

How to Cite:

Hassan, F. M., Kamil, A. M., & Hasaan, K. S. (2022). Knowledge and practices regarding iodine deficiency disorders and iodized salt among pregnant women in Al-Najaf governorate. *International Journal of Health Sciences*, 6(S6), 5205–5215.
<https://doi.org/10.53730/ijhs.v6nS6.11710>

Knowledge and practices regarding iodine deficiency disorders and iodized salt among pregnant women in Al-Najaf governorate

Farah Mohammed Hassan

College of Health and Medical Technologies, Middle Technical University-
Baghdad, Iraq

*Corresponding author email: farahallbaan1994@gmail.com

Amal Mustafa Kamil

College of Health and Medical Technologies, Middle Technical University-
Baghdad, Iraq

Khadija Shabaan Hasaan

College of Health and Medical Technologies, Middle Technical University-
Baghdad, Iraq

Abstract--Iodine is one of the most important trace elements in the human body, which is considered essential for synthesising thyroid hormones. Iodine deficiency can cause several diseases, including spontaneous abortion, increased infant mortality, cretinism, goitre, and mental defects. This study aims to determine the level of knowledge and practice regarding Iodine deficiency disorders and Iodised salt among a sample of pregnant women in Al-Najaf governorate in Iraq. A descriptive cross-sectional study was conducted in seventeen primary health care centres, and four hospitals were selected randomly by multistage sampling technique. The study involved (731) pregnant women from both urban and rural areas selected by systematic sampling technique. The result showed that the overall knowledge of pregnant women regarding IDD and iodised salt was poor. Where a good score was 13.0% only, while a poor score was 23.4%, and the majority was fair/acceptable with 63.6%. And the practice was poor, where the good practice was 16.8%, the poor score was 35.7%, and the majority was fair/acceptable with 47.5%. There was a significant association between age and residence of pregnant women with practice scores. Also, there was a significant association between educational qualifications for mothers and fathers with practice scores. Also, there was a significant association between occupational status for mothers and fathers with practice scores at a $p\text{-value} \leq 0.05$. In conclusion, most pregnant women had insufficient

knowledge about IDD and iodised salt that reflected on their practices to prevented IDD.

Keyword--iodine deficiency, iodine deficiency disorders, iodized salt, pregnant women, knowledge, practice.

Nomenclature

ICCIDD	international council for control of iodine deficiency disorders	μg	a unit of mass or weight equal to one millionth of a gram
IDDs	iodine deficiency disorders		
USI	universal salt iodization		
UNICEF	united nations international children's emergency fund		
WHO	world health organization		
Symbols			
ppm	parts per million		

Introduction

Iodine is a prime ingredient for the function of the thyroid gland; it is needed in tiny quantities for average growth and development ¹. Iodine deficiency in humans can lead to many health problems named iodine deficiency disorders, such as spontaneous abortion, increased infant mortality, cretinism, goitre, and mental defects². IDD are recognized as a significant global health issue because it affects so many vulnerable categories of individuals, including children and breastfeeding women. There are over 2 billion ID victims worldwide, of which about 50 million have clinical symptoms ³. On daily bases, a low concentration of iodine in the diet is considered the main cause of IDD, which result in insufficient thyroid hormones excretion ⁴. The human body needs iodine elements in very few amounts, 150 $\mu\text{g}/\text{day}$ for adults and adolescents. while this amount must rise to 200-250 $\mu\text{g}/\text{day}$ for pregnant and lactating women ^{5,6}. IDD affect all age groups starting from the fetus stage to the adult stage. globally IDD are considered one of the most important preventable micronutrition deficiencies, and it's recognized as the easiest and cheapest disorder to prevent by the consistent daily use of iodized salt ⁷. IDD can be prevented through iodized salt, considered the most common measure, injection of iodized oil, the fortification of milk, water, and bread with iodine element, and taking dietary supplements³.

