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IMPACT OF ELAICHI (*Elettaria cardamomum*) WATER IN EFFECTIVE SIDE EFFECT MANAGEMENT DURING CANCER TREATMENT AMONG ADULT AND MIDDLE ADULT LUNG CANCER INDIVIDUALS ENROLLED WITH 4BASECARE

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ABSTRACT

Elettaria Cardamomum has been widely used in Indian Cuisine as a spice and also used as a very good remedy in Ayurveda treatment for acidity relief, mouth ulcer and Peptic ulcer. It promotes digestion, alleviates stomach spasms, provides relief to the stomach lining and helps regulate acid production **[1]**. Cancer treatment brings in severe side effects that last for months or even years after treatment is completed. Some of the common side effects that affect the

food intake includes nausea, vomiting, loss of appetite, tastelessness and feeling tired. This pilot study was conducted to explore the potential efficacy of cardamom in managing treatment-related side effects in young and middle-aged adults diagnosed with lung cancer. In this investigation, a cohort of 35 lung cancer patients was examined, with a focus on those who incorporated cardamom water into their daily routines during the treatment. Preliminary findings reveal a distinct contrast in outcomes among the subjects: 30 participants adhering to the cardamom water regimen, reported positive results. In contrast, the 5 subjects who did not follow this regimen reported no discernible impact on their well-being. Among these 35 very few were on side effect related medicines. The study's emphasis on specificity to the understanding of cardamom's potential therapeutic role. The qualitative analysis of patient experiences sheds light on the personalised nature of complementary strategies in cancer care. These findings contribute valuable insights to the discourse on traditional remedies in cancer support, paving the way for further integration of holistic care practices in oncology.

Keywords: Elaichi (Elettaria cardamomum), Cancer treatment, Side effect management, Lung cancer, 4BaseCare, Integrative medicine, Complementary therapy, Symptom management, Alternative medicine, Supportive care

INTRODUCTION

In Cancer some of the body's cells grow uncontrollably invading the nearby tissues. It is a genetic disease caused by changes in genes that control the function of the cells. There is research proving the risk factors increase the risk. One risk factor that a dietitian can play a vital role is diet and lifestyle **[2]**. Cancer treatments, while essential in combating malignancies, often bring about too many side effects that can significantly impact the quality of life for individuals undergoing the therapies. The search for complementary and alternative approaches to alleviate these treatment-related side effects has gained momentum in recent years **[4]**. One such avenue of exploration is the potential therapeutic role of cardamom (*Elettaria cardamomum*) in managing the adverse effects associated with cancer treatment.

Cardamom, a spice native to the Indian subcontinent, has been revered for centuries for its culinary uses and medicinal properties. Its bioactive compounds, including essential oils, terpenoids, and flavonoids, have demonstrated antioxidant, anti-inflammatory, and anti-cancer properties in various preclinical studies. Recent anecdotal evidence suggests that regular intake of cardamom water may hold promise in ameliorating some of the common side effects experienced by cancer patients undergoing treatment **[3]**.

Considering the challenges cancer patients go through during treatments, to meet their dietary needs, we dietitians at 4basecare planned to come up with a one stop dietary solution to incorporate in daily diet that can help them to treat the side effects, improve the food intake to meet the dietary need additionally it must also possess properties that helps cancer patients exclusively. We studied the benefits of cardamom and came up with an easy diy cardamom water and incorporated it in their diet advice. During the follow ups we observed few significant outcomes in cancer patients.

This research aims to investigate the impact of cardamom consumption, specifically in the form of cardamom water, on the management of side effects related to cancer treatment. The study explores the experiences of cancer patients who incorporated cardamom water into their daily routines during treatment, with a focus on the perceived benefits and potential improvements in their overall well-being.

As we delve into the narratives of those who have embraced cardamom water as a complementary measure, this research seeks to shed light on the role of traditional remedies in enhancing the holistic care of individuals navigating the challenges of cancer treatment.

OBJECTIVE

1. To assess the socio demographic details, anthropometry, treatment history and feedback of diet counselling of the selected individuals.
2. To assess the diet type of the selected individuals.
3. To determine the special dietary requirement of the selected individuals.
4. To determine the relationship between the type of diet and BMI of the selected individuals.
5. To assess the side effects of the selected individuals in relation to treatment taken.
6. To analyse the impact of elaichi water in managing the side effects during cancer treatment of the selected individuals.
7. To analyse the correlation of side effects managing medications taken during the elaichi water consumption period of the selected individuals.

REVIEW OF LITERATURE

Cardamom, found in cardamom spice and many other herbs, has been extensively studied as a chemo preventive agent for various cancers, including breast cancer, diabetes, colon cancer, and cancer, according to a 2014 study by Goncalves and colleagues. This study also reviews research on cardamom, including its natural sources, health benefits, and the review process for its identification. This study also points to cardamonin as another important compound. Some authors cited in the study stated that it appears to have anti-

inflammatory, anti-tumour, vasodilator, hypo-glycemic and anti-inflammatory properties, and that the search for its health applications is increasing, noting that clean drinking will only grow in the future, as evidenced by increased consumption. This situation is clearly seen in published articles **[5]**.

Bhattacharjee *et al*. In 2007, it was said that phytochemicals such as limonene and 1,8-cineole in cardamom oil showed anti-cancer properties. Previous studies conducted in the laboratory have also reported the preventive effects of cinnamon and cardamom on azomethane-induced colon carcinogenesis due to their anti-inflammatory, anti-proliferative and pro-apoptotic effects. This study, conducted in 2 groups of mice given oral doses of cinnamon and cardamom, one of which was receiving other treatments for stomach cancer, clearly demonstrates the drug antioxidant effect of cardamom and cinnamon. The study also concluded that establishing cinnamon and cardamom as effective antibiotics requires examining the properties of their active ingredients, including metabolism and toxicity **[6]**.

According to the research of Neha Vutakuri and Sita Somara, natural and herbal treatment of breast cancer using *Elettaria cardamom* (L.) spice is a widely used substance in human nutrition and can be taken in safe doses with very few side effects. Cardamom DCM and IC3 compounds kill breast cancer cells and prevent their proliferation. The study is actively investigating the elements of cardamom to prove that they may provide additional anti-inflammatory benefits by boosting the immune system. Various studies have shown that regular consumption of cardamom helps prevent cancer. This review provides an overview of cardamom, including its history, biochemical properties, and medicinal uses in humans. The study demonstrates cardamom's ability to inhibit breast cancer cells in vitro and examines cardamon’s use in animal and human clinical trials **[7]**.

