiving ACH is an old adult, this finding is consistent with *Haugnes et al., (2018)*, who reported why tinnitus prevalence and alteration in hearing perception increases with that age.

While, more than half of patients not read or write that is the factor for delay seeking medical member once feeling of pain or after receiving ACH. More than half received

the second phase of ACH. Three quarter of studied patients received ACH from 6 months to less than one year which reflects the speed of occurrence of ACH side effects.

Concerning to, taste perception alteration the present study indicated that the majority of patients complain from sense of taste perception alteration by ACH, feeling nauseated, having a reduced appetite, being bothered by the smell of food, and having difficulties with eating meat were the most distressing problems experienced by patients.

The current results were consistent with (*Belqaid, Tishelman, Orrevall, Månsson-Brahme, & Bernhardson, 2018*) which stated that, that more three quarter of patients receiving ACH had taste perception alteration and usually taste all food like metal, cardboard, or sandpaper, is too salty, sweet, sour, bitter or is simply tasteless. Consequently, that result of comfort alteration, nausea, and anorexia.

The results of the studied patients reported degusting food issues and said they had difficulty differentiating whether some foods or beverages were fresh or spoiled. As patient said: *"I first thought the jar was wrong, so I went and got another one and tried it, but it was the same when I tasted it, and then I realized that the problem was with me, not the jam"*. Also, most patients describe the taste of water as *"musty, dry, sweet or iron."* Patients have often described the taste of coffee, sometimes as being particularly *burnt or bitter*.

Also, the results were consistent with previous study of (*Halyard, 2009*) who observed more than half of patients complain from taste perception alterations in the majority of cancer patients. In addition to, (*Amézaga et al., 2018*) who proved that mainly half patients reported taste perception alteration and less than half of patients complain from smell changes .

The present research has also shown that there is a statistically important relation between the start date of ACH and alteration in taste perception. Regarding to (*Zabernigg et al., (2010)*) who reported that, taste perception alterations may start within a few minutes after drug administration. Whereas some patients seem to experience taste perception alterations immediately after the first treatment according to (*Thiermann & Buchbauer, 2017*).

Thus, the solution for altering taste and odor perception involves minimizing sensitivity to metallic taste and other chemosensory responses, sustaining or increasing energy levels (e.g., energy dense, high protein foods) and resolving other common side effects (e.g., dry mouth, nausea, fatigue) that could impede sufficient energy intake. However, most cancer patients do not seek dietary advice, because the vast number of patients expressing nutritional issues supports the need for nutritional therapy as a normal part of treatment (*de Vries et al . , 2018*). Thus, nutritional resources could be widely distributed to patients with cancer, including websites or mobile apps that include recipes and other evidence-based nutritional information(*van Oort, Kramer, de Groot, & Visser, 2018*).

In addition, there is a need for collaborations between physicians, nutrition experts, registered dietitians, food scientists, chefs and patients / survivors to establish strategies that discuss and appeal to patients (*Bozzetti et al., 2012*).

As regards to smell perception alteration the study Illustrate that, felling of nausea related to cooking odor have a great mean between patients followed by refusing to eat some of food because of its smell .This results clarified by (*Bernhardson, Tishelman, & Rutqvist, 2007*) Who indicated that the cooking odors, perfumes, and cleaning items contained different substances commonly affected. Patient reported: "*I don't know those odours because they're so much weaker than normal.*"

Moreover, tactile perception alteration is a complex phenomenon and considers the second most important side effect of patients receiving ACH. The present results showed that most patients had tingling, numbness, decreased touch sensitivity and feeling in their legs that cause difficulty with balance. These patients need to introduce strategies designed to diagnose and manage this condition early in order to recognize, avoid or treat the problem, minimize discomfort and sensory harm that reduces the performance of everyday activities and compromise the quality of life.

According to *Seretny et al.,(2014)* a meta-analysis of patients who received ACH treatment showed that approximately more than half of patients experience tactile perception alteration after one month of treatment, majority of them at 3 months; and less than half Keep on hurting from tactile perception alteration 6 months or more after receiving ACH .With regard to the experience of the tactile perception alteration symptoms most patients in the present study experience of the tactile perception

alteration symptoms themselves (*numbness, tingling, and pain like needle stuck in feet, extreme burning in fingertips, 'Like placing fingers on a hot stove,' a line of numbness through fingers*).

As regards ocular perception alteration the current result of studied patients showed that, less than half of patients receiving ACH frequently report ocular perception alterations during treatments, these include eye irritation, discomfort, blurred vision, and excessive tearing. Burning sensation has been reported to be the major complaint of patients receiving ACH in this study followed by excessive tearing problem, and this may be due to lack of contact with the ophthalmologist and ignoring relevant findings from the eye history, vision test results and external eye examination findings.

According to (*Omoti & Omoti, 2006*) who illustrate that prevalence rates of ocular perception alterations; minority of those patients have conjunctivitis , tearing , burning sensation and blurred vision . Respectively, the same findings were made by(*Harman, 2016*) who observed that ocular perception alterations were generally mild and transient in nature such as, itchiness, altered sensation, blurring, and burning.

In terms of hearing perception alteration, the current results of the study show that less than half of patients worry about altered hearing perception, which is consistent with (*Marnitz et al., 2018*) and (*Noszek et al., 2017*) who reported that patients receiving ACH complain from hearing perception alterations , that may cause permanent bilateral hearing perception alteration in substantial numbers of patients.