The universal salt iodization (USI) strategy is recommended by the world health organization(WHO) as the principal approach to eliminating IDD in the world ⁸. WHO/ UNICEF/and ICCIDD have granted about 20–40 parts per million (ppm) of iodine in salt (USI) with regular monitoring of iodine is considered the best steps to deal with ID ⁹. The Iraqi government implemented the universal salt iodization programme in 1993. But in 2000, inadequacies were reported in the programme. And when the iodine level was measured in the Eastern Mediterranean countries in 2001, Iraq was reported as having severe iodine deficiency ¹⁰. It is necessary to increase the knowledge of the population about the vital role of iodine in human health, and regular public health education for appropriate handling and consumption of iodized salt should be continued. This study aimed to determine

the level of knowledge and practices about iodine deficiency disorders and iodized salt among pregnant women.

Subjects and Methods

This study is descriptive; a cross-sectional study. The place of this study was four hospitals (which contain a gynaecological consultant ward) and 17 primary health care centres (pregnant women care unit) from the three health sectors of Al-Najaf governorate/Iraq, which were selected randomly by multi-stage sampling technique.

Inclusion criteria

Randomly selected pregnant women who attend hospitals to gynaecological consultant wards. And primary health care centres in Al-Najaf governorate.

While the exclusion criteria

Any pregnant women refuse to participate in the study. Also other women who attend hospital and primary health centres for another purpose rather than pregnancy.

Data collection

Made a selection for units of the study was during systematic sampling technique; which selected from gynaecological consultant ward and pregnancy care unit in Al-Najaf Governorate/Iraq. Systematic sampling is used because of its convenience, little chance of bias, help in the random selection and relative ease of administration; with systematic sampling, every k^{th} item is selected to produce a sample size n from a population of size N . The value of k , sometimes called the sampling cycle, can be determined by the following formula:

$$k = \frac{N}{n},$$

where k = size of interval for selection

N = population size

n = desired sample size.

Sample Size of the Study

The calculated sample size was according to Daniel's sample size formula; which is explained as the following formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

n = number of expected sample units

Z : statistic for a level of confidence. (for the level of confidence of 95%, which is conventional, Z value is 1.96), P : expected prevalence or proportion (when unknown we use $p = 0.5$).

d: is the desired level of absolute precision. (d is considered 0.05 to produce good precision and smaller error of estimate).

This mean that **z** = 1.96

P=0.5

d = 0.05

n = $(1.96)^2 * (0.5 * 0.5) / (0.05)^2 = 384$.

n = 384; this is the minimum sample size. However, we select 700 pregnant women as a sample.

To minimize erroneous results, the non-response or recording error and to increase the study reliability, the target sample size was inflated by 10%.

Sample size *10% → $700 * 10 / 100 = 70$.

Sample size = $700 + 70 = 770$.

The total studied sample size was collected = **731** pregnant women.

Tools of the study

A questionnaire form consisted of three parts: Respondent demographics characteristics and the Knowledge module and the practice module. Questions in the knowledge module have many choices (yes, no, don't know), the corrected answer given (2) score, don't know given (1) score and the fowls answer given (0) score (Likert respondent scale), while Questions in the practice module have many choices (yes, no), the corrected answer given (1) score, and the fowls answer given (0) score. Before collecting samples we implemented the questionnaire tool on 30 respondents as a pilot sample to check it. Sample of the pilot study collected by covenant sample. The pilot sample not included in the study sample.

Statistical analysis

Data analysis was carried out using the available statistical package of SPSS-28 (Statistical Packages for Social Sciences- version 28). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The significance of the difference in different percentages (qualitative data) was tested using the Pearson Chi-square test (c2-test). Statistical significance was considered whenever the P value was equal to or less than 0.05.

