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# The effect of drinking cold water on nausea and vomiting among patient with post-chemotherapy breast cancer

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## ABSTRACT

**Background**: Nausea, vomiting after chemotherapy is still major problem that interferes with the process of treating cancer, especially breast cancer. There are 2 things that can be done to reduce nausea, vomiting, pharmacologically and non-pharmacologically. Drinking cold water is one of the non-pharmacological ways for patients who experience nausea, vomiting after chemotherapy. These actions can reduce acute nausea and vomiting delayed due to chemotherapy
**Purpose**: The purpose of this study was to determine the effect of drinking cold water on nausea and vomiting after chemotherapy in breast cancer patients in RSUP M. Djamil Padang.
**Methods**: This research was a time series. Sampling by consecutive sampling and determination of intervention and control groups by randomization of simple subject allocations. The research sample consisted of 38 respondents, consisting of 19 respondents as an intervention group who were treated with cold drinking water for 3 days and 19 respondents as a control group
**Results**: Testing the difference in the decrease in the average score of nausea and vomiting in the intervention group using the repeated measure ANOVA test. The results showed an average decrease in the intervention group of < 0.001.
**Conclusions**: The conclusion significantly drinking cold water can reduce nausea and vomiting after chemotherapy in breast cancer patients in RSUP M. Djamil Padang. It is recommended that drinking cold water be applied as part of nursing intervention in providing nursing care to patients who experience nausea and vomiting after chemotherapy.

**Keywords**: cold water; chemotherapy; nausea; vomiting

## INTRODUCTION

Breast cancer is the highest cause of death in women. According to WHO, the number of people breast people with cancer as many .522,000 people in 2012, there was an increase in 2015 to as many as 571,000 people. In one of the developed countries with the highest incidence rate in the United States in 2017 there are an estimated 252,710 new cases and about 40,610 women are estimated to die from breast cancer (WHO, 2022).

## *Nursing and Healthcare Practices*

- *Monitoring and companion support should be provided by nurses during the implementation of cold-water drink intervention.*
- *To avoid aspiration, the correct procedure of cold-water drink intervention should be a concern.*
- *cold-water drink could be an effective and affordable intervention to redure nausea and vomiting among patient post-chemoteraphy.*

Indonesia is also a country that contributes to the number of sufferers as many as 61,682 people, one of which is west Sumatera area 2,285 people (Kemenkes RI, 2015).

In West Sumatera, RSUP M. Djamil Padang is one of the hospitals that became a referral center for several regions (Jambi, Bengkulu, Padang and Pekanbaru). Based on data on the number of breast cancer patients at M. Djamil Padang Hospital in 2014 (3,323 patients), 2015 (1,225 patients), 2016 (4,241 patients), in 2017 from January to September 1,721 patients. Outpatients who underwent chemotherapy in 2016 (614 people) and in 2017 from January to September as many as 510 people. The average breast cancer patient who was immunotherapy in 1 month was approximately 56 people.

Breast cancer is a disease with a disorder of growth of cells in the air out of control. This disease requires immediate action so as not to spread or get worse. Some activities can be done: surgery, chemotherapy, radiotherapy, and hormone therapy (Widayati et al., 2022). Chemotherapy is one of the most widely used and effective ways to overcome cancer because it kills cancer cells until they are not left.

In general, chemotherapy causes nausea and vomiting. Nausea and vomiting varies in severity, depending on the type of medication used. High and moderate doses of the drugs are cisplatin and doxorubicin, which can cause nausea and vomiting in 70% - 90% of patients) (Bayo et al., 2012; Hosseini et al., 2016). Nausea is part of the body's defence against toxins or toxins that enter. Vomiting is a protective reflex to expel or remove toxins from the intestines before absorption (Singh et al., 2016).

Nausea and vomiting after chemotherapy is categorized into acute, delayed, and anticipatory. Acute vomiting nausea is a symptom of nausea and vomiting that occurs less than 24 hours after chemotherapy. Delayed nausea is the onset of nausea symptoms of vomiting after 24 hours to 6 days after chemotherapy. Anticipatory is a symptom of nausea and vomiting that occurs before chemotherapy (Aapro, 2015). Several factors involved in the aetiology of nausea and vomiting include therapies such as opioid therapy, metabolic abnormalities, gastrointestinal irritation, increased intraatomic pressure caused by the tumor itself or by the presence of metastasis and treatment or neurosurgery. Nausea and vomiting relies heavily on the stimulation of the vagal afferent nerve (Aapro, 2015). Then, the substance cholecystokinin and, most importantly, *5-hydroxytryptamine* (5-HT3) are separated from enterochromaffin cells found in the gastrointestinal mucosa in response to chemotherapy. These mediators bind to 5-HT3 and *neurokinin-1* (NK1) receptors located at the afferent nerve endings of the vagal (Singh et al., 2016).