The current results indicate that patients who have experienced a high frequency hearing perception alteration in connection with ACH would most likely experience more issues in the future and will need hearing aids. In addition to providing the patients with proper hearing aid at a much earlier stage, regular follow-up may also encourage good social development for these patients.

As regards balance perception alteration the recent results revealed that there was a balance perception alteration induced by ACH. Majority of patients complain from rock whilst sitting, have difficulty walking or climbing stairs, suffer from dizziness during daily activities. This may be due to inability to perform any exercise such as lower limb strength training, progressive resistance training, weight training and mixed sports

training which may be the most suitable option and improve patients' lower limb strength and walking ability by improving balance function and stability .

The current findings agree with *Monfort et al., (2017)* that cancer patients who receive ACH often experience falls and unstable gait. In addition, the research of *Espy, Yang, Bhatt, & Pai, (2010)* who showed that cancer patients often experience walking problems, feeling shaky, and having a decreased sense of balance, possibly affecting their ability to perform daily living tasks.

Finally, from the above mentioned, these present study findings emphasized the importance of assessment of sensory perception alteration for patients ACH to promote and enhance health self-care modalities and prevent subsequent side effect of treatment. Also, the study contributes to the clarification of impaired sensory perception in patients with cancer receiving ACH in addition to establishing risk factors. Early detection of risk factors and early implementation of measures to identify, avoid or manage the problem may directly lead to declining pain and sensory harm reducing daily activity output and sacrificing quality of life.

CONCLUSION:

Based on findings of the present study, it can be concluded that:

Alteration of sensory perception is a common complication of ACH that has a negative effect on health by creating unpleasant symptoms, reducing functional output and causing distress. These recent findings support previous research which indicates that changes in sensory perception have a negative impact on functional, social, and emotional well-being. It is therefore critical for nurses and other health care professionals to assess and understand concerns from patients and provide help, realistic approaches, and treatments and cope with these alterations in sensory perception.

RECOMMENDATIONS:

It is recommended, based on the findings of the present study:

- Conducting educational program to improve patient's knowledge regarding receiving of ACH and its side effects to improve quality of life

- Supporting modeling labs, where appropriate, to track and explain action and education regarding disease development, nutrition, exercise, side effects of medication, and lifestyle modification

For further researches:

- Replication of the current study on a large probability sample from different geographical areas to achieve more generalized results.

Limitation of the study

The sample size was small, limiting the generalizability of the results. The sample was selected from a single geographic location where patients tend to be of above-average education and socioeconomic status, although no data on these variables were collected. Minority populations were not adequately represented. Results may differ based on racial or ethnic variations. The selection of participants was not random but purposive and, therefore, the experience of these patients may differ from those in a random sample.

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تقييم إدراك التغيير الحسي لمرضى الأورام الخاضعين للعلاج الكيميائي

الخلاصة

المقدمة: ان استخدام العلاج الكيميائي يؤدي الي حدوث تغيرات ادراكية حسية عالية بين المرضى يمكن ان تؤثر بشكل خطير على الحالة الصحية للمرضى **الهدف من الدراسة:** تهدف هذه الدراسة الي تقييم إدراك التغيير الحسي لمرضى الأورام الخاضعين للعلاج الكيميائي. **تصميم البحث:** تم تصميم دراسة البحث باستخدام دراسة الأساليب المختلطة التي تجمع بين الأساليب النوعية والكمية لجمع البيانات **مكان البحث:** أجريت هذه الدراسة في العيادات الخارجية للعلاج الكيميائي في (مستشفى بورسعيد العام بمدينة بورسعيد) **عينة البحث:** 100 مريض ممن يتلقون العلاج الكيميائي المضاد للأورام والذي كان متاحًا خلال 6 أشهر. **أدوات جمع البيانات:** - تم جمع البيانات من خلال الاستبيان الخاص بجمع البيانات الكمية والمقابلة مع المرضى لجمع البيانات النوعية. **نتائج الدراسة:** اظهر غالبية المرضى في الدراسة تغيير في ادراك حاسة التذوق اعلي قيمه متوسط (66.35) متبوعا بمعني تغيير ادراك حاسة اللمس يليه (57.54) ثم تغيير الادراك البصري (45.41) متبوعا بتغيير ادراك السمع (39.81) ثم ادراك حاسة اللمس ثم الاتزان وأخيرا ادراك حاسة الشم (34.61). هناك علاقة ذات دلالة إحصائية بين الإحساس بالرؤية والإحساس بتغيير الإدراك اللمسي مع تاريخ بدء العلاج الكيماوي عند قيمة $p < 0.05$. أيضا تم تحديد ستة مواضيع في الدراسة الحالية التي ذكرت أن أكثر من نصف المرضى يعيرون عن تغيرات في إدراك الذوق. **الخلاصة:** إن تغيرات الإدراك الحسي خلال العلاج الكيماوي هي اعراض مهمة لمرضى السرطان. والتي تؤدي إلى تقليل الرضا عن الحياة ، والامتنال الضعيف ، وحتى انخفاض الاستجابة للعلاج. **التوصيات:** هناك حاجة واضحة لإجراء برامج تعليمية وتدريبية لتحسين معرفة المريض وتوعيته لتلقي العلاج الكيميائي المضاد للأورام وأثاره الجانبية للارتقاء بصحتهم.

الكلمات المرشدة: اضطرابات الإدراك الحسي، العلاج الكيميائي المضاد للأورام، الرعاية التمريضية، طرق كمية وكيفية.