Results

The results of this study showed the knowledge level of (731) pregnant mothers who agreed to participate in the study. The age groups range from (14-43) years, with mean ± SD of their ages, were (25.2±5.6) years. From urban regions. The majority of them were read and written. Housewives. And their husbands' the majority of them were in the primary grade. And the majority of their husbands' were self-employed. Table (3-1) showed the distribution of the Studied Sample by knowledge scores. Their general knowledge score was poor (29.0%) and fair (43.5%). While knowledge about IDD score where the majority of them were poor (32.7%) and fair (37.6%). Regarding the knowledge score of risk group and risk factors for IDD, the majority of them were poor and fair knowledge with (57.5%),

and (35.8%) respectively. While knowledge about general prevention for IDD the majority of the poor (39.7%), and (48.2%). While dietary knowledge score the majority of them were poor (34.9%), and fair (33.9%). regarding knowledge score regarding iodized salt the majority of them were poor (40.8%), and fair (41.3%).

figure (3.1), is related to the source of information of (pregnant women) regarding iodine, iodine deficiency disorders and iodized salt, according to sources of information the highest percentage (26.8%) of pregnant women taken their information from (Internet) and from (Family members) with percentage (20.9%), while the lowest percentage from (Radio) and (Newspapers or magazines) with (1.2%) and (0.7%). Table (3-2) regarding overall score for knowledge of pregnant women about iodine deficiency disorders and iodized salt only small percentage was (13.0%) had good knowledge , high percentage (63.6%) was fair and acceptable knowledge and (23.4%) was poor knowledge score.

The practice score towards iodine deficiency disorders and iodized salt, showed (47.5%) and (35.7%) of studied sample having fair and poor practices score towards iodine deficiency disorders and iodized salt respectively, while only (16.8%) of them having good practices score towards it. Table (3-3) refers to the association between practice score and socio-demographic characteristics of pregnant women about iodine deficiency disorders and iodized salt, this table found a statistically significant association with the age of pregnant woman, residence, educational status of pregnant woman, occupational status of pregnant woman, education status of the husband, occupational status of the husband, with ($P\text{-value} \leq 0.05$). While all other items had a non-significant association with gravidity and the smoking ($P\text{-value} > 0.05$). Table (3-4) shows the association among practice score and the total knowledge score ,attitude score according the table was significant association between practice score and knowledge score and significant association found between practice score and attitude score was (0.0001).

Table 3.1
Distribution of the Studied Sample by knowledge scores

Knowledge scores		No	%
I-General knowledge	Poor (≤ 9)	212	29.0
	Fair (10-13)	318	43.5
	Good (≥ 14)	201	27.5
II-Knowledge about IDD	Poor (≤ 15)	239	32.7
	Fair (16-22)	275	37.6
	Good (≥ 23)	217	29.7
III-Risk groups & risk factors for IDD	Poor (≤ 7)	420	57.5
	Fair (8-10)	262	35.8
	Good (≥ 11)	49	6.7
IV-General prevention for IDD	Poor (≤ 4)	290	39.7
	Fair (5-6)	352	48.2
	Good (≥ 7)	89	12.2
V-Dietary knowledge	Poor (≤ 8)	255	34.9
	Fair (9-12)	248	33.9
	Good (≥ 13)	228	31.2

VI-Knowledge about Iodized salt	Poor (≤ 5)	298	40.8
	Fair (6-7)	302	41.3
	Good (≥ 8)	131	17.9