The impact if nausea and vomiting occurs prolonged in fear that there will be dangerous conditions, namely dehydration, worsening of nutritional status, decreased quality of life and physical function), disruption of treatment schedule (20% delayed treatment), reduced compliance, 30-40% of patients reported uncontrolled nausea and frequent vomiting, increased cost of treatment and loss of workdays; (Potter et al., 2016). In line with research Clark Snow et al., (2018) that says there are still 20% of patients experiencing changes in chemotherapy due to nausea, vomiting, and reporting visits to the emergency department / Hospital due to Uncontrolled nausea and vomiting.

Nausea and vomiting can be overcome with pharmacological and non-pharmacological therapy (Greenlee et al., 2017). Pharmacological treatment is given antiemetic. Non-pharmacological, according to American Cancer Society (2018a), recommends one of the treatments, namely cold drink water, dry bread, and yogurt. Cold water is the most preferred and chosen drink because the type of water does not contain many risks or counter-indications to other substances (Muaris, 2014).

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The review (Eccles et al., 2013) said that cold rations in the mouth could provide a pleasant taste; related to thirst and refreshing effects. This is supported by research Pangesti & Sofiani (2016) by comparing three types of cold drinks with a temperature of 10-150C in 30 breast cancer patients who have undergone chemotherapy. Where divided into three groups with sweetened iced tea drinks, melon juice, and milk ice. This study explained that cold drinks provide a pleasing effect, open up an appetite, and stabilize emotions. In general cold beverages cause the body's response to vasoconstriction so that there is no excessive expenditure of calories. This is reinforced by Adams, (2014) that using a temperature of 150C in beverages affects fluid consumption in maintaining optimal hydration.

Drinking water on an empty stomach can pass through the colon and into the bloodstream within 5 minutes (especially if the water is more excellent than warm water). But if drinking water is done simultaneously as eating, you may have to wait up to 45 minutes before the water enters the intestines because the stomach must digest food first. Overall it takes an average of 5 minutes to a total of 120 minutes for the water to fully absorb into the bloodstream since drinking (Maughan et al., 2016).

Drinking cold water also affects endorphins and serotonin, which act as pleasure (Eccles et al., 2013). Endorphins and serotonin are receptors that the stimulate chemoreceptor trigger zone (CTZ) and the vomiting center (Gordon et al., 2014). The advantages of drinking cold water are that one of them is safe. But the need to drink cannot be equated. Research Cho & Yoo (2015) explained that the arrangement in the amount of drinking water could not be determined because each individual is different adjusted to the needs of the body. Giving cold water drinking has the same content as bottled water that is following standards. The water we drink quenches and benefits the body as the main blood component that supplies cells with oxygen and nutrients and carries food-waste out of the body.

The initial study on May 29, 2018, Chemotherapy Room RSUP M. Djamil Padang. All ten breast cancer patients complained of moderate and severe nausea and vomiting after chemotherapy. Four people never wanted to continue chemotherapy for the seven patients who experienced nausea and vomiting. A total of 3 patients experienced repeated hospitalization due to nausea and vomiting during the week; patients were lazy to drink eat and felt that chemotherapy aggravated their health problems.

Based on the results of the researcher's interview with the Chemotherapy Room nurse, it was obtained that so far, to overcome nausea given antiemetic therapy (collaborative action) has never been applied treatment. Non-pharmacological such as drinking cold water. Based on this, researchers conducted a study on the effect of drinking cold water on reducing vomiting nausea after chemotherapy in breast cancer patients at RSUP M. Djamil Padang.

