

# An Evaluation Of The Effect Of Hot Water Intake On Physiological Changes In The Body

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## Abstract

**Background-** There are many physiological changes in the body due to hot water intake. Many people have contributed to create awareness and assess the changes the study focuses on, especially to evaluate the knowledge and assess the physiological changes the aim is to create awareness among dental students regarding the benefits of daily morning hot water intake.

**Materials and Methods-** Based on cross-sectional study, a survey was conducted among dental students on their hot water intake and any changes in the field due to the same question I was estimated through an online survey link that is Google forms. Nearly 75 students participated in and data circulated. Results were collected and statistically analysed through SPSS software version 23. Another study involved 20 participants dividing them into two groups, Group 1: Hot water intakers with regular intake of 500 ml of hot water every day morning for two weeks. Group 2: Non hot water intakers. The subjects assessed for certain physiological changes like Body Mass Index (BMI), body temperature and White blood cell(WBC) count.

**Results-** The results of the survey revealed that 62% were male and 38% were female. 66% of people were satisfied by their experience of hot water drinking. Out of hundred percent, 28.4% did not consume hot water and 5.4% were dissatisfied due to daily intake. Physiological changes after two week consumption were an increase in body temperature, decrease in BMI, increase in WBC count.

**Conclusion-** The study concluded that the respondents were aware of the physiological benefits of hot water intake and were much satisfied. Two weeks of hot water consumption had significantly decreased BMI and had an immunostimulatory effect.

**Keywords-** Awareness, BMI, body temperature, hot water intake, immunostimulation.

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## Introduction

Human body is made up of 50 to 75% water. Water shapes the basis of blood, stomach related juices, pee and sweat and is contained in lean muscle, fat and bone. Our body cannot produce enough water by metabolism or obtain enough water by food injection to fulfil its needs. As a repercussion we must pay attention to what we drink daily and check that we meet the daily requirement, as not doing so we may have to face adverse health effects (1), (2–4)

Body water content is higher in men than women and falls in both with age. Most mature adults around have 3 L per day this can be increased due to the hot climate. Water is important because it is present for most bodily functions. It helps in maintaining the health and integrity of every cell in the body. It helps eliminate the byproducts of the body, regulate body temperature through perspiration, acts as a lubricant and cushion for joints. For male adults the daily water intake should be 2.6 L and for females it should be 2.1 L. Lack of hydration happens when the water content of the body is too low. This can be fixed by increasing fluid intake(5). Symptoms of dehydration include headache, lethargy, dark coloured urine and tiredness. If dehydration is not corrected by fluid intake, eventually urination stops, the kidney fails and then there is damage in the excretory process and in the worst case dehydration leads to death (6), (7–12).

People have consumed hot water and drinks for thousands of years. From ancient times practitioners of Eastern medicine recommended beginning the day with a glass of hot water to boost metabolism in the body. According to studies there are various benefits of drinking hot water in the morning. These benefits of or more of long-term and short-term benefits. Further the benefits of hot water intake has been discussed (13), (8).

Healthy digestion: When a person does not meet its daily request for hot water intake the body absorbs water from food and consumes. This causes dehydration and can make it difficult to have bowel movement(14). Hot water delights blood vessels in the gut which aid in digestion (6,15).

Body detoxification: Drinking hot water leads to an increase in body temperature. Due to increase in body temperature there is sweating which leads to expulsion of toxins and helps in cleaning pores.

Improve circulation: Like taking a hot water shower leads to improved circulation and relaxation same is the case with hot water intake. It increases the blood circulation through arteries and veins. More efficient blood flow can have benefits ranging from improving blood pressure to reducing risk of heart disease orders(16).

Dental health: Cold water causes a filling material to contract and fall off leading to destruction of dental work. It is also recommended to brush with warm water.

Weight loss: Hot water consumption in the morning prepares your gut for the rest of the day. It helps clear the intestine, prevent bloating and get rid of excess water weight through contraction of bowels. It also increases body temperature which causes the body to expend energy to decrease the body temperature which in turn improves metabolism.

Mood: It has been found in recent studies that consumption of hot water among individuals leads to improved mood (17).

