



# The Effectiveness of Pamphlet toward Consumption Behavior Changing of Iodized Salt among Housewives: A Quasi-experimental Study

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## Abstract

**BACKGROUND:** Poor management of iodized salt when cooking food or vegetables can reduce iodine levels. The pamphlet about managing iodized salt is expected to change the consumption behavior of iodized salt effectively.

**AIM:** This study aimed to determine the effectiveness of pamphlets toward the consumption behavior changing of iodized salt among housewives.

**METHODS:** The study was designed quasi-experiment with the control group. The experiment group has attached a pamphlet on a kitchen wall or cooking area, while the control group was given a leaflet. The total number of samples was 76 (each group had 38 samples). Before the intervention, each group measured iodized salt consumption behavior (management). After 4 months of intervention, the iodized salt management behavior was measured again. To answer the aim study, the statistic using a t-test after the normality and homogeneity test and the level significance used  $\alpha$ - 5% with a confidential interval of 95 %.

**RESULTS:** The study showed the experiment group's mean was 3.8158, while the control group was 3.1316; it is a different mean score of 0.6842 points higher than the experiment group. The standard deviation score was 0.309. The t-test score was 2.891 and  $p = 0.004$ . There are different scores of 1.973 points between before and after intervention in the experiment group. The paired sample t-test score was -9.449 with a  $p = 0.001$ .

**CONCLUSION:** The attached pamphlets in the kitchen area effectively increase consuming iodized salt among housewives, so the pamphlet used in this study is expected to be applied in various cooking places.

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## Introduction

When unmet dietary iodine needs, the thyroid hormone synthesis process is disrupted because it requires iodine, iodine is found in salt, and its content is relatively high. A pregnant woman's lack of iodine levels in salt leads to prenatal disorders and postnatal growth disorders [1]. The study results indicate the need for guidance on nutritional intake, including iodine for pregnant women [2]. Based on the results test for iodine content in salt using the reagent kit shows that 231 salts sample, six households (2.5%) in the salt's iodine content have no iodine [3]. Referring to research, results on 72 samples show the form of salt consumed 6.9% still use bulk salt (slightly iodine), while there was 80.6% salt storage in plastic in terms of a salt storage and the method for storing salt is 25% salt storage in opening storage [4].

In addition, salt problems and management are also related to using salt when cooking. Based on a preliminary survey to ten housewives, as much as 90% of seasoning salt on food or vegetables cooked in a

boiling state causes the level of iodine in salt would be decreased. The duration of salt storage will reduce the iodine content of the salt, and the length of time the use of salt in hot vegetables will reduce the level of iodine in the salt [5]. Based on the study results, the quality of salt decreased after 10 min of heating. Salt should add when the food is almost cooked and ready to be served [6].

The public, especially housewives, needs to know and understand how to manage and use iodized salt in a good and useful way. The role of information, education, and communication is important. Changing the behavior of a community needs time and to be adapted to the type of community for the behavior offered [4]. An effective and necessary form of information when using iodized salt when cooking is very necessary. The pamphlet on iodized salt is expected to change eating habits that are not correct in managing iodized salt effectively. This can affect attitudes and behavior in making decisions using salt when cooking, as the study results stated that attitudes and behaviors related to labels or information can be seen and read [7]. Behavior change begins with the

process of information (stimuli) which develops into an attitude and eventually becomes a behavior [4]. Other studies suggest that titles' presence seems adequate for the nutritional assessment of snack products compared to without labels.

This study aimed to determine the effectiveness of pamphlets toward the consumption behavior changing of iodized salt among housewives.