## METHODS

### Design

This study uses a quantitative approach with a quasi-experimental design with time series. This study will divide the two groups into a treatment group and a control group as a comparison. Each treatment group will be carried out pretest-posttest, and in the control group will also be measured. After treatment in one group will be measured the results of the intervention as a form of the magnitude of the

**Table 1.** Characteristics of respondents (n=38)

| Variable | Intervention (n=19) | | Control (n=19) | |
|---|---|---|---|---|
| | n | % | n | % |
| Age | | | | |
| Early Adult | 4 | 21.1 | 6 | 31.6 |
| Late Adult | 5 | 26.3 | 5 | 26.3 |
| Early Elderly | 10 | 52.6 | 8 | 42.1 |
| Education | | | | |
| Low | 4 | 21.1 | 6 | 31.6 |
| High | 15 | 78.9 | 13 | 68.4 |
| Cancer Stage | | | | |
| II | 8 | 42.1 | 7 | 36.8 |
| III | 11 | 57.9 | 12 | 63.2 |
| Chemotherapy Cycle | | | | |
| Cycle 1 | 5 | 26.3 | 3 | 15.8 |
| Cycle 2 | 3 | 15.8 | 4 | 21.1 |
| Cycle 3 | 3 | 15.8 | 3 | 15.8 |
| Cycle 4 | 1 | 5.3 | 3 | 15.8 |
| Cycle 5 | 3 | 15.8 | 3 | 15.8 |
| Cycle 6 | 4 | 21.1 | 3 | 15.8 |

**Table 2.** Average nausea score vomiting measurement of 12 hours up to 72 hours measurement of breast cancer patients in intervention group (n=19)

| Measurement | Mean | SD | Min-Max |
|---|---|---|---|
| 12 hours | 18.26 | 2.130 | 14-22 |
| 24 hours | 14.00 | 2.000 | 10-18 |
| 36 hours | 12.05 | 1.545 | 10-15 |
| 48 hours | 9.84 | 1.864 | 7-13 |
| 60 hours | 6.37 | 1.802 | 3-10 |
| 72 hours | 3.05 | 1.471 | 0-6 |

**Table 3.** Average vomit nausea score measurement of 12 hours up to 72 hours measurement of sixth breast cancer patient in the control group (n=19)

| Measurement | Median | Min-Max |
|---|---|---|
| 12 hours | 20 | 12-25 |
| 24 hours | 20 | 11-26 |
| 36 hours | 19 | 15-22 |
| 48 hours | 19 | 14-26 |
| 60 hours | 21 | 15-28 |
| 72 hours | 18 | 3-22 |

influence.

## Sample and Setting

The sample is part or representative of the population studied (Dahlan, 2017). Research subjects are selected based on certain eligibility criteria (inclusion and exclusion criteria) in experimental research. Inclusion criteria consists of patients aged over 26-55 years, stage II-III, cooperative, experiencing acute or delayed nausea and vomiting Able to know place, person and time Patient able to write or read using chemotherapy drug doxorubicin by infusion Patients who are in the city field, this is to facilitate monitoring and observation Minimum use of antiemetics ondansetron, dexamethasone and ranitidine: to compare the use of antiemetics used by patients and in field studies the antiemetics that are often given are these drugs. Chemotherapy with usual emetogenic effect: 8 mg or 0.15 mg/kg BW by slow Intra venous (IV) injection. Chemotherapy with severe emetogenic effect: 8 mg IV or Intramuscular (IM) injection before chemo Maintenance dose can be given by infusion at 1 mg/hour for 24 hours , or by injection of 8 mg given 4 hours and 8 hours after the initial dose. Exclusion Criteria: Patients with other cancers such as digestive, liver, or pancreatic because patients with this disease are more prone to nausea, vomiting, experiencing dizziness, vertigo, Stage IV (four), previous experience of emesis that was not well controlled patients with previous experience of nausea and vomiting were more likely experience nausea and vomiting in response to a new treatment with monotherapy. The extent of any previously experienced side effects is very important. Suppose that emetic control is sufficient during previous chemotherapy. In such cases, the percentage of patients who did not develop emesis at subsequent chemotherapy was more significant than those whose last antiemetic treatment was insufficient. Gender and age are among the most important prognostic factors of nausea and vomiting; women are more likely to vomit nausea than men. Age was also a significant risk factor, as younger patients (<50 years) experienced more severe nausea and vomiting than older patients (>65 years). Alcohol intake, history of light alcohol use, patients with a history of consuming 0.1 ml of alcohol per day with a history of the last one year. Patients prone to motion sickness were responsible for motion sickness and reported greater frequency, severity, and duration of nausea and vomiting after treatment: anxiety, previous history of chemotherapy-induced emesis, motion sickness, emesis in the previous pregnancy. Consecutive sampling is the method used in sampling.