Achalasia. Drinking hot water as compared to cold water could help in swallowing. People with achalasia have difficulty in swallowing because the lower esophageal sphincter does not relax. Hot water helps in decreasing the resting pressure of lower esophageal sphincter which assists the relaxation of lower esophageal sphincter and relieves the symptoms (18), (7).

Drinking hot water in the morning leads to better absorption of water the entire day. Japanese water therapy is a therapy where you have to bring several glasses of hot water every morning once you wake up(19). It has been claimed that this therapy can help curing or reducing the symptoms of blood pressure, Type II diabetes and cancer. The therapy includes having 600 ml of hot water on an empty stomach upon waking up and before brushing your teeth and waiting for another 45 minutes before eating breakfast(20). Besides the benefits mentioned above there are more benefits such as automatically being hydrated for the entire day and lower calorie intake (1,21).

Dr Ashish Sachdeva also recommends having 650 ml of hot water after waking up and having hot water 30 minutes before any meals leading to weight loss. According to him there is a 24% increase in metabolism. Drinking warm water also leads to damage of tissue oesophagus. It means scald your tongue and burn your tastebuds. Hot water sometimes contains more contaminants and sometimes it can lead to breathlessness. This research is needed to create awareness that there is also a lack of comprehensive research on this topic.

### **Materials and Methods**

The physiology changes were assessed by categorizing the subjects as

Group 1: Hot water intakers with regular intake of 500 ml of hot water every day morning for two weeks.

Group 2: Non hot water intakers.

The subjects were assessed for certain physiological changes like BMI, body temperature and white blood cell (WBC) count.

A descriptive cross-sectional study was done to analyse the benefits of hot water intake in the morning among dental students. Approval was obtained from the institutional review board to conduct an online survey. The survey was conducted among 75 students. A self administered questionnaire of 13 close ended questions was prepared and distributed among dental students through online-based survey forms Google forms. The questionnaire contains questions on demographic details also. The method of sampling that is done is simple random sampling. The responses were collected, tabulated in excel sheets and analysed. Data entered in SPSS and results were represented in a pie chart. Chi-square test was used to analyse and compare education levels of students and their experience of drinking hot water.

### **Results**

Physiological changes assessment done showed that the study showed that there was a significant decrease in BMI , increase in body temperature and increase in white blood cell count (Fig 1,2,3).

The cross sectional study showed the response of the participants related to hot water intake and their experiences about it. 62.2% participants were female and 37.8% participants were male. 53% participants were hydrated in the morning after waking up while 8% participants woke up dehydrated. 44.6% participants had increased hunger than before. 48.6% participants had relief from muscle pain. Figure 4 shows the responses to the question about relief from nasal congestion due to hot water intake. Majority of the participants responded as definitely there was relief from nasal congestion (47.30%). Figure 5 shows the responses to the question about the habit of having 3 glasses of hot water in the morning. Majority of the participants agreed that they have the habit of drinking 3 glasses of hot water.(59.46%). Figure 6 shows a comparison of responses between gender and an improvement in mood and positive emotions in the morning. Majority of females agreed that there was an improvement in their mood in the morning. Figure 7 shows comparison of responses between gender and loss of weight. Majority of females agreed that they felt a loss in weight.

### Cross tab evaluation

The association between gender and improvement in mood and positive emotions were analysed. Females found an improvement in mood and positive emotions compared to males and the value was statistically insignificant ( $p < 0.05$ ). The association between gender and loss of weight was analysed. Females found a decrease in weight compared to males and the value was statistically insignificant ( $p < 0.05$ ).