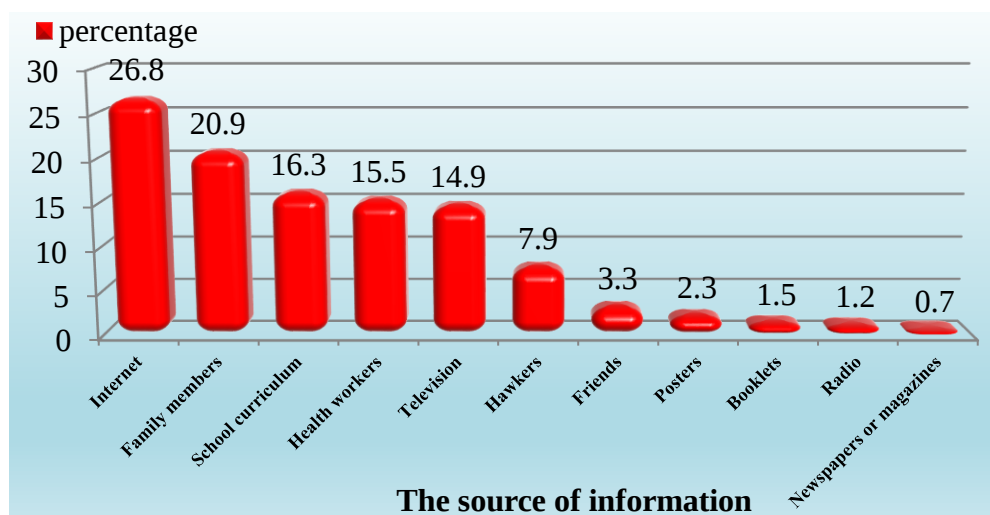


Figure 3-1. The source of pregnant women towards Iodine Deficiency Disorders and Iodized Salt

Table 3.2

Distribution of the Studied Sample according to their overall knowledge and practice scores regarding Iodine Deficiency Disorders and Iodized Salt

Overall knowledge and practice scores		No	%
Knowledge Score	Poor (≤ 48)	171	23.4
	Fair (49-72)	465	63.6
	Good (≥ 73)	95	13.0
	Mean $\pm$ SD (Range)	58.0 $\pm$ 12.6 (12-88)	
Practice Score	Poor (≤ 6)	261	35.7
	Fair (7-9)	347	47.5
	Good (≥ 10)	123	16.8
	Mean $\pm$ SD (Range)	7.3 $\pm$ 2.3 (1-13)	

Table 3.3

Association between practice Score of Pregnant Women and Socio-Demographic Characteristic

		Practice Score (Q13)						P value
		Poor (<=6)		Fair (7-9)		Good (>=10)		
		No	%	No	%	No	%	
Age of pregnant woman (years)	<20years	55	21.1	43	12.4	8	6.5	0.0001*
	20---24	87	33.3	129	37.2	33	26.8	
	25---29	76	29.1	110	31.7	42	34.1	
	30---34	32	12.3	38	11.0	22	17.9	
	=>35years	11	4.2	27	7.8	18	14.6	
Residence	Urban	160	61.3	239	68.9	109	88.6	0.0001*

Educational level	Rural	101	38.7	108	31.1	14	11.4	0.0001*
	Illiterate	53	20.3	17	4.9	1	.8	
	Read and write	98	37.5	89	25.6	8	6.5	
	Primary	75	28.7	91	26.2	19	15.4	
	Intermediate	16	6.1	53	15.3	12	9.8	
	Secondary	7	2.7	38	11.0	19	15.4	
	Institute	6	2.3	15	4.3	18	14.6	
Occupational Status of pregnant woman	College & higher	6	2.3	44	12.7	46	37.4	0.0001*
	Employee	6	2.3	34	9.8	49	39.8	
	Self-employee	8	3.1	6	1.7	6	4.9	
	Housewife	241	92.3	274	79.0	55	44.7	
Gravidity	Student	6	2.3	33	9.5	13	10.6	0.197
	Primigravida	63	24.1	88	25.4	40	32.5	
Smoking	Multigravida	198	75.9	259	74.6	83	67.5	0.092
	No	156	59.8	206	59.4	88	71.5	
Education status of husband	Pasive smoking	96	36.8	126	36.3	34	27.6	0.0001*
	Active smoking	9	3.4	15	4.3	1	.8	
	Illiterate	44	16.9	28	8.1	3	2.4	
	Read and write	63	24.1	59	17.0	10	8.1	
	Primary	80	30.7	100	28.8	22	17.9	
	Intermediate	34	13.0	47	13.5	17	13.8	
	Secondary	8	3.1	29	8.4	7	5.7	
	Institute	9	3.4	16	4.6	10	8.1	
Occupational status of husband	College & higher	23	8.8	68	19.6	54	43.9	0.0001*
	Employee	49	18.8	97	28.0	63	51.2	
	Self-employee	180	69.0	226	65.1	52	42.3	
	student	13	5.0	15	4.3	5	4.1	
	Retired	2	.8	2	.6	2	1.6	
	Unemployed	17	6.5	7	2.0	1	.8	

*Significant difference between percentages using Pearson Chi-square test (χ^2 -test) at 0.05 level.