In a study Hudiyawati *et al*. aimed to determine the effect of cardamom aromatherapy on nausea and vomiting in cancer patients receiving chemotherapy. This study adopted a quasi-experimental research design and pre-test-post-test control group design approach. Research results show that cardamom aromatherapy is effective on nausea and vomiting in cancer patients receiving chemotherapy. There was also a significant difference in mean nausea and vomiting scores between the intervention and control groups. The study also concluded that cardamom aromatherapy affected changes in nausea and vomiting in cancer patients receiving chemotherapy **[8]**.

A. Vidya *et al*. In 2014, he conducted an in vitro study on the immunomodulatory effects of pepper (black pepper) and cardamom extracts using mouse macrophage cell lines, and this study showed that cardamom and black pepper are used as spices in many countries around the world. They exhibit different medicinal properties in different cultures. Therefore, in this study, they have investigated black pepper and cardamom on macrophages to study the potential immunomodulatory effects. They found that black pepper and cardamom extracts are potent anti-macrophages. Their findings suggest that black pepper and cardamom can be used alone or together to develop therapeutic tools to modulate the immune system, depending on the type of infection. So they tried to look at the anti-inflammatory properties of cardamom and black pepper. He also said the active compound with anti-inflammatory properties is still unknown **[9]**.

F Ahamadi *et al*.'s study in 2020 found that the main compounds of cardamom include cineole, limonene, terpine acetate, sabinene limonene and linalool. Cardamom is a plant from the ginger family and is known as the king of spices. This study found that cardamom's anti-nausea effect is due to its local effect on the intestinal wall, unlike most anti-nausea drugs that affect the central nervous system. Cardamom is often used to relieve indigestion, cough, and irritation, and to prevent and treat infections of the stomach, throat, lungs, and mouth. One of its uses is to reduce nausea and vomiting **[10]**.

METHODOLOGY

RESEARCH DESIGN

Ex-Post Facto and experimental research design approaches were adopted to investigate the impact of green cardamom water in managing side effects of selected participants, thereby testing the hypothesis framed and stated below. In the Ex Post Facto approach, the side effects were assessed. In an experimental approach, dietary modification strategies including lifestyle intervention were followed in order to assess the impact of the same on side effects of selected subjects.

HYPOTHESIS

"H.1) Diverse dietary patterns among lung cancer individuals undergoing treatment will contribute to significant side effects, while (H.2) the inclusion of cardamom water in their diet patterns will have a substantial impact on managing these side effects."

PURPOSIVE SAMPLING:

In this study, Purposive sampling is used to identify the samples, Purposive sampling (also known as judgement, selective or subjective sampling) is a sampling technique in which a researcher relies on his or her own judgement when choosing

members of the population to participate in the study.

Purposive sampling is a non-probability sampling method and it occurs when "elements selected for the sample are chosen by the judgement of the researcher. (C R Kothari, fourth edition)

SAMPLING TECHNIQUE:

The process of selecting the samples or respondent is called sampling technique. The sampling technique adopted in the study was "convenient sampling technique". A convenience sampling is a statistical method of drawing representative data by selecting people because of their volunteering or selecting units because of their availability or easy access.

When population elements are selected for inclusion in the sample based on the ease of access, it can be called as convenience sampling (C R KOTHARI, Fourth edition).

The study will be conducted among lung cancer individuals who are enrolled in 4basecare. A total number of 35 subjects will be considered for the study. Convenient sampling method will be used for the selection of the subjects.

STUDY DESIGN

SELECTION OF AREA - 4BASECARE, INDIA

⇩

SELECTION OF SUBJECTS- ADULTS AND MIDDLE ADULTS LUNG CANCER INDIVIDUALS

(n=35)

⇩

PHASE I

ASSESSMENT

SOCIODEMOGRAPHIC DATA:

NAME, AGE AND GENDER

ANTHROPOMETRIC DATA:

HEIGHT, WEIGHT AND BMI

DIET TYPE : VEG/ NON VEG/ OVA VEG

CURRENT TREATMENT STATUS

COMORBIDITIES

CBC STATUS

CURRENT SIDE EFFECTS

INTAKE OF SIDE EFFECT RELATED MEDICINES.

⇩

PHASE II

INTERPRETATION OF DIET

SUGGESTION OF ELAICHI WATER

⇩

PHASE III

FOLLOW UP ON THE IMPACT OF ELAICHI WATER IN MANAGING SIDE EFFECTS OF THE SELECTED INDIVIDUAL

ELAICHI WATER PREPARATION:

TAKE TWO CARDAMOM (0.4 grams approximately) [12]

⇩

Mash and add it to one glass of plain water (200 ml)

ALLOW IT TO SOAK OVERNIGHT

⇩

HEAT THE WHOLE CONTENT FOR 2 MINS IN LOW TO MEDIUM FLAME

⇩

ALLOW IT TO COOL DOWN TO LUKEWARM TEMPERATURE

CONSUME IN EMPTY STOMACH SLOWLY SIP BY SIP IN SITTING POSITION

CRITERIA FOR SAMPLE COLLECTION:

The study will be conducted with the following Inclusion and Exclusion criteria.

Inclusion criteria :

1. Lung Cancer individuals who are on or post treatment

Reason :Because there are more lung cancer patients enrolled with 4basecare, who are cooperative and easy to follow up.

2. Adults and middle adult lung cancer individuals

Reason: As the basal metabolic rate decreases linearly with age, it is very important to consider age to find a super food's impact on individuals **[11]**.

Exclusion criteria:

1. Childhood and Old age lung cancer patients:

Reason: The number of childhood cancer patients enrolled were very less to consider for the study. Ageing is a dynamic process where there will be gradual decline or deterioration in function. In old age both the digestive system and immunological system deteriorates. The reduction in the amount of saliva, gastric juices and enzyme actions upsets the digestive process causing frequent constipation and stomach inflammation which is similar to side effects of cancer treatment. As there is reduction in beta cells and t cells the immune system becomes less efficient. During this period of senescence older people experience sensory deprivation that frequently results in tastelessness which is again one of the side effects of cancer treatment. Due to these factors there is a challenge to distinguishing the benefit of elaichi water in respect to cancer treatment related side effects- So old age is excluded **[13]**.