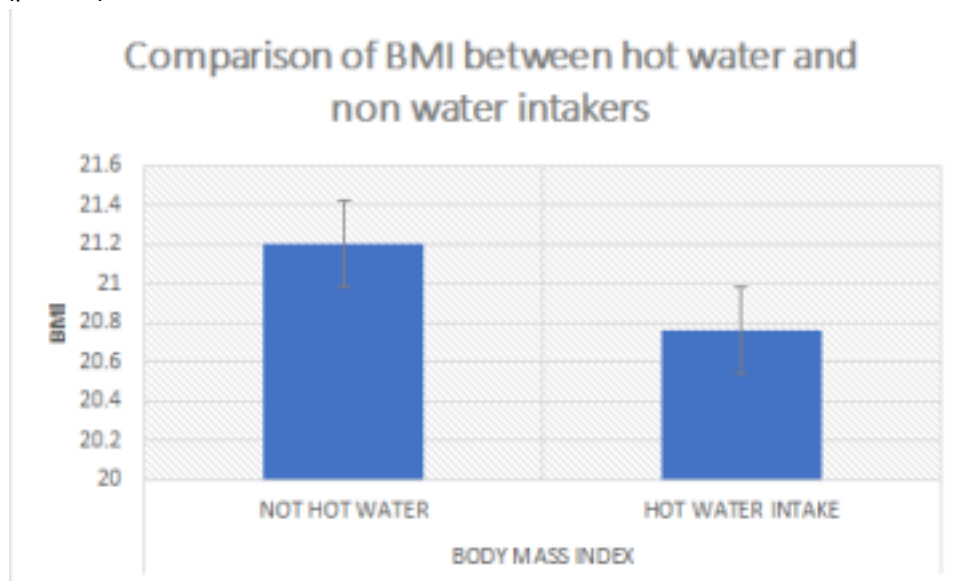


Figure 1-The above bar graph represents the comparison of BMI between hot water intakers and non hot water intakers. It is observed that there is a statistically significant decrease in BMI in the group who drank hot water when compared to the group who did not drink hot water. ( $p < 0.05$ ).

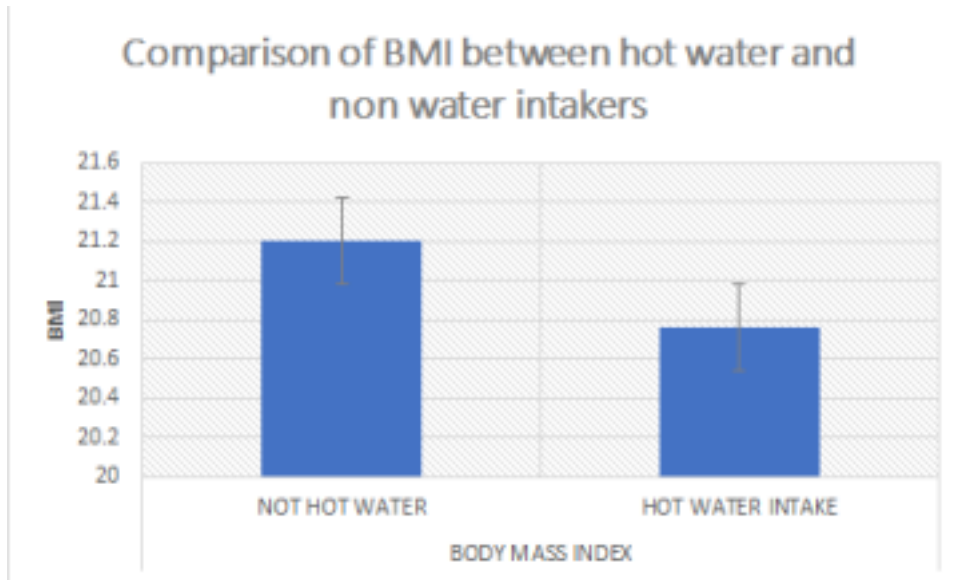


Figure 2-The above bar graph represents the comparison of body temperature between hot water intakers and non hot water intakers. It is observed that there is a statistically significant increase in body temperature in the group who drank hot water when compared to the group who did not drink hot water ( $p < 0.05$ ).