Table 3.4
Association between practice Score of Pregnant Women and knowledge score

		Practice Score (Q13)						P value
		Poor (<=6)		Fair (7-9)		Good (>=10)		
		No	%	No	%	No	%	
Knowledge Score (Q48)	Poor (<=48)	96	36.8	61	17.6	14	11.4	0.0001*
	Fair (49-72)	155	59.4	233	67.1	77	62.6	
	Good (>=73)	10	3.8	53	15.3	32	26.0	

*Significant difference between percentages using Pearson Chi-square test (χ^2 -test) at 0.05 level.

Discussion

Iodine deficiency disorders affect all life stages because of the pregnant mother's role as a mother and to take care of her family. Therefore we assessed the pregnant women's knowledge regarding iodine deficiency disorders and iodized salt in Al-Najaf Governorate. The knowledge of pregnant mothers regarding iodine deficiency disorders and iodized salt is poor, but the lowest part was about risk groups and risk factors, and the general preventive measures. That appearing the weak role of educational program toward iodine deficiency disorders and iodized salt by health care workers. Regarding the study sample source of information, our study found that each pregnant mother might have one or more different

sources of information about iodine deficiency disorders and iodized salt. The majority of them get their information from the Internet (26.8%),

Family members (20.9%) while a low percentage (<20%) from (school curriculum, health workers, television, hawkers, friends, posters, booklets, radio, newspapers or magazine) respectively, the possible reasons regarding that the majority of pregnant women got their information about iodine deficiency disorders and iodized salt from internet and family members; might be related to the acceptability and availability of internet like Facebook, Google, others, as well as the household usage of iodized salt in cooking at homes make the information easily shared between family members like from mother to daughter. And that explains the weak role of the educational program by a health care worker, also the weak role of mass media (TV and radio) and printed materials. This result was in disagreement with a study in India by ¹¹ where showed that the main source of information was television (18.1%) and health workers (9.05%), but only (1.08%) the internet. Also disagreement with a study by ⁷ in Ghana that showed the main source of information from health workers (46.6%). Also in disagreement with another study in Sudan by ¹², they found the main source of informations were health workers (55.2%) and mass media (31.5%). That explains the strong role of health workers and media in sharing the correct health message to the community.

The current study's overall knowledge score among pregnant mothers toward iodine deficiency disorders and iodized salt showed only (13.0%) of them had good knowledge, the possible reason is the low educational status of pregnant mothers and their husbands' education is the critical point for knowledge, in addition, many of them married in younger ages with no experience to deal with real life. And the weak role of health educational programs. This result is in line with what had been reported in Ethiopia by ¹³, where (28.7%) of respondents had good knowledge about iodine deficiency disorders and iodized salt. While another study disagreed with a study conducted in Ethiopia ¹⁴, which found that about (65.4%) had good knowledge regarding the iodine deficiency disorders and iodized salt. This difference in result may be related to study sample differences. Regarding the practice score of pregnant mothers regarding iodine deficiency disorders and iodized salt, results showed only (16.8%) had a good practice, the study finding is in line with another study done in Iran by ¹⁵, where they found (16.6%) had a good practice. While the present study finding disagreement with a study conducted in Ethiopia ¹⁴, where about (74.0%) had a good practice. This disagreement may be related to differences in sample size where they enrolled 240 pregnant women only.