STUDY PERIOD:

The study period for the project "IMPACT OF ELAICHI (*Elettaria cardamomum*) WATER IN EFFECTIVE SIDE EFFECT MANAGEMENT DURING CANCER TREATMENT AMONG ADULT AND

MIDDLE ADULT LUNG CANCER INDIVIDUALS ENROLLED WITH 4BASECARE" is about 10 days to 8 months.

TOOLS AND TECHNIQUES USED

TOOLS USED FOR DATA COLLECTION:

General Proforma was used in this study. Proforma is a questionnaire format which includes demographic data such as name, age, sex, diet type, treatment taken, side effects faced… . This proforma also includes anthropometric data such as height, weight, body mass index.

SOCIO-DEMOGRAPHIC DATA :

Demography involves the statistical study of human populations. As a very general science, it can analyse any kind of dynamic living population, i.e., one that changes over time or space. It encompasses the size, structure and distribution of these populations, and special and/ or temporal changes in them in response to time, birth, migration, ageing and death. (Zoran Karlovac, Mateo Peric 2013).

Demographic data which include name, age, sex, treatment status were obtained from the selected subjects through interview and recorded in the proforma.

ANTHROPOMETRIC DATA:

Anthropometric data which includes, height, weight and body mass index were collected from the study subjects using standard assessment techniques.

HEIGHT:

The standing height of the patients was collected orally.

WEIGHT:

Body weight is a simple gross estimate of body composition. Body weight is one of the most important measures in assessing nutritional status and it is used to predict energy expenditure. Weight can be measured using beam scales and spring scales. The values of the patients were collected orally.

BODY MASS INDEX:

BMI, formerly called the Quetelet index, is a measure for indicating nutritional status in adults. It is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m2) [WHO]. BMI of the study subjects was derived from their height and weight and interpreted as follows:

BMI FORMULA

Body Mass Index (kg/m2) = Weight (kg) / Height (m2)

BMI is very easy to measure and calculate and is therefore the most commonly used tool to

correlate risk of health problems with the weight at population level.

ASIAN BMI CLASSIFICATION (WHO)

Below 18.5 Underweight

18.5 – 24.9 Normal weight

25.0 – 29.9 Overweight

30 – 35.9 Obese Class I

36 – 39.9 Obese Class II

>40 Obese Class III or Morbid Obesity

QUESTIONNAIRE:

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. Questionnaires can be an effective means of measuring the behaviour, attitudes, preferences, opinions and intentions of relatively large numbers of subjects more cheaply and quickly than other methods. An important distinction is between open-ended and closed questions.

The questionnaire used in the study was designed for the patients for follow up purposes to analyse the impact of diet counselling in cancer patients and the impact on their health after following the instructions.

The following details were collected using the questionnaire.

1. Gender, Age, Height, Weight and BMI
2. Diet type (Veg / Non-Veg/ Ova-Veg)
3. Treatment during the diet counselling session
4. Was Elaichi Water Suggested
5. Impact Of Elaichi on the patient's health
6. Was there a requirement of Iron Diet, Neutropenic Diet, Side Effect Management for the patient during first session
7. Comorbidities Presence (Yes/No)
8. Was the patient following the prescribed diet
9. Was the patient consuming medications to treat the same side effects
10. How much patients recommend diet counselling to cancer patients in a 5 scale

RESULTS AND DISCUSSION

Figure 1.1 shows the no. of male and female Lung cancer participants, where 63 percent are female participants and 37 percent are male participants respectively.

Figure 1.2 shows the no. of adults and middle adult participants, where 20 percent are adult participants and 80 percent are middle adult participants respectively.

Figure 1.3 shows the distribution of BMI of the participants, where 14 percent of the participants are underweight, 37 percent of the participants under healthy weight, 29 percent of the participants under overweight and 20 percent of the participants are obese.

Figure 1.4 shows the distribution of current treatment taken by the participants, where 88.6 percent of the participants were on chemotherapy, participants who have completed their chemotherapy and targeted therapy are 5.7 percent respectively.

Figure 1.5 shows the distribution of participants who took their first ever diet counselling session in 4basecare where 100 percent of the participants, 4basecare diet

counselling session was their first diet counselling session ever.

Figure 1.6 shows the distribution of elaichi water suggested to the participants where all the 100 percent of the participants were suggested with elaichi water.

Figure 1.7 shows the distribution of impact of elaichi water on side effects of the treatment taken by the participants where for 3 percent of the participant have answered that taking elaichi water helped managing weakness and tiredness, for 3 percent of the participant taking elaichi water helped in treating acidity, for 3 percent of the participant helped treating nausea, for 11 percent of the participants helped treating tastelessness, for 23 percent of the participants helped improving the appetite, for 43 percent of the participants helped managing multiple side effects and for 14 percent of the participants there were no side effects during their treatment.

Figure 1.8 shows the distribution of participants who followed the diet prescribed, where 86 percent of the participants followed the diet prescribed and 14 percent of the participants did not follow the diet prescribed.

Figure 1.9 shows the distribution of participants recommending the diet counselling session to other cancer patients where 80 percent of the participants have rated 5 as in very highly recommended to other cancer patients and 20 percent of the participants rate 4-4.5 as in highly recommended to other cancer patients.

Figure 2.1 shows the distribution of food habits of the lung cancer participants where 29 percent of participants are vegetarian, 68 percent of participants are non-vegetarian and 3 percent of participants ova-vegetarian respectively.

Figure 3.1 shows the distribution of participants who needed the iron rich diet discussion during the diet counselling session, where 97 percent of the participants were anaemic; they were in need of iron rich diet discussion and 3 percent of the participants did not require iron rich diet discussion.

Figure 3.2 shows the distribution of participants needing a neutropenic diet chart where 20 percent of the participants required the chart of neutropenic diet during the counselling session whereas 80 percent of the participants did not require the chart of neutropenic diet during the counselling session to follow.

Figure 3.3 shows the distribution of participants needing comorbidities management diet discussion, where 46 percent of the participants required the diet chart of co morbidities management diet during the counselling session and 54 percent of the participants did not required the chart of co morbidities management diet during the counselling session.

The **Figure 4**.1 shows us the relation between BMI and the dietary habits of the participants. Where 13 participants come under Normal category among which 8 participants are non-vegetarian, 4 vegetarian and 1 ova-vegetarian, 7 Participants fall under obese category where 6 participants are non-vegetarian and 1 participant is vegetarian, 10 participants come under overweight category where 8 participants are non-vegetarian and 2 participants are vegetarian and 5 participants come under underweight category where 2 participants are non-vegetarian and 3 participants vegetarian respectively.