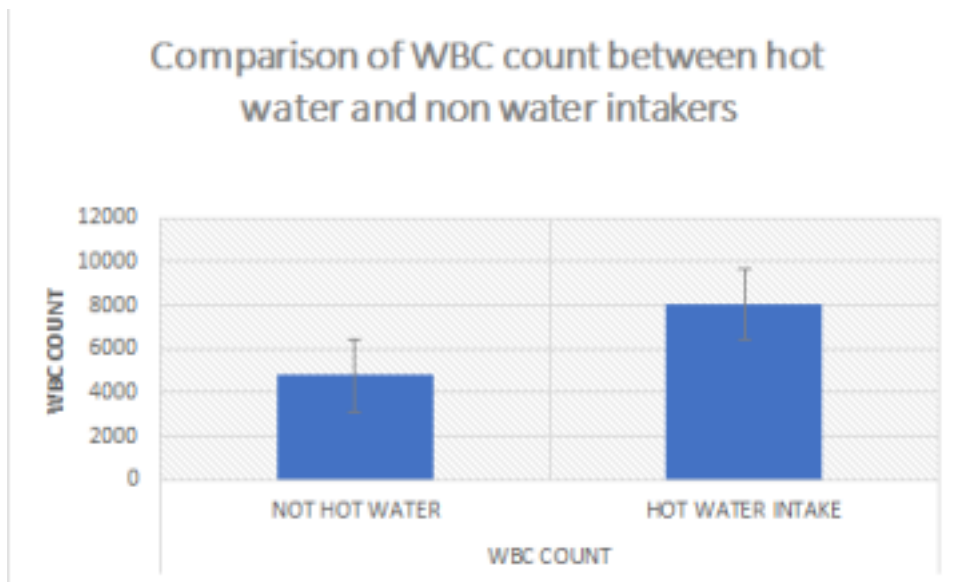


Figure 3-The above bar graph represents the comparison of WBC count between hot water intakers and non hot water intakers. It is observed that there is a statistically significant increase in the count of WBC in the group who drank hot water when compared to the group who did not drink hot water ( $p < 0.05$ ).