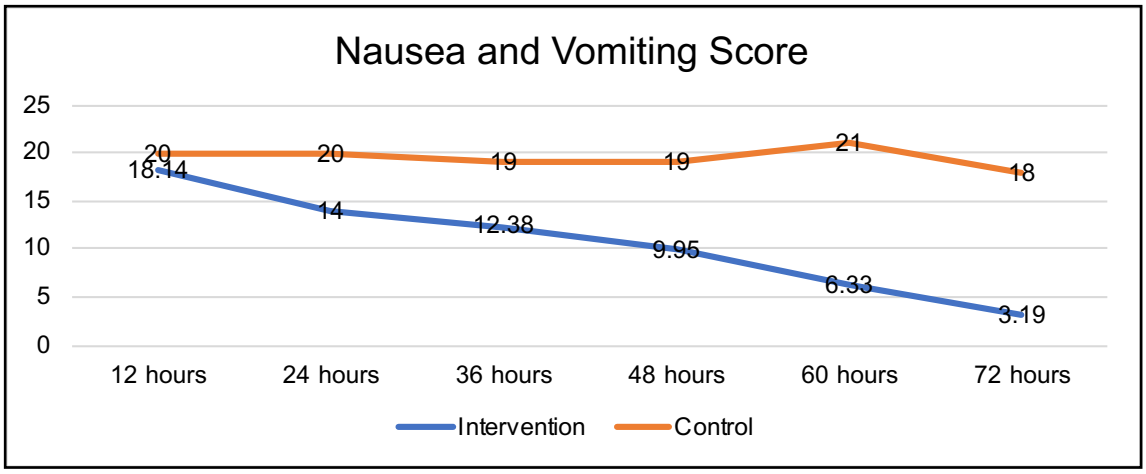


**Figure 1.** Vomiting score on intervention and control groups

## Instruments

Nausea and vomiting in this study was measured using a questionnaire that is Rhodes index nausea, vomiting, and retching (INVR). This INVR questionnaire consists of 8 questions, where there are eight questions to measure nausea and vomiting with 5 Likert scales that are 0-4. The patient will fill out the questionnaire after being given a cold drink. The questionnaire will be evaluated six times per 12 hours, through direct observation and over the phone to see if there is a reduction in nausea and vomiting or not. In this study, researchers used Rhodes' INVR questionnaire. This questionnaire is a standard questionnaire widely used in studies related to vomiting nausea, so researchers do not conduct validity and reliability tests again. The validity test results obtained all valid question items (r>0.88) and reliability test results with a value of r Alpha (0.97), which is greater than the r table. Researchers use a transverse temperature measurement tool provided by the researcher himself to measure the water drinking temperature of 150C. How to check before drinking is to measure the temperature of the drink.

## Intervention

Researchers selected respondents who fit the inclusion criteria. 1) Researchers determined the control group and the intervention group. Parents/companions from the intervention group were briefed on the administration of cold water, while the control group was not given the act of providing cold drinking water. 2) Researchers provided information about the study and asked for the willingness of the intervention group's companion/parent/child to engage in the study, give a drink of cold water, monitor and report nausea and vomiting patients. 3) Researchers are welcome to sign the consent sheet of both the intervention group and the control group. 4) Researchers began filling in the data while in the hospital. 5) Before chemotherapy began, researchers explained how to give water to respondents and asked about food/ beverage cooling facilities at home. If there are no researchers, facilitate the place and ice cubes (coolers) and measuring cups (measuring plastic). Researchers asked again how to provide interventions that had been taught to escorts. 6) Researchers explained the provision of cold water drinking, the purpose and intervention, and how to fill out questionnaires. 7) Researchers conducted a TTV examination and calculated the fluid requirement. 8) Make sure the patient has a beverage cooling facility or not. If there is no loaned ColdBox or the patient has a closed thermos at home. 9) Administration begins when nausea subsides (first nausea) after chemotherapy. Drinks temperature of 15$^0$C (measured with a king tool) is given 3 ml / 1 spoon if the patient feels sickness has begun to subside, increase the amount of fluid. 10) If the patient is going to eat, avoid drinking for 15-30 minutes before and after eating. 11) After chemotherapy, researchers gave drinking cold water. Respondents are encouraged to drink at least 24 hours as much as the number of patients needs to be measured. 12) After the first 12 hours from the start of the drinking is done fill out the first questionnaire, then the next 12 hours fill out the second questionnaire, and so on until filling out the sixth questionnaire. 13) Researchers gave a vomit nausea instrument