Figure 5.1 shows us that all 35 participants were facing side effects during the counselling session and 5 participants did not follow the diet, among which 31 participants were on chemo, 2 were on targeted therapy, 2 were on post chemo state. Also, this shows the distribution of side effects of the treatment taken by the participants where for 1 participant was facing weakness and tiredness, 1 participant was facing acidity, 2 participants were facing nausea, 5 participants were facing tastelessness, 7 participants were facing loss of appetite, 15 participants were facing multiple side effects.

The **Figure 6.1** shows us that totally 30 out of 35 participants were following the diet suggested during the counselling session and 5 participants did not follow the diet, among which 5 participants who were not following the diet were on chemo, among 30 participants who were following the diet, 26 participants were on chemo, 2 were on targeted therapy, 2 were on post chemo state, The fig 6.1 also shows the distribution of impact of elaichi water on side effects of the treatment taken by the participants where for 1 participant elaichi water helped managing weakness and tiredness, for 1 participant elaichi water helped in treating acidity, for 1 participant elaichi water helped treating nausea, for 4 participants elaichi water helped treating tastelessness, for 8 participants elaichi water helped improving the appetite, for 15 participants elaichi water helped managing multiple side effects and these 30 participants were following the diet recommended and for 5 participants there were no change in their side effects as it persisted as they did not follow the diet recommended.

The **Figure 7.1** shows the relationship between side effects related medicines taken and impact of elaichi water where for 15 participants who have not disclosed about their medicine details who were taking elaichi water 1 participant said it helped manage weakness and tiredness, for 1 participant taking elaichi water helped in treating acidity, for 2 participants helped treating tastelessness, for 7 participants helped managing multiple side effects and for 1 participant the side effects persisted,

for 3 participants helped improving the appetite. Among 12 participants who were not taking any medicines for 1 participant helped treat nausea, for 2 participants helped treat tastelessness, for 3 participants helped improve the appetite, for 6 participants helped manage multiple side effects and 1 participant's side effects persisted. Among 8 participants who were taking medicines to manage side effects, 1 participant helped treat tastelessness, for 2 participants helped improve the appetite, for 2 participants helped manage multiple side effects and for 3 participants there were no impact and their side effects persisted.

Table 1: Sociodemographic and anthropometry of the selected subjects (n=35)

VARIABLES		FREQUENCY (n=35)	PERCENTAGE (%)
GENDER	FEMALE	22	62.9
	MALE	13	37.1
AGE	ADULTS (20-40 yrs)	7	20
	MIDDLE ADULTS (40-60 yrs)	28	80
BMI	UNDERWEIGHT (Below 18.5)	5	14.3
	NORMAL (18.5-24.9)	13	37.1
	OVERWEIGHT (25-29.9)	10	28.6
	OBESE (30 and above)	7	20