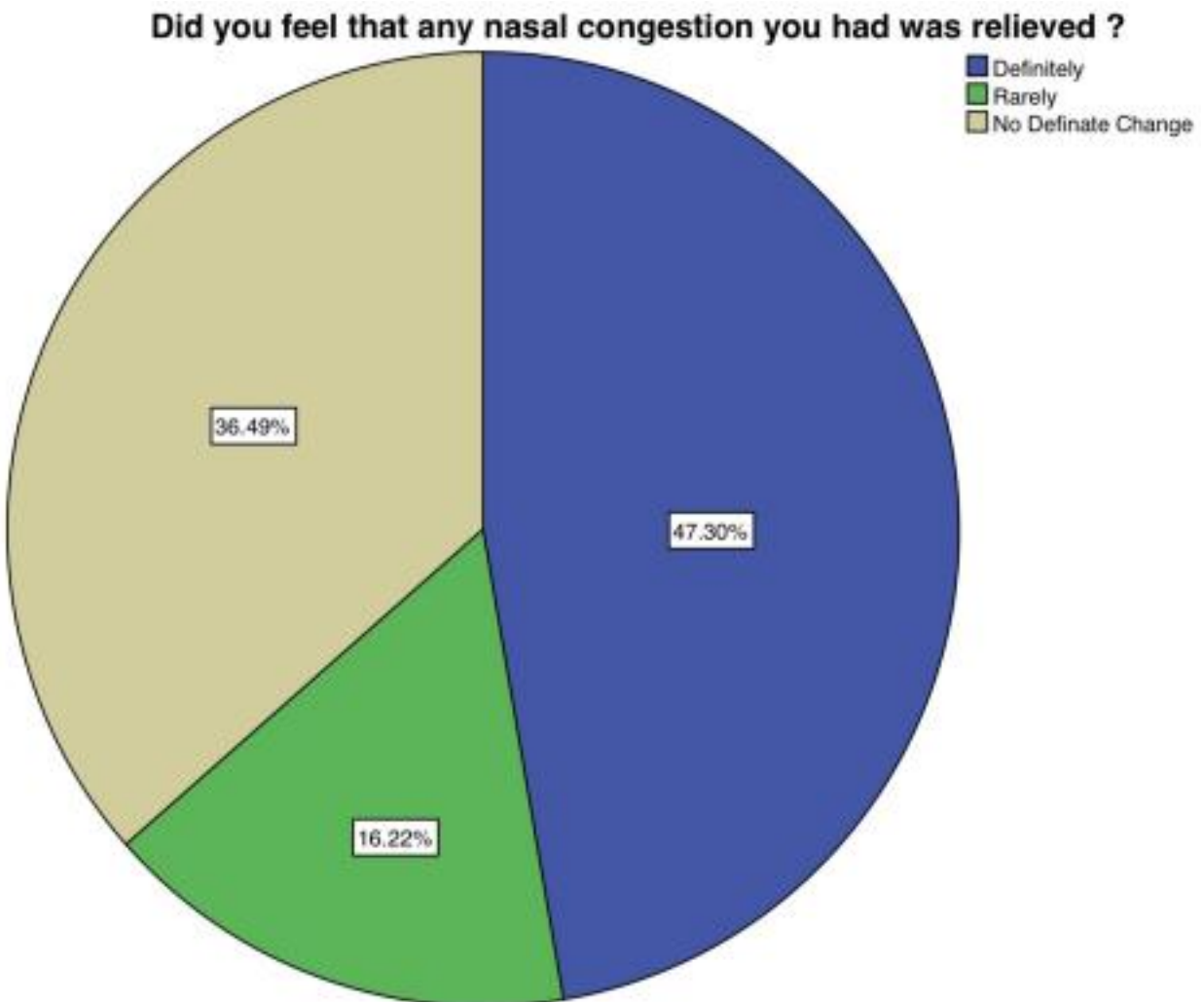


Figure 4- Pie chart showing the responses to the question about relief from nasal congestion due to hot water intake. Blue color represents definitely, beige color represents no definite change and green color represents rarely. Majority of the participants responded as definitely there was relief from nasal congestion (47.30%).