## Materials and Methods

The study design used a quasi-experiment against two groups, namely, the experiment group (pamphlet) and the control group (non-pamphlet) regarding consumption behavior (management) of iodized salt; it consists of six variables: (1) Seasoning time when cooking with salt, (2) selection of the salt form, (3) salt storage, (4) salt storage, (5) salt storage meth, and (6) salt usage time. Before and after the intervention, the groups identified behavior management use of iodized salt. The study sample was housewives with inclusion criteria: Ages 15–49 years, cooking always using iodized salt and flavoring, house owner, and always cooking at home to meet daily needs. The sampling technique of the study was determined purposively. The sample size was calculated using the formula:

$n$  = sample size

$Z_{1-\alpha/2}$  = 1,96 Z score for 95 % Confident level (CI).

$Z_{1-b}$  = 0.84 for power test 80 %

$P_1$  = Proportion of experiment group 67.5% (0.67) 67% of proportion storage practice iodized salt [8].

$P_2$  = Proportion of control group 43% [9] (0.43). 43% of proportion practice iodized salt on leaflet (Brossur) [9].

$P = P_1 + P_2: 2 = (0.67+0.43)/2 = 0.55$

Estimated minimum of 34 samples for each group, ( $2 \times 34 = 68$  samples), plus 10%  $n = 68+10\%$  (7) = 75 = 75 rounded to 76 samples, so that each group of 38 samples.

The pamphlet was explicitly designed, educative, informative, and easy to understand and obtained intellectual property rights from particular institutions. A pamphlet was applied to the experiment group and a leaflet to the control group. Both pamphlets and leaflets contain material means a manage of iodized salt that includes: how to grow, choose salt form, storage, placement, time using of the salt, and iodized salt consumption when cooking.

The study implemented into four stages:

Stage 1: Before the experiment, first identifies salt consumption behavior (management) of iodized salt.

Stage 2: Pamphlet attached to the wall in the cooking room/kitchen for the experiment group. While the control group, the sample was given of leaflet that explains how to consume iodized well.



Picture 1: Pamphlet attached to the Kitchen wall

Stage 3: Monitoring studies through visits and observations, especially in the experiment group, whether the pamphlet was still attached to the wall of the cooking room or not. At the same time, the control group is only asked whether the leaflet is still there or not.

Stage 4: Evaluate the behavior of using iodized salt after 4 months of intervention in both experiment and control groups.

To facilitate the analysis, the measurement of variables, especially the consumption behavior of iodized salt, is carried out. The behavior of consuming iodized salt (management of salt) consists of six variables: (1) Seasoning time when cooking with salt: When boiling, score = 0, half boiling, score = 0, when warm, score = 1, and seasoned with salt when cold = 1. (2) Selection of salt form: Bulk form = 0 and fine form = 1. (3) Salt storage: In glass, score = 1, metal, score = 1, plastic container, score = 0, and do not use container, score = 0. (4) Salt storage: Closed shelf, score = 1, at the table, score = 1, open shelf score = 0, and refrigerator, score = 0. (5) Salt storage method: Closed score = 1 and open score = 0, and (6) salt usage time: 1 day–1 week score = 1,  $\geq 1$  week–2 weeks score = 1,  $> 2$  weeks–1 month score = 0, and  $> 1$  month score = 0. Scoring behavior of iodized salt consumption is grouped in the range of 1 = the lowest score and 6 = the highest score.

### Statistical analysis

After all the data that have been collected were edited and then coded for each variable in Microsoft Excel, then transferred to IBM SPSS version 26 software. The characteristic of behavior consumption of iodized was analyzed on the frequency distribution (percentage) between experiment and control groups.

To identify the effectiveness of consumption, behavior of iodized salt was analyzed using t-test after normality and homogeneity test. To know the differences of average (mean) between two groups independent t-test and paired sample t-test was used to know differences of average (mean) after and before intervention in the experiment group. Level significance used  $\alpha$ - 5 % with confidential interval 95%.