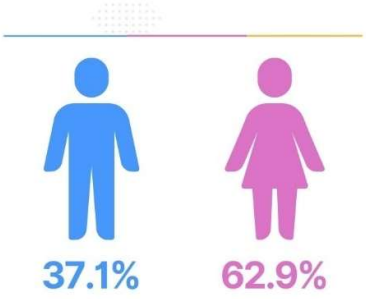

Figure 1.1: Gender Distribution of the Participants

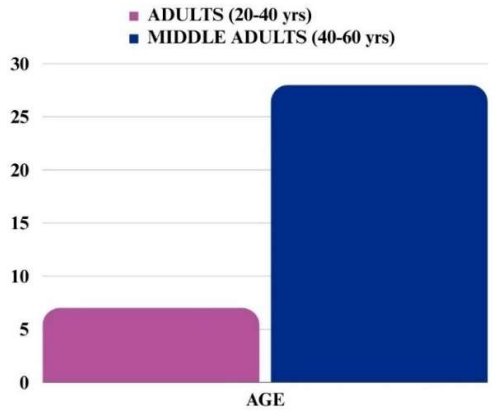

Figure 1.2: Age Distribution of the Participants

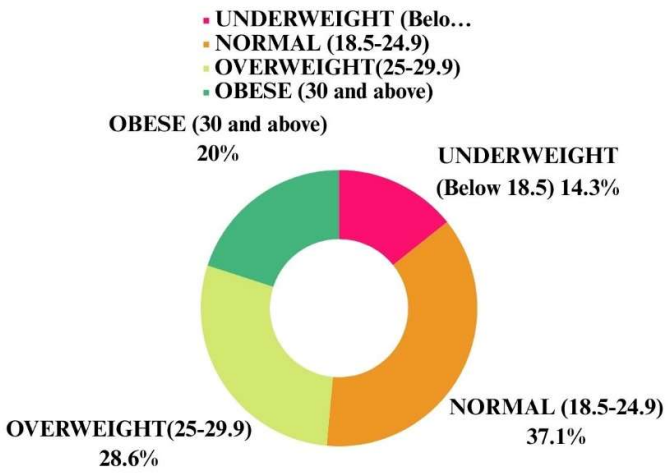

Figure 1.3: BMI Distribution of the Participants

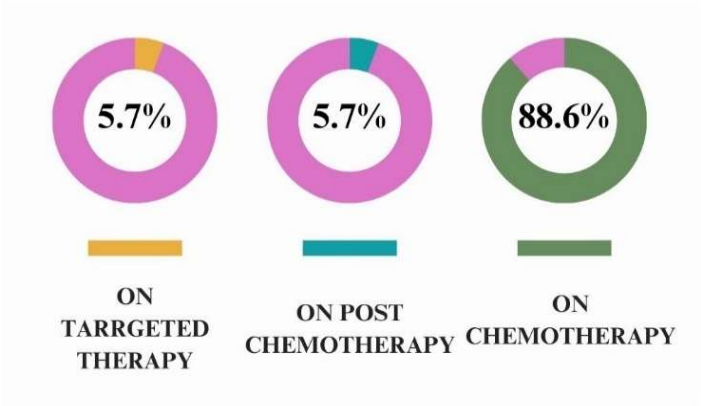

Figure 1.4: Distribution of Current Treatment Taken by the Participants

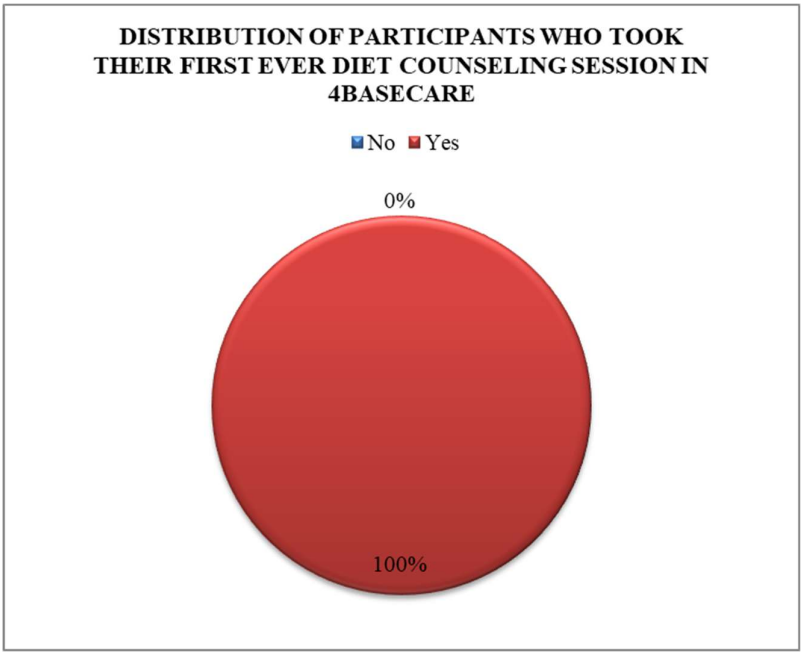

Figure 1.5: Distribution of Participants Who Took Their First Ever Diet Counselling Session in 4basecare

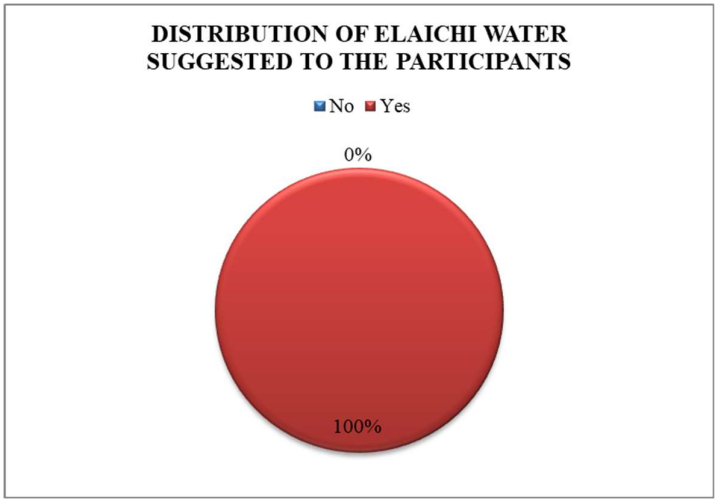

Figure 1.6: Distribution of Elaichi Water Suggested to the Participants

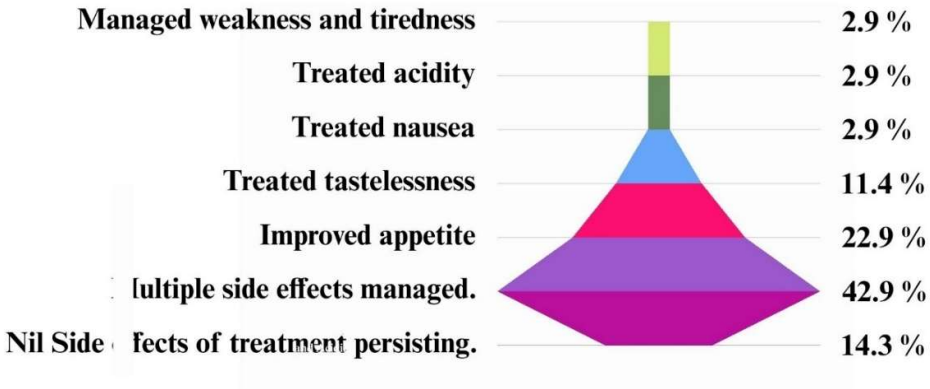

Figure 1.7: Distribution of Impact of Elaichi Water

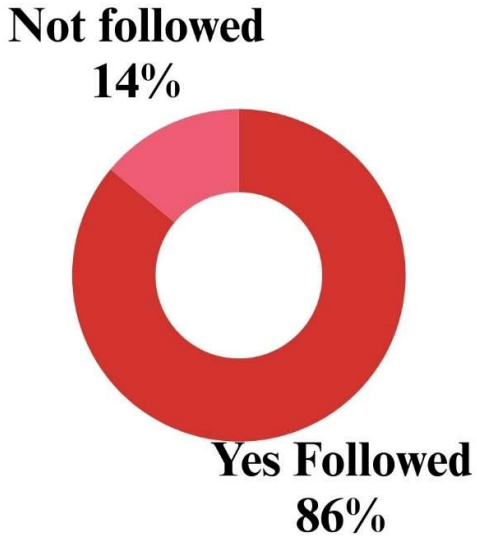

Figure 1.8: Distribution of Participants Who Followed the Diet Prescribed

Figure 1.9: Distribution of Participants Recommending the Diet Counselling Session to Other Cancer Patients

Table 2: Distribution of Food Habit of the Participant

VARIABLE	FREQUENCY (n=35)	PERCENTAGE (%)
Vegetarian	10	28.6
Non-Vegetarian	24	68.6
Ovo-Vegetarian	1	2.9
Total	35	100.0

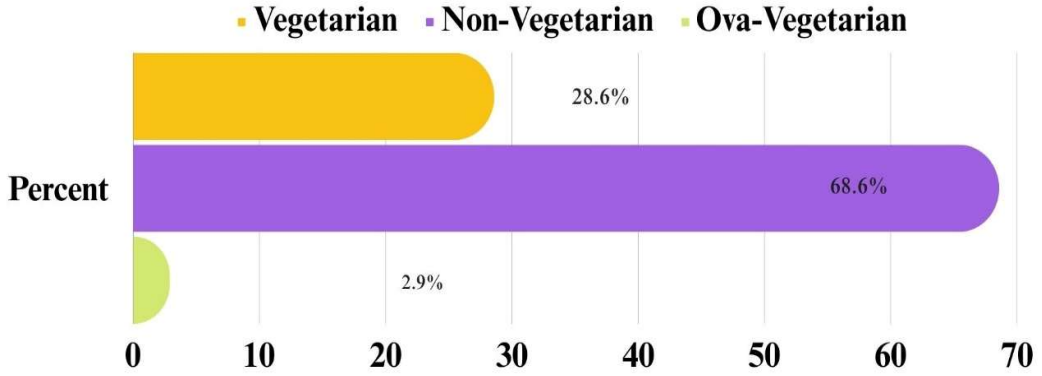

Figure 2.1: Distribution of Food Habit of the Participant

Table 3: Distribution of Different Type of Dietary Requirement of the Participants

