

AWARENESS FOR INCREASED IODINE CONSUMPTION – CURRENT STATUS AND FUTURE PERSPECTIVES

CONSCIENCIALIZAÇÃO AO AUMENTO DO CONSUMO DE IODO – PONTO DE SITUAÇÃO E PERSPETIVAS FUTURAS

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ARTIGO ORIGINAL

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ABSTRACT

INTRODUCTION: Previous studies have shown that the Azorean population presented a lack of iodine intake in children and pregnant women. This led organizations to initiate more efforts to increase awareness and provide solutions to this problem, particularly through the consumption of iodised salt.

OBJECTIVES: To clarify the effectiveness of the implemented health measures and what influenced the use of iodised salt.

METHODOLOGY: Observational and cross-sectional study with the application of a questionnaire that surveys iodine consumption in people presenting to the Unidade de Saúde da Ilha do Faial, Azores, between November 9th and November 14th, 2020.

RESULTS: Out of 100 individuals, 49 consumed iodised salt and 51 individuals did not. The mean age of responders was 49,81 years old. 19 participants had a diagnosis of thyroid disease. A recommendation from a physician and/or a nutritionist was the main reason that influenced people to implement iodised salt in their diet (n=18; 36.7%). Out of the 51 participants who did not consume iodised salt, 21 (41.2%) did not know about the existence of iodised salt and 11 did not know the benefits of iodised salt (21.6%). 28 individuals (28%) stated that a health care professional had recommended them to implement iodised salt or a multivitamin supplement containing iodine in their diet as opposed to 66 (66%) who said they did not receive that recommendation. Individuals who had a recommendation by a health care professional to implement iodised salt or a multivitamin supplement containing iodine are 8 times more likely to utilize iodised salt (OR=8,138; CI 95% [2,764;23,967]).

CONCLUSIONS: While it is a work in progress, the implementation of iodised salt in the Azorean's diet has taken a step in the right direction. It was demonstrated that implementing the consumption of iodised salt, explaining its importance and creating awareness of iodine deficiency by a health care worker can be a powerful weapon to tackle iodine deficiency.

KEYWORDS

Awareness, Azorean islands, Iodine, Iodine deficiency, Iodised salt

RESUMO

INTRODUÇÃO: Estudos passados demonstraram uma carência de iodo na população açoriana, nomeadamente em crianças e grávidas. Isto levou a uma implementação de medidas para aumentar a consciencialização e fornecer soluções para este problema, nomeadamente através do consumo de sal iodado.

OBJETIVOS: Esclarecer a eficácia das medidas de saúde implementadas e que fatores influenciaram o consumo de sal iodado.

METODOLOGIA: Estudo observacional e transversal realizado através da aplicação de um questionário para avaliação do consumo de iodo a pessoas que se apresentaram à Unidade de Saúde da Ilha do Faial, Açores, entre 9 e 14 de novembro de 2020.

RESULTADOS: De 100 indivíduos, 49 consumiam sal iodado e 51 indivíduos não. A idade média dos participantes foi de 49,81 anos. 19 participantes indicam ter um diagnóstico de doença tiroideia. A recomendação de um médico e/ou nutricionista foi o principal fator influenciador para a implementação de sal iodado (n=18; 36,7%). Dos 51 participantes que não consumiam sal iodado, 21 (41,2%) não tinham conhecimento da existência do sal iodado e 11 (21,6%) não conheciam os benefícios do sal iodado. 28 indivíduos (28%) afirmaram que um profissional de saúde recomendou a implementação sal iodado ou um suplemento multivitamínico contendo iodo na sua dieta; contrariamente, 66 (66%) negam ter recebido essa recomendação. Indivíduos em que um profissional de saúde recomendou a implementação de sal iodado ou suplemento multivitamínico contendo iodo têm 8 vezes mais probabilidade de utilizar sal iodado na sua dieta (OR=8.138; IC 95% [2.764;23.967]).

CONCLUSÕES: Embora seja um problema que necessita de intervenção adicional, a implementação do sal iodado na dieta dos açorianos deu um passo na direção correta. Demonstrou-se que implementar o consumo de sal iodado, explicando sua importância e mantendo a consciencialização sobre a deficiência de iodo por parte de um profissional de saúde pode ser uma arma poderosa para combater este problema.