**Table 4.** Effect of drinking cold water on nausea and vomiting after chemotherapy in breast cancer patients (n=19)

| Measurement | Mean | SD | *p* |
|---|---|---|---|
| 12 hours | 18.26 | 2.130 | < 0.001 |
| 24 hours | 14.00 | 2.000 | |
| 36 hours | 12.05 | 1.545 | |
| 48 hours | 9.84 | 1.864 | |
| 60 hours | 6.37 | 1.802 | |
| 72 hours | 3.05 | 1.471 | |

**Table 5.** Decrease in average vomiting nausea score after chemotherapy patients breast cancer in the intervention group (n=19)

| Measurement | Mean Difference | 95% CI | *p* |
|---|---|---|---|
| 12 hours - 24 hours | 4.143 | 3.053 - 5.232 | < 0.001 |
| 12 hours - 36 hours | 5.762 | 4.715 - 6.809 | < 0.001 |
| 12 hours - 48 hours | 8.190 | 6.998 - 9.383 | < 0.001 |
| 12 hours - 60 hours | 11.810 | 10.432 - 13.187 | < 0.001 |
| 12 hours - 72 hours | 14.952 | 13.629 - 16.275 | < 0.001 |
| 24 hours - 36 hours | 1.619 | 0.738 - 2.500 | 0.001 |
| 24 hours - 48 hours | 4.048 | 2.919 - 5.176 | < 0.001 |
| 24 hours - 60 hours | 7.667 | 6.477 - 8.857 | < 0.001 |
| 24 hours - 72 hours | 10.810 | 9.827 - 11.792 | < 0.001 |
| 36 hours - 48 hours | 2.429 | 1.607 - 3.250 | < 0.001 |
| 36 hours - 60 hours | 6.048 | 5.166 - 6.929 | < 0.001 |
| 36 hours - 72 hours | 9.190 | 8.319 - 10.062 | < 0.001 |
| 48 hours - 60 hours | 3.619 | 2.617 - 4.621 | < 0.001 |
| 48 hours - 72 hours | 6.762 | 5.725 - 7.799 | < 0.001 |
| 60 hours - 72 hours | 3.143 | 2.511 - 3.775 | < 0.001 |

(Rhodes INVR) to a companion, explained how to fill it, and provided the stationery needed. 14) Researchers monitored nausea and vomiting via phone and home visits on the third day after nausea and vomiting began and examined instruments performed by a companion.

## Data Analysis

Anova Repeated Test statistical test is used to test the mean difference over two normal distributed paired groups (Dahlan, 2017). To find out the effect, the Repeated Anova Test with a 5% error rate was used to see the impact and difference in vomit nausea score in the group of cold water drinking. Testing assumptions by taking pretest and posttest data on the last measurement.

## Ethical Consideration

This study uses humans as subjects, and it must not be contrary to ethics, the purpose of the research must be ethical, meaning that the rights of respondents must be protected. We received ethical approval from RSUP Dr. M. Djamil Padang with number 116/ KEPK/2019. In this study, the steps taken after obtaining the researcher's approval were asking permission to explain the purpose and benefits of the researcher and then asking for the willingness of the respondents to participate in the study, ethical issues in this study would be implemented such as research consent sheet, anonymous, confidentiality, privacy, fair treatment, self-determination.

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**Table 6.** Average vomiting nausea score after chemotherapy in breast cancer patient control group (n=19).

| Measurement | Median | Min-Max | *p* |
|---|---|---|---|
| 12 hours | 20 | 12-25 | 0.144 |
| 24 hours | 20 | 11-26 | |
| 36 hours | 19 | 15-22 | |
| 48 hours | 19 | 14-26 | |
| 60 hours | 21 | 15-28 | |
| 72 hours | 18 | 3-22 | |

**Table 7.** Comparison of average vomiting nausea score between intervention and control group (n = 38).

| Variable | Vomiting Nausea Score | | *p* |
|---|---|---|---|
| | Mean | SD | |
| Intervention | 12.21 | 1.134 | < 0.001 |
| Control | 19.53 | 2.170 | |

## RESULTS

The intervention group was more in the early elderly age, namely 10 people (52.6%), more than half of highly educated 15 people (78.9%), more than half of stage III as many as 11 people (57.9%) and more in chemotherapy cycle 1 as many as 5 people (26.3%). Meanwhile, in the control group, more respondents were in the early elderly, 8 people (42.1%), more than half of higher education 13 people (68.4%), more than half of stage II as many as 12 people (63.2%) and many in the second cycle of chemotherapy, 4 people (21.1%) (Table 1).