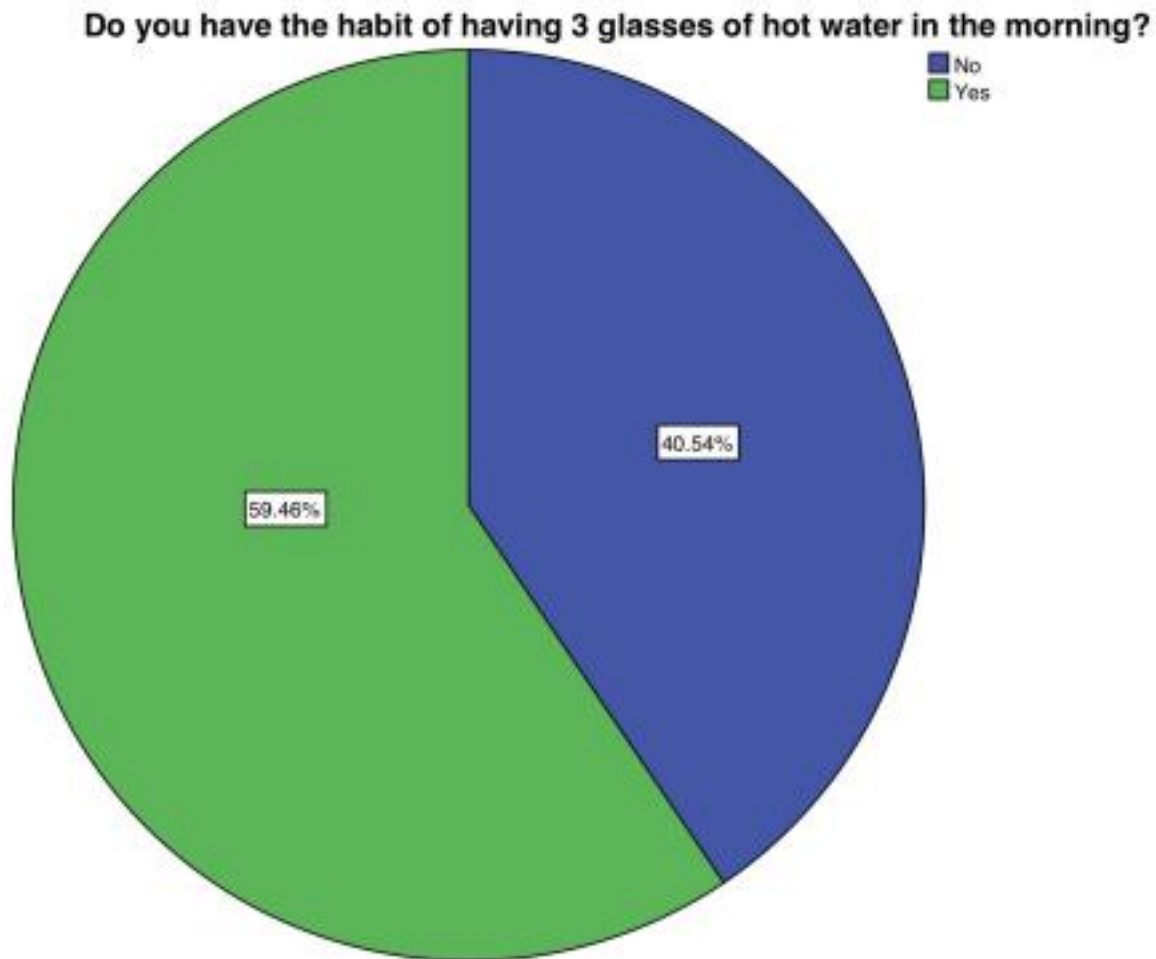


Figure 5- Pie chart showing the responses to the question about the habit of having 3 glasses of hot water in the morning. Blue represents no, and green represents yes. Majority of the participants agreed that they have the habit of drinking 3 glasses of hot water (59.46%).