PALAVRAS-CHAVE

Consciencialização, Açores, Iodo, Deficiência de iodo, Sal iodado

INTRODUCTION

Iodine is an essential micronutrient to the normal functioning of the human body and its metabolism. Concurrently, this micronutrient is only present in small amounts, almost exclusively in the thyroid gland and enables the synthesis of thyroid hormones, one of the greatest moderators of cell metabolism and organ development (1, 2).

In 2007, the World Health Organization found that iodine deficiency remains a significant public health problem in Europe, despite its increased awareness. Salt iodization was unveiled as a solution, currently being the main preventive strategy to tackle iodine deficiency disorders. Its success is based on the implementation of iodised salt (IS) by the general population, and most notably, by the most susceptible groups to iodine deficiency disorders, like pregnant woman and children (1–3).

Studies performed in the Autonomous Regions of the Azores showed a significant lack of iodine intake for children and pregnant women. It was shown that 78% of Azorean children had an insufficient supply of iodine, attaining greater significance when compared to Mainland Portugal values (only 47% of children had iodine insufficiency), thus demonstrating the need of this micronutrient in this region (4–6). This led to an increased awareness by the Autonomous Region of the Azores and its health institutions, which prompted the enlighten of the population on the benefits of the consumption of IS (4). To achieve this goal, health care professionals raised awareness through patient care visits and communication channels. These measures started to be implemented in the region in 2014 and 2015. The Government of the Azores implemented a broadcasting of 37 seconds, explaining the health implications of iodine deficiency (particularly in pregnancy and child development), recommending the consumption of iodine rich foods, and highlighting the importance of replacing non-iodised salt by IS. This broadcast was transmitted in the Azorean broadcaster RTP Açores, in order to specifically target the Azorean population. Awareness in patient care visits was mainly performed in health centers and consisted of a more individualized approach performed by health care workers (physicians, nutritionists, nurses, etc.). In these visits, iodine deficiency and IS's role and benefits were discussed with the patients with assistance from other educational materials (for example, pamphlets) (7).

One of the greatest steps instigated to improve the supply of iodine was the implementation of a government protocol that replaced non-iodised salt by IS, in all regional public administration services' canteen/bar service, being public schools meals one of the main targets (8). Another measure enforced by the government was the free distribution of iodine supplements by primary care health centers to pregnant/breastfeeding women (9).

Despite most efforts have been made in the following years after implementation of these measures, some of them are still active today, mainly the utilization of IS in canteen/bar service and the free distribution of iodine supplements to pregnant/breastfeeding women. In a 2020 study conducted in São Miguel Island, Azores, it was observed a significant reduction in iodine deficiency in schoolchildren and pregnant women. Some of these results were attributed to the implementation of IS in Azorean houses and canteens of all public schools (10, 11).

These efforts were directed at all Azorean population, including Faial Island's population, and its effectiveness has yet to be determined.

OBJECTIVES

This study aims to clarify the effectiveness of health measures created to motivate Azoreans to implement IS in their diets and acknowledge

the influencing factors of this implementation in Faial island's population.