## Results

### *Characteristic consumption behavior using (management) iodized salt based on experiment and control group*

Evaluation of characteristic behavior change using iodized salt after 4 months of the experiment. The study results showed consumption behavior on iodized salt seasoning: In the experiment group was, 47.4% put iodized salt when food or vegetables were warm, while in the control group, only 10.5%. Differences also on the choosing salt form, experiment group chose fine salt 97.4% while the control group chose 94.7%. Storage location on the table was 52.6% higher than the control group. It is 36.8%. Salt storage was 92.1% in the experiment group, while in the control group, it was 81.6%. Usage time  $\geq$  1-2 weeks was 55.3% on experiment group while on control group only 23.7% (Table 1).

**Table 1: Characteristic consumption behavior of using iodized salt. n = 76**

Use of Iodized Salt	Experimental group		Control group	
	F	%	F	%
Iodized salt seasoning				
When it boils	13	34.2	24	63.2
Half boiling	4	10.5	8	21.1
Warm	18	47.4	4	10.5
Cold	9	7.9	2	5.3
Choosing Salt form				
Fine	37	97.4	36	94.7
Brick	1	2.6	2	5.3
Storage Container				
Glass	1	2.6	2	5.3
Metal/jars	1	2.6	0	0
Plastic	35	92.1	34	89.5
Do not use a container	1	2.6	2	5.3
Storage location				
On a closed shelf	16	42.1	19	50
On the table	20	52.6	14	36.8
Open shelf	1	2.6	3	7.9
In the fridge	1	2.6	2	5.3
Salt storage				
Closed	35	92.1	31	81.6
Open	3	7.9	7	18.4
Usage time				
1 day-1 week	11	28.9	14	32.9
$\geq$ 1 week-2 weeks	21	55.3	9	23.7
> 2 weeks-1 month	6	15.8	13	34.2
>1 month-1 year	0	0	2	5.3
Total	38	100	38	100

### *Differences in average scoring consumption behavior of using iodized salt between experiment and control groups*

The analysis results showed that the experiment group's mean was 3.8158, while the control

group was 3.1316. There is a meaningful difference, which offers a contrast of 0.6842 points greater in the experiment group than the control group. The difference was also seen in the standard deviation score, which was 0.309 smaller in the experiment group than the control group. After going through Levene's test for equality of variances, the t-test value of 2.891 and  $p = 0.004$  showed that the difference in mean scores between the experiment and control groups was very significant (Table 2).

**Table 2: Differences of average (mean) scoring of consumption behavior of using iodized salt between experiment group and control group (n = 76)**

Group	n	Mean	SD	t	p-value
Experiment	38	3.8158	0.760	2.891	0.004*
Control	38	3.1316	1.069		

SD: Std. deviation. \*Independent sample t-test.

### *Differences of average scoring consumption behavior of using iodized salt between before and after for experiment group*

The dependent t-test analysis results show a difference scores of 1.973 points before and after the intervention, namely, before the intervention, the score is 1.842, and after intervention score was 3.185. The analysis results from the paired-sample t-test of  $-9.449$  with  $p = 0.001$ . The study results show different scores of iodized salt consumption behavior in the experiment group (Pamphlet) before and after the intervention (Table 3).

**Table 3: Differences of average (mean) scoring consumption behavior of using iodized salt before and after in experiment group (n = 38)**

Group	n	Mean	SD	t	p-value
Pre-test	38	1.8421	0.973	-10.575209	0.001*
Post-test	38	3.8157	0.925		

SD: Std. Deviation. \*Paired samples t-test.

## Discussion

Iodine in foodstuffs is not 100% into Sistem digestion but must go through the processing stage. The processing of food ingredients will reduce the availability of iodine from food. Iodine loss is directly proportional to the temperature and length of time the food is processed. The higher the temperature and the longer the time used for processing food ingredients, the higher the amount of iodine decreases. Using salt is a flavor enhancer in vegetables or food cooked in the state of boiling, causing reduced levels of iodine in salt. The content of iodine in salt is affected by storage and heating time [5]. The study results showed that the quality of salt decreased after 10 min of heating. Salt should be added when the food is almost cooked and

ready to be served [6]. Period with total long periods will cause damage to salt iodine levels because there are environmental influences such as water humidity. Salt iodine salt is going down in the event of damage, so it cannot maintain its quality to the consumer level. This damage can occur during storage in warehouses or stalls.