Association between socio-demographic characteristic of pregnant women and practice score

The study shows that significant association at $P < (0.05)$ between practice score and age of pregnant women, the mother's age at child delivery was considered one of the important factors for predicting the health condition and nutritional status of children. This result is similar to that reported by a study conducted in Tehran, Iran by ¹⁶, and in Egypt by ³. However, the present study results disagree with a study done in Sri Lanka by ¹⁷, where they found no significant association at $P >$

(0.05) between pregnant women's age and practice score. The current study found a significant association at $P < (0.05)$ between practice score and residence area of pregnant women, this is in line similar to study done in Ghana by ¹⁸, and in Egypt by ³. The present study showed that was a highly significant relationship between practice score and mother's, father's educational level at $P < (0.05)$ educational level is an important factor to determine the pattern of human practices in general and therefore will be reflected in the prevention of iodine deficiency disorders and correct usage and storage of iodized salt. These results are in line with previous studies done in Ethiopia ¹³ and in Ghana ⁷. while the current study results in disagreement with another study in India by ¹⁹, which found no significant relationship between practice score and mother's, father's educational level. This disagreement may be related to the difference in lifestyle between countries. Another result in this study was a highly significant association at $P < (0.05)$ between practice score and mothers', fathers' occupations. This result agrees with the results of the studies conducted in Ghana by ⁷, and in Egypt by ³, and disagreement with the study result conducted in India by ¹⁹. This may be related to the difference in economic status among countries.

Association among practice score with knowledge score

The association between practice score and knowledge score was a highly significant at ($p=0.0001$). This result agrees with another study conducted in Thailand by ²⁰. While disagrees with another study in India by ²¹.

Conclusion

It is concluded that pregnant women had poor knowledge and practice regarding iodine deficiency disorders and iodized salt, which reflected the poor role of educational programs regarding this concern. The age of pregnant women has a significant association with knowledge level. Urban women are found to be more educated than rural women. Also, the educational qualification of both mothers and fathers plays a critical role in their knowledge and practice. Also, occupational status for mothers and fathers had a significant association with knowledge and practice. But smoking status and gravidity status had no association with knowledge and practice.

Acknowledgement

We want to thank the health directorate of Al-Najaf governorate for their cooperation in completing this work. We want to extend our thanks to all the volunteer participants who agreed to participate in the study.

References

1. Abdelrahman, A., Salih, L. & Saeed, E. Knowledge, attitude, and practice of iodized salt use in Al-Riyadh and Al-Ozozab areas, Khartoum, Sudan. Sudan. J. Paediatr. 20, 26–33 (2020).
2. Andersson, † M, De Benoist, B., Delange, F. & Zupan, J. Prevention and control of iodine deficiency in pregnant and lactating women and in children