METHODOLOGY

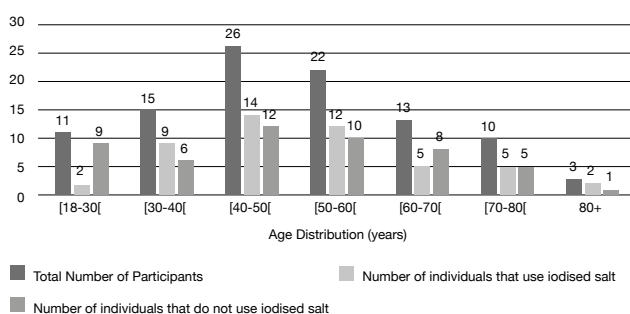
An observational and cross-sectional study was conducted, comprising all the individuals who presented themselves, in person, to the Unidade de Saúde da Ilha do Faial (USIF) for physician/nursing appointments or administrative procedures and the employees who reported to service at the USIF, from November 9th to November 14th, 2020. All individuals who were deprived of their autonomy and individuals who were not interested in participating in the study were excluded. The information was collected through the implementation of a questionnaire comprising questions on iodine consumption (IS or multivitamin supplements containing iodine [MSCI]) and their reasons behind this implementation or non-implementation. Other questions such as age, personal history of thyroid disease and whether a health care professional recommended the use of IS or MSCI were assessed (Appendix 1). All the individuals who agreed to participate in the study were required to complete an informed consent form. Questionnaire answers were inserted in an anonymized database to preserve anonymity. Database management, statistical analysis and graphics was conducted using Microsoft Office Excel (Microsoft Office Excel for Windows, Version 16.23) and IBM Statistical Package for the Social Sciences (SPSS Statistics for Windows, Version 27.0; NY, USA). Statistical analysis consisted in descriptive analysis of the results, applying the chi-square test to compare variables and calculation of the odds ratio when adequate. Approval was obtained by the Ethics Committee of Unidade de Saúde da Ilha do Faial and from the Ethics Committee of Faculdade de Medicina da Universidade de Coimbra.

RESULTS

A total of 128 people were eligible, where 102 agreed to participate, translating in a 79.7% response rate to the questionnaire. Two individuals were excluded due to incorrect filling of questionnaire and/or questionnaire filling with conflicting information, translating into a total of 100 eligible questionnaires for analysis. 49 individuals claimed to use IS in their diet. The majority (n=47; 47%) declared to only use IS, 1 declared to use IS and a MSCI and 1 declared to use IS and pregnancy/breastfeeding iodine supplementation (PBIS). 51 individuals claimed to not use IS, wherein 4 claimed to only use a MSCI. Age of responders varied between 18 and 86 years of age with a mean age of 49,81 years. IS consumption was analyzed according to each considered age group (Figure 1). 19 participants (19%) had a diagnosis of thyroid disease, where 10 (52.63%) stated the use of IS in their diet. In the group of 49 individuals that used IS, the major factor for its implementation was the recommendation from a physician and/or a nutritionist (n=18; 36.7%).

Figure 1

Age distribution (years) according to the total number of participants and the number of participants that use and that do not use IS in their diets



This was followed by implementing IS by their own initiative (n=15; 30.6%). The information/broadcasts distributed by the Government of the Autonomous Region of the Azores influenced 12 individuals (24.5%) to use IS. Despite these being the main stated reasons for IS consumption, there were also other influencing factors (Table 1). A total of 51 individuals denied using IS in their diets. When questioned about the reasons for its non-consumption, most participants responded that they were not aware about the existence of IS (n=21; 41.2%) and some did not know its benefits (n=11; 21.6%). Despite these being the main stated reasons for IS non-consumption, there were also other influencing factors (Table 2). 5 individuals claimed to take a MSCI, with only one of them (20%) stating to also use IS. 4 participants (80%) responded that they use this multivitamin supplement for their general health benefits and 1 participant (20%) did not specify the reason. Only 1 individual (1%) claimed to be taking pregnancy/breastfeeding iodine supplement at the time of questionnaire filling. That individual also stated to consume IS in their diet. Of the 100 individuals in this study, 28 (28%) stated that a health care professional (physician, nutritionist, etc.) has recommended them the implementation of IS or a MSCI in their diets and 6 (6%) have been recommended only for PBIS. The remaining 66 (66%) individuals said to have never been recommended to implement IS or a MSCI in their diets. No one (n=0) was recommended to implement a MSCI for another nutrient deficiency besides iodine deficiency. Of the 28 individuals that receives a recommendation, 23 (82.14%) used IS in their diet (Table 3). Regarding

the individuals that have a diagnosis of thyroid disease (n=19; 19%), 7 (36.84%) said to have been recommended to implement IS or a MSCI in their diet, with 6 of those (78.71%) using IS. All the patients that stated "I did not know the benefits of iodised salt" (n=11; 100%), said to not have been recommended to implement IS or a MSCI. The chi-square test proved the existence of an association between presence of a health care professional (physician, nutritionist, etc.) recommendation to implement IS or a MSCI in an individual's diet (excluding PBIS) and the consumption of IS (p<0.001). Further analysis through odds ratio calculation has shown that individuals who had a recommendation by a health care professional (physician, nutritionist, etc.) to implement IS or a MSCI (excluding PBIS) are 8 times more likely to use IS in their diet (OR=8,138; CI 95% [2,764;23,967]). There were no other variants in this study that demonstrated a statistically significant correlation (p<0.05) with IS consumption.