VARIABLES		FREQUENCY (n=35)	PERCENTAGE (%)
IRON RICH DIET REQUIREMENT	YES	34	97.1
	NO	1	2.9
NEUTROPENIC DIET REQUIREMENT	YES	7	20
	NO	28	80
COMORBIDITIES MANAGEMENT DIET REQUIREMENT	YES	16	45.7
	NO	19	54.3

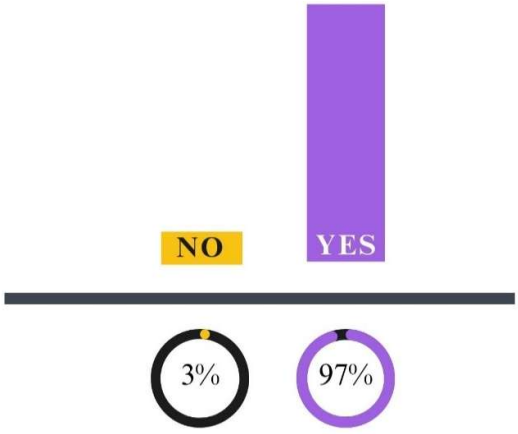

Figure 3.1: Distribution of Participants in Need of Iron Rich Diet Chart

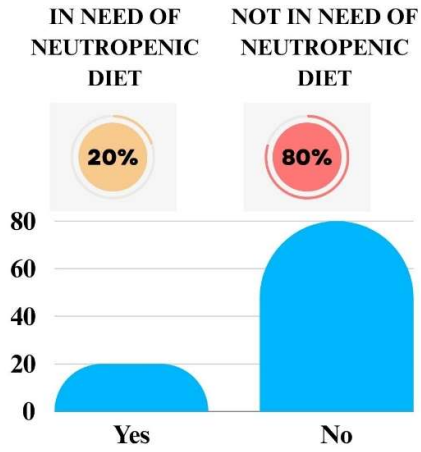

Figure 3.2: Distribution of Participants in Need of Neutropenic Diet Chart

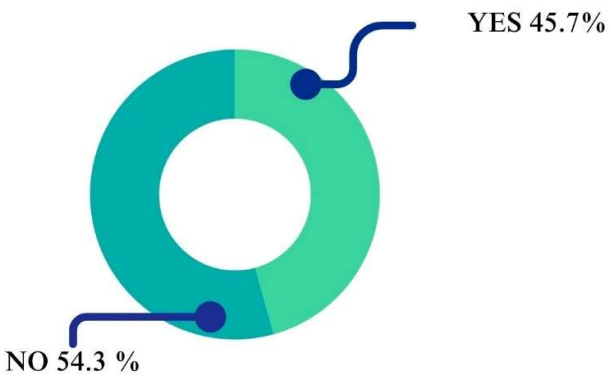

Figure 3.3: Distribution of Participants Needed Comorbidities Management Chart

Table 4: Relation Between Type of Diet and BMI of the Participants

VARIABLE		BMI of the patient (n=35)				
		Underweight	Normal weight	Overweight	Obese	Total
Current Diet practice of the patient (n=35)	Vegetarian	3	4	2	1	10
	Non-Vegetarian	2	8	8	6	24
	Ovo-Vegetarian	0	1	0	0	1
Total		5	13	10	7	35

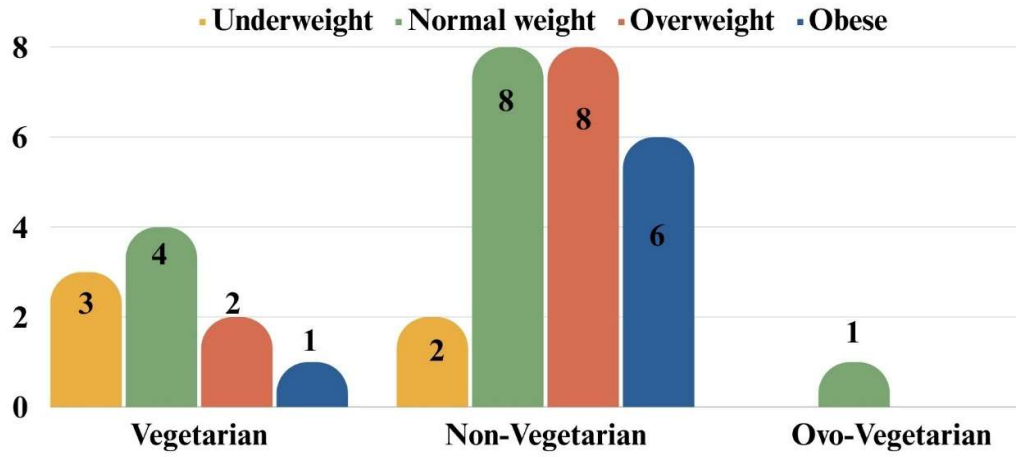

Figure 4.1: Distribution of Relation Between Type of Diet and BMI of the Participants

Table 5: distribution of Side Effects Faced by the Participants in Relation to the Treatment Taken

Side effects faced by patients realised in relation to Current treatment of the patient Crosstabulation					
		Current treatment of the patient			
		On Chemotherapy	Post Chemotherapy	On Target Therapy	Total
Side effects faced by patients	Weakness and tiredness	1	0	0	1
	Acidity	1	0	0	1
	Nausea	2	0	0	2
	Tastelessness	5	0	0	5
	Loss of Appetite	7	2	1	10
	Multiple side effects .	15	0	1	16
Total		31	2	2	35