- less than 2-years-old: conclusions and recommendations of the Technical Consultation WHO Secretariat on behalf of the participants to the Consultation. doi:10.1017/S1368980007361004.
3. Appiah, P. K., Yanbom, C. T., Ayanore, M. A. & Bapula, A. Iodine Content of Salt Use after Years of Universal Iodization Policy and Knowledge on Iodized Salt among Households in the Sissala East Municipality in Upper West Region of Ghana. 2020, 1–8 (2020).
 4. Bazezew, M. M., Yallew, W. W. & Belew, A. K. Knowledge and practice of iodized salt utilization among reproductive women in Addis Ababa City. BMC Res. Notes 11, (2018).
 5. Charlton, K. et al. Poor knowledge and practices related to iodine nutrition during pregnancy and lactation in Australian women: Pre-and post-iodine fortification. *Nutrients* 4, 1317–1327 (2012).
 6. Datta, A., Karmakar, N., Nag, K. & Singha, S. A study on knowledge, attitude and practices regarding household consumption of iodized salt among selected urban women of Tripura, India. *J. Clin. Diagnostic Res.* 12, (2018).
 7. Deepika, P. S., Rao, B. T., Vamsi, A., Valleswary, K. & Sekhar, M. C. A cross sectional study on proper use of iodized salt in communities of rural areas and its relevant factors in Prakasam district , Andhra Pradesh , India. 6, 1083–1090 (2019).
 8. Demissie, D. B. Knowledge and Practice of Antenatal care Attendant Mothers Towards Iodized Salt Utilization and Associated Factors in Ambo Town Public Health Facilities, Oromia, Ethiopia. *J. Gynecol. Womens Heal.* 13, (2018).
 9. Ebrahim, S. M. & Muhammed, N. K. Consumption of iodized salt among households of Basra city, south Iraq. *East. Mediterr. Heal. J.* 18, 980–984 (2012).
 10. Elmanssur, A. E. A., Elnour, S. A. & Elmosaad, Y. M. A. Knowledge and Attitude of Population Towards Iodized Salt in Shendi Locality River Nile State in Sudan. *Eur. Sci. Journal, ESJ* 13, (2017).
 11. Goris, J. M., Temple, V. J., Zomerdiijk, N. & Codling, K. Iodine status of children and knowledge, attitude, practice of iodised salt use in a remote community in Kerema district, Gulf province, Papua New Guinea. *PLoS One* 13, 1–17 (2018).
 12. Guajardo, A. Knowledge of dietary iodine and iodine concentration in household iodized salt in rural and urban Jalisco, Mexico. (2015).
 13. Hassan, S. K., Hamed, N. S. & Mohammed, S. E. Iodized salt, knowledge versus practice among females in Fayum governorate. *Egypt. J. Community Med.* 39, 71–81 (2021).
 14. Karmakar, N., Datta, A., Nag, K., Datta, S. & Datta, S. Knowledge, attitude, and practice regarding household consumption of iodized salt among rural women of Tripura, India: A mixed-methods study. *J. Educ. Health Promot.* 8, (2019).
 15. Khamsingnork, J., Chongsomchai, C., Kuchaisit, C. & Lumbiganon, P. *. Attitude and Practice regarding Iodine Deficiency Disorder among Pregnant Women at Srinagarind Hospital. *Thai J. Obstet. Gynaecol.* 24, 255–264 (2016).
 16. Mirmiran, P. et al. Iodine nutrition status and knowledge, attitude, and behavior in Tehranian women following 2 decades without public education. *J. Nutr. Educ. Behav.* 45, 412–419 (2013).

17. Mohebi, S., Parham, M., Sharifirad, G. & Gharlipour, Z. Social Support and Self Care Behavior Study. 1–6 (2018) doi:10.4103/jehp.jehp.
18. Sangsefidi, Z. S., Sangsefidi, Z. S., Sharifian, E. S. & Shakeri, H. S. Pregnant Women's Iodine Status and Their Knowledge, Attitude, and Practice towards Iodized Salt in Esfarayen and Jajrom Cities in 2016-2017. *J. Nutr. Food Secur.* 5, 12–19 (2020).
19. Santi, L. K. S., Sudewi, A. A. R., Duarsa, D. P., & Lesmana, C. B. J. (2021). The effect of pregnancy massage on level of depression, anxiety and stress in pregnant women. *International Journal of Health & Medical Sciences*, 4(2), 220-225. <https://doi.org/10.31295/ijhms.v4n2.1692>
20. Sarah, N. A. et al. Knowledge on Iodized Salt Use and Iodine Content of Salt Among Households in the Hohoe Municipality , Volta Region - Ghana To cite this article : 2, 1–10 (2016).
21. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. *International Journal of Health Sciences*, 6(1), i-v. <https://doi.org/10.53730/ijhs.v6n1.5949>
22. Tariku, W. B. & Mazengia, A. L. Knowledge and Utilization of Iodized Salt and Its Associated Factors at Household Level in Mecha District, Northwest Ethiopia. *J. Nutr. Metab.* 2019, (2019).
23. Zoysa, G. E. D. De, Hettiarachchi, M., Jayathilaka, K. A. P. W. & Liyanage, K. D. C. E. Knowledge and practices of iodized salt consumption among pregnant women in Galle district. *Gall. Med. J.* 20, 10 (2015).