DISCUSSION OF THE RESULTS

Even though, the effectiveness of measures designed to raise awareness on the importance of iodine in health is still under study, the tackle on iodine deficiency has made a tremendous evolution. This was achieved, not only because of government's implemented efforts but also because of the population's acknowledgment of this healthcare problem and their favorable response to these measures (1, 12–16). Of the countries that have recorded data on the consumption of IS, only 27.6% globally and 22.5% in Europe, have attained the goal of a minimum of 90% of households consuming adequately IS (15-40 mg iodine kg⁻¹). As such, although some progress has been made, the road ahead is still long (1, 12, 15, 17, 18).

Unfortunately, only 49% of participants in our sample stated to supplement their diet with IS, which is far from the 90% goal, revealing that, even though studies show promising results, there is still an information gap between the general population and the government, organizations and health care workers (11). This is also translated by the fact that, most of participants who do not consume IS do not know about its existence or benefits, contrasting with studies in which the population showed greater knowledge about the topic and displaying higher IS consumption (13, 14).

Interestingly, contrary to some regions/countries where lack of use of IS correlates with its shortage, unavailable widespread sale and a higher cost of IS, these were not influential points in our population (13, 19–21). The efforts for awareness and intervention encouraging the increase of consumption of IS performed through personalized population approaches has been studied by other authors. These showed promising results and highlighted that interventions adapted to the community and its culture is a powerful weapon to tackle iodine deficiency (22). It is also displayed the importance of health care workers as a trusted source of information about IS consumption and iodine deficiency (13, 14, 22, 23). Even though the use of MSCI and PBIS was sparse in this study, the efforts put in action by the government are already showing an important improvement in pregnant and breastfeeding women, to whom the PBIS is readily prescribed and

Table 1

Percentage and frequency of each answer to the question "If you use iodised salt, what influenced you to implement iodised salt in your diet?"

"IF YOU USE IODISED SALT, WHAT INFLUENCED YOU TO IMPLEMENT IODISED SALT IN YOUR DIET? (CAN SELECT MULTIPLE CHOICES)", % (NO.)		
"Information/Broadcasts distributed by the Government of the Autonomous Region of the Azores"	24.5%	(n=12)
"Recommendation from a Physician/Nutritionist"	36.7%	(n=18)
"Recommendation from Friends and/or Family"	14.3%	(n=7)
"Own Initiative"	30.6%	(n=15)
"Social Networks"	4.1%	(n=2)
"Television entertainment programs"	0.0%	(n=0)
"Other"	0.0%	(n=0)

Table 2

Percentage and frequency of each answer to the question "If you do not use iodised salt, are the reasons why you do not consume it?"

"IF YOU DO NOT USE IODISED SALT, WHAT ARE THE REASONS WHY YOU DO NOT CONSUME IT? (CAN SELECT MULTIPLE CHOICES)", % (NO.)		
"I did not know the benefits of iodised salt"	21.6%	(n=11)
"I did not know of the existence of iodised salt"	41.2%	(n=21)
"Iodised salt is too expensive"	2.0%	(n=1)
"I do not have any interest in implementing iodized salt"	13.7%	(n=7)
"Other:"		
"I do not use salt in my diet"	13.7%	(n=7)
Not specified	7.8%	(n=4)

Table 3

Usage of iodised salt in diet according to the presence of a recommendation by a health care professional (physician, nutritionist, etc.) to implement iodised salt or any multivitamin supplement that contains iodine