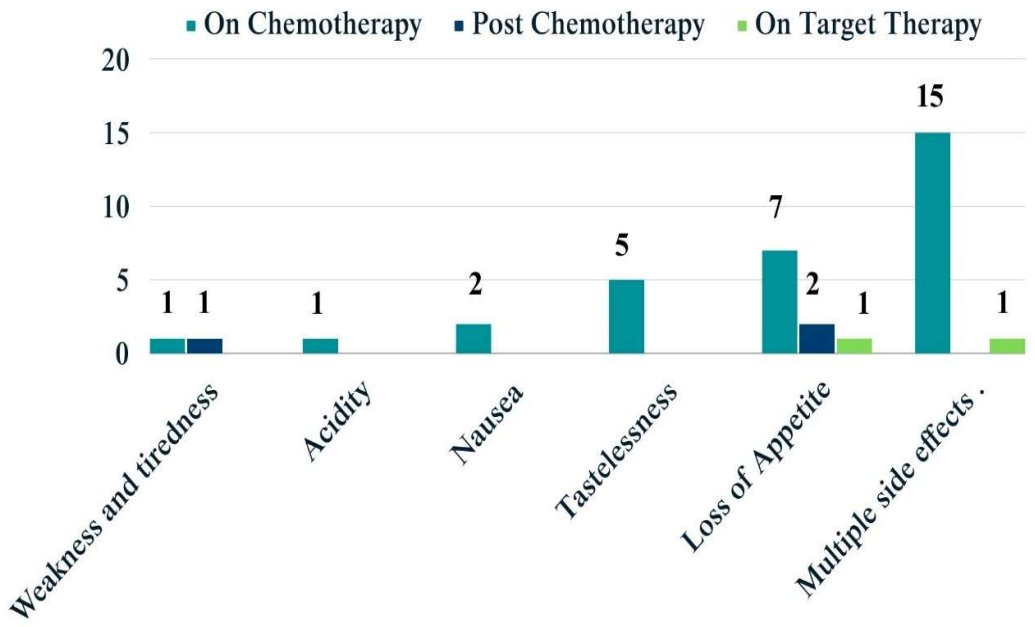

Figure 5.1: Distribution of Side effects faced by the Participants in Relation to the Treatment Taken

Table 6: Distribution of Impact of Elaichi Water in Managing Side Effects in Relation to the Cancer Treatment

Impact of elaichi water the patient realised *in relation to Current treatment of the patient Crosstabulation					
		Current treatment of the patient			
		On Chemotherapy	Post Chemotherapy	On Target Therapy	Total
Impact of elaichi water the patient realised	Managed weakness and tiredness	1	0	0	1
	Treated acidity	1	0	0	1
	Treated nausea	1	0	0	1
	treated tastelessness	4	0	0	4
	Improved appetite	5	2	1	8
	Multiple side effects managed.	14	0	1	15
	Nil, Side effects of treatment persisting.	5	0	0	5
Total		31	2	2	35

Taken

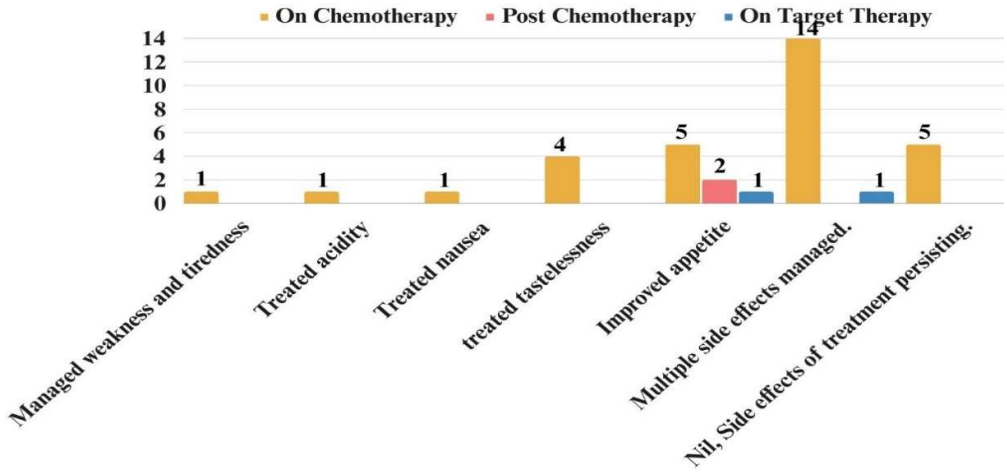

Figure 6.1: Distribution of Impact of Elaichi Water in Managing Side Effects in Relation to the Cancer Treatment Taken

Table 7: Correlation Between Impact of Elaichi Water and Side Effect Related Medicine Taken

Impact of elaichi water the patient realised in relation to Side effect related medicine intake Crosstabulation					
		Side effect related medicine intake			
		Not Disclosed	Yes	No	Total
Impact of elaichi water the patient realised	Managed weakness and tiredness	1	0	0	1
	Treated acidity	1	0	0	1
	Treated nausea	0	0	1	1
	Treated tastelessness	2	1	1	4
	Improved appetite	3	2	3	8
	Multiple side effects managed.	7	2	6	15
	Nil, Side effects of treatment persisting.	1	3	1	5
Total		15	8	12	35

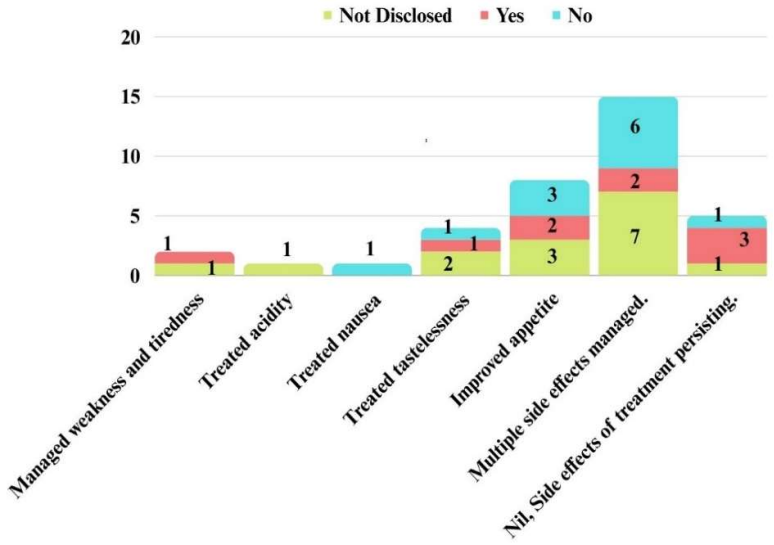

Figure 7.1: Correlation Between Impact of Elaichi Water And Side Effect Related Medicine Taken

SUMMARY

The present study entitled "**Impact of Elaichi (Elettaria Cardamomum) Water in Effective Side Effect Management during Cancer Treatment among Adult and Middle Adult Lung Cancer Individuals enrolled with 4basecare**" is concluded as follows:

- Impact of elaichi water in management of side effects among lung cancer patients was assessed which also includes socio – demographic details, anthropometric measurements, diet type, treatment status, comorbidities, CBC status, current side effects of treatment and information on medicines taken to cope with side effects.
- Socio – demographic profile of 35 subjects includes 13 females and 22 males. Among them 28 subjects (80%) were under middle adulthood and 7 (20%) of them were in adulthood.
- The Body Mass Index of the selected 35 subjects shows that 37% (n=13) of the subjects fell under the normal category, 29% (n=10) subjects were overweight, 20% (n=7) were obese and 14% (n=5) fell under the underweight category.
- Treatment status of the subjects showed that 31 subjects were on chemotherapy, 2 of them were on Targeted Therapy (TT) and 2 of the subjects were on post chemotherapy condition. Out of 35 subjects 8 were taking medications for side effect management and 12 were not taking medications for the same.
- It is clear that diet counselling with 4basecare was the first ever counselling for all the subjects. All the 35 subjects were suggested to take elaichi water.
- Out of 35 subjects 24 of them were non-vegetarian, 10 were vegetarian and 1 subject was following an ovo-vegetarian type of diet. Among the 35 subjects 7 of them required a neutropenic diet and 34 subjects were suggested to take an iron rich diet. Only 30 subjects followed the prescribed diet recommendations. 97% of the subjects required a side effect management diet.
- Out of 35 subjects 16 of them had comorbidities for which respective comorbidity management diet chart was provided, 19 subjects did not have any comorbidities and hence did not require any special diet recommendations.
- Cancer treatment causes several side effects like 1 participant was facing weakness and tiredness, 1 participant

had acidity, 2 participants were experiencing nausea, 5 participants were facing tastelessness, 7 participants were facing loss of appetite and 15 participants had multiple side effects.

- Relation between treatment, diet status and impact of taking elaichi water shows that it helped 1 participant in managing weakness and tiredness, 1 of them overcome acidity, it helped 1 participant to manage nausea, 4 subjects were helped to treat tastelessness, improved appetite for 8 subjects, it helped 15 subjects to manage multiple side effects and 5 of them did not have any changes since they did not follow the recommended diet. In comparison with medications taken to manage side effects it shows that 5 subjects were taking medications which also had a possible positive impact on controlling the side effects of the treatment.
- Generally, nausea and tastelessness prevails for 3 to 5 days post chemotherapy treatment. On discussion with the subjects, it clearly shows that these side effects were reduced to 1 or 2 days. Vomiting episodes of the subjects were also reduced to 1 or 2 times a day from more than 4 times.
- On the comparison of age, gender, BMI, co-morbidities and diet type with the intake of elaichi water we can conclude that the elaichi water had a positive impact on all the perspectives.

CONCLUSION

It is observed here that the diverse dietary patterns among lung cancer individuals undergoing treatment contributed to significant side effects and the inclusion of cardamom water in their diet patterns had a substantial impact on managing those side effects.

LIMITATIONS

The limitation of the study was that a descriptive analysis was done instead of an analytical statistics since the sample size (n=35) was very less. This was also because study was not taken in all types of cancer patients.

RECOMMENDATIONS

Sample size should be increased so that analytical statistics can be done to study the correlations. The side effects management using elaichi water can be studied in all types of cancer. Like cardamom, other spices such as ginger, cloves and cinnamon also contribute in managing side effects during cancer treatment which can also be studied in future.

Conflicts of interest: None declared

Financial disclosures: None declared

REFERENCES

[1] *Nair, K. P. Prabhakaran (2011). Agronomy and Economy of Black Pepper and Cardamom: The "King" and "Queen" of Spices. Elsevier. ISBN 978-0-12-391865-9.*

[2] *https://www.cancer.gov/about-cancer/understanding/what-is-cancer*

[3] *Cárdenas Garza GR, Elizondo Luévano JH, Bazaldúa Rodríguez AF, Chávez Montes A, Pérez Hernández RA, Martínez Delgado AJ, López Villarreal SM, Rodríguez Rodríguez J, Sánchez Casas RM, Castillo Velázquez U, Rodríguez Luis OE. Benefits of Cardamom (Elettaria cardamomum (L.) Maton) and Turmeric (Curcuma longa L.) Extracts for Their Applications as Natural Anti-Inflammatory Adjuvants. Plants (Basel). 2021 Sep 14;10(9):1908. doi: 10.3390/plants10091908. PMID: 34579443; PMCID: PMC8467221.*

[4] *https://stanfordhealthcare.org/medical-clinics/cancer-nutrition-services/managing-side-effects.html*

[5] Goncalves LM, Valente IM, Rodrigues JA. An overview on cardamonin. J Med Food. 2014;17:633–640.

[6] Bhattacharjee S, Rana T, Sengupta A. Inhibition of lipid peroxidation and enhancement of GST activity by cardamom and cinnamon during chemically induced colon carcinogenesis in Swiss albino mice. Asian Pac J Cancer Prev. 2007;8(4):578-582.

[7] Vutakuri, N., & Somara, S. (2018). Natural and herbal medicine for breast cancer using Elettaria cardamomum (L.) Maton. *Int J Herbal Med*, *6*(2), 91-96.

[8] Hudiyawati, D., Devi, A. N., Rosyid, F. N., & Primalia, P. (2022, April). The Effect of Aromatherapy of Cardamom on Chemotherapy Induced Nausea and Vomiting Among Cancer Patients. In International Conference on Health and Well-Being (ICHWB 2021) (pp. 150-155). Atlantis Press

[9] A. Vaidya, M. Rathod, An in vitro study of the immunomodulatory effects of Piper nigrum (black pepper) and Elettaria cardamomum (cardamom) essential oils using a Ahmadi, F., & Yazdandoust, Y. (2020). Use of medicinal herbs in the treatment of nausea and vomiting in pregnancy: A systematic review. *Journal of Advanced Pharmacy Education & Research| Jan-Mar*, *10*(S1), 103.

[10] https://pubmed.ncbi.nlm.nih.gov/8361073/#:~:text=Age%20is%20one%20of%20the,in%20the%20normal%20human%20body.

[11] https://www.nutritionix.com/food/cardamom-pods

[12] Sushila, S., & Rani, S. K. *Textbook of Human Development–A Lifespan Development Approach*. S. Chand Publishing., First edition., 2014

[13] murine macrophage cell line, Am. Int. J. Res. Formal Appl. Nat. Sci. 8 (2014) 18e27