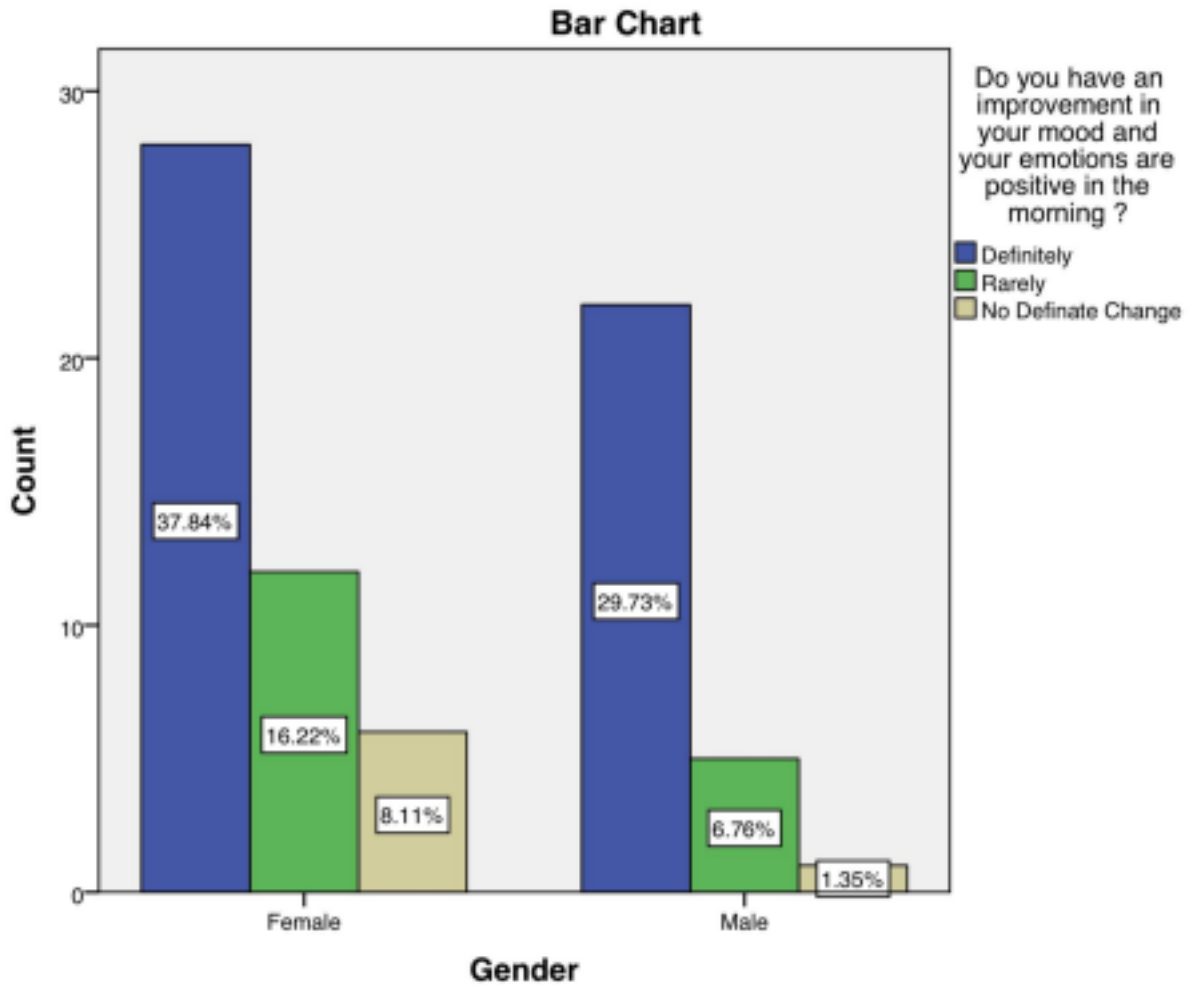


Figure 6- Bar graph showing comparison of responses between gender and an improvement in mood and positive emotions in morning. X-axis represents gender and y-axis represents the number of responses who said definitely (blue), rarely (green) and no definite change (brown). Majority of females agreed that there was an improvement in their mood in the morning. However the difference was statistically not significant. Chi square test P value =0.226 (>0.05 statistically not significant).