Table 2 showed average nausea and vomiting in the highest intervention group on the 12-hour measurement (18.26 with SD 2,130) and the lowest on the 72-hour measurement (3.05 with SD 1.471).

Table 3 showed the average nausea and vomiting in the highest intervention group on the 60-hour measurement (21) with a min-max value (15-28) and the lowest on the 72-hour measurement (18) with a min-max value (3-22).

Based on figure 1, there was a decrease from the 12-hour measurement to 72 hours, while the control group saw an increase in the 60-hour measurement, a 36-hour measurement.

Based on table 4 there was an average decrease from the 12-hour measurement (18.26 ± SD 2.130), the 24-hour measurement (14.00 ± SD 2.000), the 36-hour measurement (12.05 ± SD 1.545), 48-hour measurement (9.84 ± SD 1.864), measurement (6.37 ± SD 1.802) and 72-hour measurement (3.05 ± SD 1.471). Further analysis showed an average decrease between 12-hour measurements, 24-hour measurements, 36-hour measurements, 48-hour measurements, 60-hour measurements, and 72-hour measurements by cold water drinking interventions or in other words significantly giving cold water drank an effect on reducing vomiting nausea scores of p < 0.001.

Based on the table 5 the first measurement compared to the second occurred an average decrease in score of 4.143. The first measurement compared to the third occurred an average score reduction of 5.762. The first measurement compared to the fourth occurred an average decrease in score of 8.190. The first measurement compared to the fifth occurred an average score reduction of 11.810.

The first measurement compared to the sixth occurred an average decrease in score of 14.952. The second measurement compared to the third occurred an average decrease in score of 1.619. The second measurement compared to the fourth occurred an average decrease in score of 4.048. The second measurement compared to the fifth occurred an average score reduction of 7.667. The second measurement compared to the sixth occurred an average score reduction of 10.810.

The third measurement compared to the fourth occurred an average score of 2.429. The third measurement compared to the fifth occurred an average score reduction of 6.048. The third measurement compared to the sixth occurred on average a score reduction of

9.190. The fourth measurement compared to the fifth occurred an average score reduction of 6.762. The fourth measurement compared to the sixth occurred an average score reduction of 3.143. The difference in the decrease in the score is real because the $p < 0.05$.

Based on table 6 obtained median data in the control group vomit nausea score measurement 12-24 hours by 20, measurement score 36-48 hours by 19, measurement score 60 hours by 21, and measurement 72 hours by 18. Further analysis showed no decrease between the 12-hour measurement, the 24-hour measurement, the 36-hour measurement, the 48-hour measurement, the 60-hour measurement, and the 72-hour measurement in the control group of $p = 0.144$.

Based on table 7 shows the average difference in vomiting nausea in the group given drinking cold water with no done, namely $p < 0.001$ (<0.05).

## Discussion

The study results obtained similar to the previous Pangesti & Sofiani (2016) showed the score decreased before the lowest giving was four and the highest was 7. And it is known that the amount of nausea and vomiting after giving a cold drink 10-15ºC the lowest is one and the highest is 3, as well as the value of $p < 0.001$.

Giving cold drinks is more quickly absorbed in the body than warm water. It helps in rehydration to provide a fresh taste and open appetite and stabilize emotions in overcoming nausea and vomiting. By Aapro (2015) nausea and vomiting often occurs after chemotherapy is done. Nausea and vomiting or another name is nausea and vomiting, is nausea and vomiting that can not be controlled and can affect the therapeutic response to the cure rate of cancer. The reflex response to vomiting by spouting the stomach's contents through the mouth, usually starting from the sensation of nausea. Where nausea is a disorder of the central nervous system receiving and processing emetic stimuli (Potter et al., 2016).

This system produces efferent signals sent to several organs and tissues that eventually result in vomiting. The vomiting method does not depend on a unique area but involves several areas of the body (Babic & Browning, 2014). These areas are the trigger zone of the chemoreceptor and vomiting center in the brain, as well as vagal afferent pathways and enterochromaffin cells in the gastrointestinal system (Silbernagl & Lang, 2016).

Based on Singh et al., (2016) explained that nausea and vomiting is the primary and most crucial response after administering chemotherapy agents, both acute and emesis phases. And it was concluded that there was no association between adherence in taking antiemetics and the reaction to nausea and vomiting. Non-pharmacological therapy can be one of the companions in reducing the problem of nausea and vomiting in patients after chemotherapy. One of them is drinking cold water recommended by several cancer associations (American Cancer Society, 2018a; Greene et al., 2017; Tsuji et al., 2018). This study is one of the good ways to vomit nausea patients after chemotherapy.