The role of the media always seems to have considerable power so that it will form the appearance of behavior. The results of other studies show that small media campaigns appear to be effective in increasing the absorption of screening and growing knowledge related to cancer [10].

Mothers, especially housewife, have a role in providing household food needs. An educational approach to housewife is a highly recommended strategy to address public health problems related to iodine deficiency [9]. Providing information to housewives in management or consumption behavior of iodized salt can increase their knowledge. Based on a study, the statistical analysis of the unpaired t-test has a score of -2,181 with a p-value 0.032, which indicates there was a significant difference between the study group and the control group on knowledge [11]. The attached pamphlets in the cooking room can affect attitudes and behavior in making good salt decisions. Mood and behavioral factors are closely related to the use of labels or information that can be seen and read [7]. Other studies suggest that tags seem practical for the nutritional assessment of snack products compared to without labels. Specific behavioral and behavioral factors are associated with the use of markers [12]. In addition, a research result shows a difference in the effect of pocketbook media on consumption behavior so that there is an increase in protein intake [13].

The health behaviors of a person or society are determined by the knowledge, attitudes, beliefs, traditions, etc., of the person or community concerned. Besides that, health workers' availability of facilities, attitudes, and behavior on health will also support and strengthen the formation of health behavior. Behavior forms because of attitudes, but attitude is not behavior. An attitude that has not been automatic manifests in action (overt behavior).

Placing the pamphlet on the area wall where the behavior is carried out is expected to trigger a positive attitude. Ultimately, the behavior ordered in the pamphlet is to use iodized salt correctly. There is information that is visible when cooking. That information is needed as a reminder to create knowledge, where knowledge creation and behavior have a close relationship with some user needs [14]. A visualization that integrates with psychology forms information and knowledge stored in the mind to develop attitudes and eventually become habitual behavior.

The three key elements of behavior change psychology are self-regulation, motivation, and

habits [15]. A research result shows that visual media with a positive stimulus can affect snacks in some children [16]. The press would provide a stimulus effect if the context or message conveyed matches the desired behavior change. The results reveal a significant impact of media context on behavior change [17]. It is in line with a study investigating messages' effect on behavioral changes in people with diabetes after receiving messages tailored to their goals [18].

## Conclusion

The study results in characteristic consumption behavior (Management) of iodized salt show the experimental group more high percentage than the control group. These differences include the addition of iodized salt when cooking warm food/vegetables, which are 36.9% larger in the experiment group. The choice of salt in refined form is 2.4% larger in the experiment group. The storage location on the table was 15.8% larger than the control group. Salt storage is more closed 10.5% larger in the experiment group and duration of use  $\geq 1$  week–2 weeks 1.6% larger in the experiment group.

Deferential of the experiment group's mean was 3.8158, while the control group was 3.1316. The standard deviation score was 0.309. The t-test score was 2.891 and  $p = 0.004$ . Mean scores between the experiment group and the control group were significant. There is significant differential score after and before the intervention for experiment group before the intervention, the score is 1.842, and after intervention score was 3.185 the paired sample t-test score  $-9.449$ , and  $p = 0.001$ .

Based on conclusion above, this study indicates that pamphlet is effective toward consumption behavior changing of iodized salt among housewives.

## Recommendation

The pamphlet used in this study is expected to be applied in various cooking places such as restaurant cooking rooms, catering cooking rooms, hotel cooking rooms, and other cooking activities.

This study has limitations and needs improvement, so it is expected to investigate further by other researchers to develop other media that can change the behavior of consuming iodized salt when cooking effectively.

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