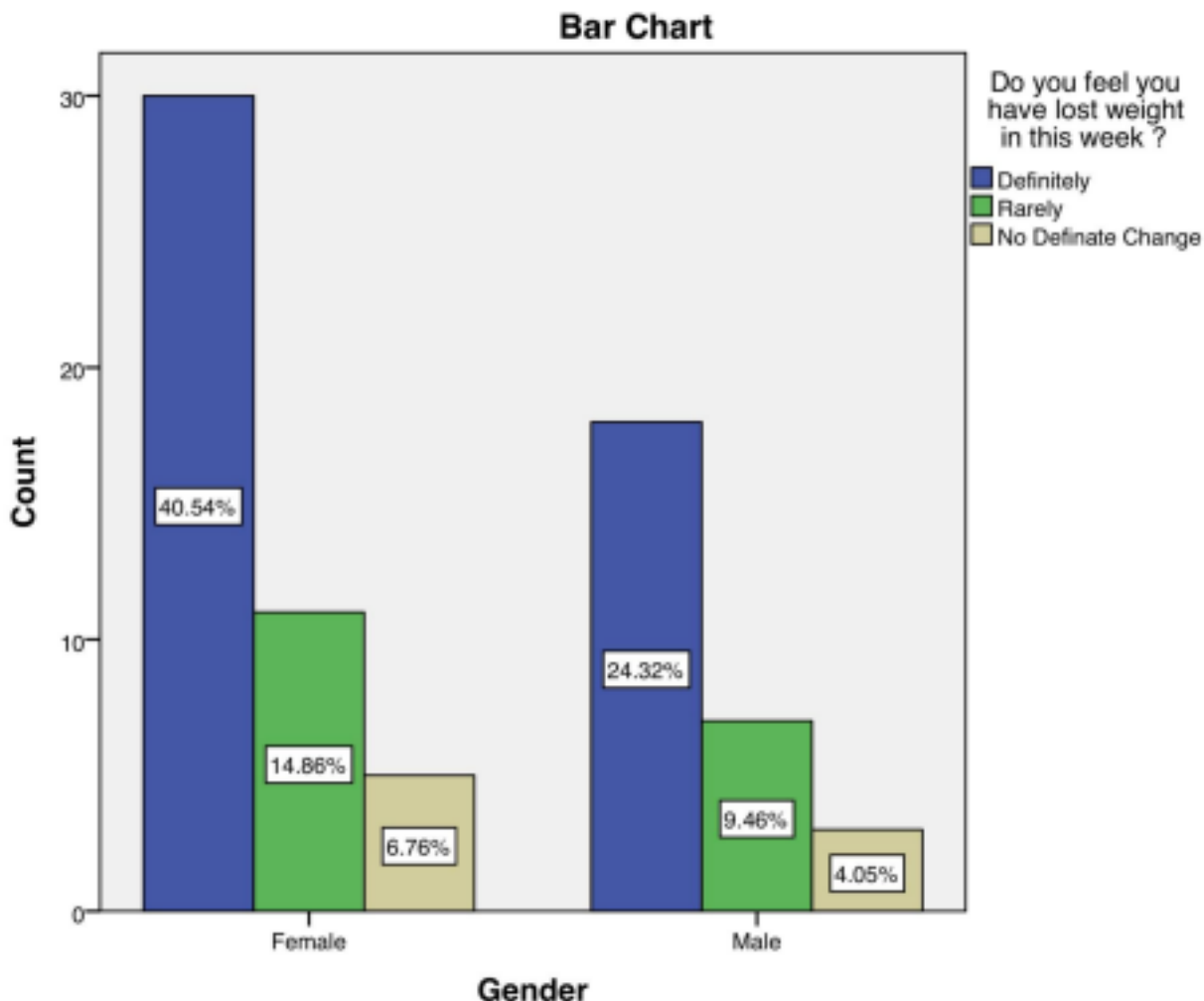


Figure 7- Bar graph showing comparison of responses between gender and loss of weight. X-axis represents gender and y-axis represents the number of responses who said definitely (blue), rarely (green) and no definite change (brown). Majority of females agreed that they felt a loss in weight. However the difference was statistically not significant. Chi square test P value =0.994 (>0.05 statistically not significant).

### Discussion

The survey conducted revealed that the majority of participants had the habit of drinking hot water and felt hydrated and got relief from nasal congestion and also that there was significant change in the BMI and Total Leucocyte Count (TLC) in hot water intakes for a period of two weeks. Previous literature supported our findings stating the association between hot water intake and immunity in pigs. Utilization of oxygenated drinking water was related with increased immune action, illustrated by expansion of peripheral blood mononuclear cells and interleukin-1 $\beta$ , an increment within the CD4+:CD8+ T-cell proportion and boosted immune responses against bacterial infection (22,12). In addition, consumption of oxygenated water was associated with an increase in the concentration of IgG and IgM in broiler

chickens (11,23,6,24). Earlier research has shown that drinking hot water increases participants' brain activity and decreases their self-reported anxiety (25,2,10,26).

The study also reported an increased BMI and body temperature after hot water intake among the subjects. In one previous study showed that the sympathetic activation after hot water drinking might stimulate thermogenesis and increase resting energy expenditure by 30% and it can happen within 10 min of drinking the water (peaked at 30-40 min) and maintained over an hour. Another study reported that Drinking water that had been heated to 37°C, attenuated the thermogenic response by 40% ; which led to the suggestion that water-induced thermogenesis could be partly attributed to the energy cost of warming the water to body temperature (27). The mechanism that causes sympathetic activation with water drinking is not fully understood. But factors like Water temperature, distension of gastrointestinal organs and even changes in osmolarity could play a role in this concept. Thus, water drinking-induced cardiovascular and metabolic responses can also be part due to the thermal stimulus (28). Another explanation reported that the water-induced changes may be explained by stimulation of osmosensitive structures which had played a positive role in the changes in sympathetic activity, blood pressure, and metabolic rate as well (29,30). The sample size was too small to verify the physiological findings and some participants were excluded due to medication and insufficient water intake. The future research should be conducted with more samples for better results.

### **Conclusion**

The present study showed that hot water intake provided good physiological actions in the body by improving immunity, relief from nasal congestion, muscle pain and improvement in mood and positive emotions. It can be recommended for further therapeutic implications.

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### **AUTHOR CONTRIBUTIONS:**

Mr.Mithil : Literature search, survey, experimental data collection, analysis, manuscript writing  
Dr. Sridevi.G : Study design, data verification, manuscript drafting

### **CONFLICTS OF INTEREST:**

The authors declare that there are no conflicts of interest in the present study.

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