Dehydration can affect the brain's work, where 75% of the brain is water. Maughan et al., (2016) that the temperature of drinks has been shown to increase fluid consumption. Low fluid intake can even affect cognition and mood (Greenlee et al., 2017). The cold effect provided also causes a pleasing effect. Endorphins and serotonin influence this pleasure. In nausea, vomiting serotonin plays a role in the central meaning of vomiting. If there is a decrease in rations against serotonin, then nausea and vomiting will also have an effect (Navari, 2016; Newman, 2017; Pangesti & Sofiani, 2016).

Water enters through the body the way we consume it. About 0.5 litters of water are produced daily. Water intake from drinking can vary within an extensive limit of 0.5 litters – 15 litters per day. Water disappears from the body through evaporation, vomiting urine, and others. When the state of vomiting, the body will sweat and increase body temperature due to the vomiting expenditure so that the centre of the brain works to control all activities of the body.

The ideal temperature may be culturally conditioned, but more water is consumed at a temperature of 5ºC–15ºC (Maughan et al., 2016) explains that dehydration can negatively impact fluid activity and balance. Drinking during exercise has been shown to improve performance during exercise. The results of Backes & Fitzgerald, (2016) supported this study using cold temperatures. A temperature of 150C makes the intake of fluids higher (optimal hydration level); this temperature is highly recommended. So from previous research, we can make it a reference where with spoiled hydration, the body can maintain and increase the activity of patients who experience nausea

and vomiting.

In an overview of the observation sheet in the intervention group, the amount of fluid entered was monitored by the planned target. Monitoring carried out by the family is by meeting the needs that have been set (Wulandari et al., 2022). The results of monitoring the intake of incoming fluids are obtained from the drink given and metabolic water obtained directly from the patient's body. At the overall output, the highest amount of vomiting is 600 cc and decreases to the end of the measurement. The patient's intake control was also seen from drinking water and water metabolism on the observation sheet. The number of vomiting patients reached 860 cc.

On the observation sheet, nausea and vomiting was found above 18.00 WIB after 6 - 8 hours. This is by Aapro (2015) Acute CINV, acute nausea, and vomiting occur within minutes to a few hours after receiving chemotherapy and usually do not last more than 24 hours. Symptoms typically reach a maximum intensity of 5 - 6 hours after receiving chemotherapy.

Nausea and vomiting is an unwanted thing undergoing chemotherapy and an unavoidable something. Compliance in pharmacological therapy is felt to have not eliminated complaints of vomiting nausea. Drinking cold water is a simple way that can help reduce nausea and vomiting. Drinking overcomes dehydration caused by nausea and vomiting.

At the time of this study, several things were found, such as the fear of drinking water with cold temperatures. Opinion from some respondents, that hard water can cause ulcers to recur. Thus, nausea or vomiting that exists is caused by induction from chemotherapy and the psychic patient himself.

Based on the results of research between confounding variables (age, education, stage, and cycle of chemotherapy) statically not obtained an association with vomiting nausea, namely the value of p = 0.308 (> 0.005), but in the researchers that from several confounding variables contributed to the incidence of nausea and vomiting. Based on age, old age is when there are changes in digestive function and the body's response to incoming ingredients. Education affects the level of understanding and knowledge. The stage is influential because of the amount of dose given to the patient and the cycle of chemotherapy affects. After all, the period of average cells returns.

In the results of research conducted by Singh et al., (2016), his study found an average age of 49 years or the same as the elderly early. Supported by the results of the (Moradian et al., 2014), which took actions aimed at managing vomiting nausea in the acute and delayed phase, the study reported data on the age of respondents at an average age of 49 years (early elderly).

In line with research conducted by Rahmatya et al., (2015) saw the relationship of age with the breast cancer pathology clinic picture in the Surgical Section of M. Djamil Padang Hospital. The study results found that most patients were over 40 years (78.3%) or had an average of 46.87 years. The risk factor for breast cancer is one of them is age factor. Age <65 years and can increase up to 80 years. Another age-related factor is a personal history of early-stage breast cancer at age <40 years (American Cancer Society, 2018b).

This is supported by research conducted by Tsuji et al., (2018) where the research was conducted on respondents with an age range of 24-83 years. The results revealed that <60 years is a significant risk of vomiting nausea associated with this acute and delayed phase. Using first-generation 5-HT3 receptor antagonists without NK-1 receptor antagonists is a considerable risk factor.

The study results are in line with (Shin et al., 2016) where the results of the study are as much as 31.5% high school level and 26.6 college levels that have a lot of breast cancer. In line with the research Hosseini et al., (2016) conducted research on risk factors for slow vomiting due to chemotherapy in breast cancer patients and found undergraduate education (high) as much as 28.3%.

A total of 11 people (57.9%) in the intervention group and 12 people (63.2%) in the control group showed that the respondents' stages were most in stage III. Supported by sari research, (Sari et al., 2015) conducted research on the decrease in acute vomiting nausea after the aroma delivery of peppermint therapy. The study was conducted in November 2014 with a sample of 15 respondents. The result obtained is that patients with stage III are the most found at 46.7%.

According to (American Cancer Society, 2018c) nearby tissue (skin above the breast or muscles below it) has spread to many surrounding lymph nodes. One treatment performed at this stage begins with neoadjuvant therapy or before surgery with chemotherapy. Chemotherapy aims to shrink the size of the

tumor.

Based on this, researchers can assume that the symptoms of breast cancer are less felt in the early stages, so no early detection is done. As a result, many patients are found too late and even afraid to get checked health. Based on these circumstances, the patient comes into a state with an advanced stage.

Based on the study results, the chemotherapy cycle of the intervention group was mainly in the first chemotherapy cycle as many as five people (26.3%) and in the control group in the second chemotherapy cycle as many as four people (21.1%). Research in line with Rapoport (2017) where CINV is delayed, is very complex. The reflexes involved the external pathways of both the central and peripheral nervous systems. This problem will always arise when the patient undergoes chemotherapy. Based on the assumptions of researchers, the cycle of chemotherapy cannot be underestimated, with the experience of undergoing chemotherapy affecting the physical and psychological of the patient.

Nausea and vomiting is affected by three main groups of neurotransmitter receptors involved in this process: dopamine, serotonin, and the P-substance receptor (Noman et al., 2021). Antiemetics are already known effects on dopamine receptors such as phenazine, benzamide and butyrophenone groups. The 5-HT3 receptor antagonist acts on the digestive tract and central nervous system, playing an essential role in the process of vomiting through the vagal afferent pathway. The NK1 receptor (target P-substance) is another major determinant of nausea and vomiting, and specific antagonists have been developed (Aapro, 2015).

One way to affect increased serotonin rationing is cold drinking water. The goal of drinking cold water is to speed up rehydration, speed up fluid absorption, reduce physiological stress, and speed up the recovery of fatigue (Cho & Yoo, 2015). The temperature of the water is the determinant of the amount consumed. The ideal temperature commonly used most ideal is 5$^{o}$C – 15$^{o}$C.

There was a decrease and increase between some measurements in the control group. This is due to the amount of water consumed. In the intervention group, the companion gave fluids gradually so that fluids were met to hydrate, while in the control group, the amount of fluid was not monitored. In the control group, fluid fulfilment compliance was seen in patients if not given management. Even the drinking water used is regular, so it does not desire to consume more water continuously. The amount of fluid that enters affects the production of toxic substances that enter the body and the number of out put-outs that come out of the body.

In researchers' view, drinking cold water is one alternative in reducing nausea and vomiting. For example, in a treatment that can be done at home issued by the American Cancer Society which states that drinking cold water is one way that can be applied to reduce nausea and vomiting due to chemotherapy at home (American Cancer Society, 2018c). Based on the findings, it is expected that drinking cold water can be applied to help patients to reduce nausea and vomiting due to chemotherapy.

## Conclusions

Form the our study, it could be concluded that the average vomit nausea score in the intervention group of cold water drinking decreased from a 24-hour measurement to a 72-hour measure. Thus, the average vomit nausea score in the control group did not decrease or increase on the 24-hour measurement; there was an increase in the 36-hour measurement and the 48-hour measurement and the 60-hour measurement, then there was a decrease in the 72-hour height. Based on the statistical analysis, we found that there was an effect of giving cold water to reduce vomiting and nausea after chemotherapy in breast cancer patients at M. Djamil Padang Hospital. In addition, there was a difference in vomiting nausea scores between the intervention and control groups. This study is expected to be developed in the future in the form of drinks that are easy and practical to use for patients in overcoming nausea and vomiting.

### *Declaration of Interest*

*No conflict of interest*


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### *Data Availability*

*The datasets generated during analyzed the current study are available from the corresponding author on reasonable request.*

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