"HAS ANY HEALTH CARE PROFESSIONAL (PHYSICIAN, NUTRITIONIST, ETC.) EVER RECOMMENDED YOU TO IMPLEMENT IODISED SALT OR ANY MULTIVITAMIN SUPPLEMENT THAT CONTAINS IODINE IN YOUR DIET?"	UTILIZES IODISED SALT IN DIET, % (NO.)		DOES NOT UTILIZE IODISED SALT IN DIET, % (NO.)		TOTAL, NO.
"Yes"	82.14%	(n=23)	17.86%	(n=5)	n=28
"Yes, but only for pregnancy/breastfeeding iodine supplementation"	66.67%	(n=4)	33.33%	(n=2)	n=6
"No"	33.33%	(n=22)	66.67%	(n=44)	n=66

freely provided (10). Increasing informed decision making and providing awareness on the benefits of PBIS might provide even further improve results in pregnant women (24).

Adding to similar international studies, a recent study in São Miguel Island, Azores, showed the remarkable effects of implementing mandatory IS in public school canteen/refectory/bar services and increasing household consumption of IS in schoolchildren, decreasing the number of children with iodine deficiency in that island (11, 15, 16, 25, 26). The 48.3% household IS consumption registered in São Miguel Island is similar to the reported 49% use of IS of individuals in this study, as this might demonstrate consistency in information spread and implementation of measures in São Miguel Island and Faial Island. Other interventions to improve household IS consumption have been discussed throughout literature such as mandatory, government regulated salt iodization in order to provide properly iodised salt with adequate concentration to all households (27–29). But this might not be required if new and already implemented measures are better enforced to create awareness on iodine deficiency and providing the correct and needed information.

Since this study was conducted on a primary care setting and the sample retrieved from individuals attending appointments and working in this setting, there might be at play an important selection bias, as these individuals might be more health conscious and knowledgeable about iodine deficiency and IS. Consequently, the fraction of individuals who implement IS on their diet might be higher in this study than that of the overall population of Faial Island. The sample size in this study was also smaller than ideal.

CONCLUSIONS

Despite the great efforts made, and many with fruitful results, it is still necessary to strengthen the promotion of IS, in substitution of non-iodized salt, through awareness campaigns tailored to the community. The government, health institutions and health care workers should maintain the efforts to raise awareness of iodine deficiency, its implications on the people's health, and work together to promote the utilization of IS more closely within the community.

It would be important to repeat this study, expanding it to all the islands in the Azores, with surveys not only in health care institutions, but also through other forms of surveys to increase accessibility and sample size. Although, in this studied population, health care professionals' intervention was the main reason for IS implementation an individualized approach might not be sustainable to attain the 90% IS household consumption and improve iodine deficiency numbers. Having this into consideration, a mandatory, regulated salt iodization program can perhaps be considered solutions for this problem.

Further deepen the knowledge on IS consumption and the reasoning behind the community's implementation of IS in their households, can provide some guidance on how to achieve the 90% household usage of IS goal and use the attained information to resolve this problem and others to come.

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CONFLICTS OF INTEREST

The author does not reported any conflict of interest.

AUTHORS' CONTRIBUTIONS

CPS: Was responsible for the conception of this study, aquisition of data, writing the manuscript and its review.

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APPENDIX 1

ALL QUESTIONS AND ANSWER OPTIONS PROVIDED IN THE QUESTIONNAIRE.

Q1: Age (years)	Q2: Were you diagnosed with any thyroid disease? (Yes/No)
Q3: Do you consume iodised salt or any multivitamin supplement that contains iodine? (Can select multiple choices)	
Iodised Salt	Multivitamin supplement that contains iodine
Pregnancy/Breastfeeding iodine supplement	None of the above
Q4: If you use iodised salt, what influenced you to implement iodised salt in your diet? (Can select multiple choices)	
Information/Broadcasts distributed by the Government of the Autonomous Region of the Azores	
Recommendation from a Physician/Nutritionist	
Recommendation from Friends and/or Family	
Own Initiative	
Social Networks	
Television entertainment programs	
Other	
Q5: If you use a multivitamin supplement containing iodine, what influenced you to implement it in your diet? (Can select multiple choices)	
Information/Broadcasts distributed by the Government of the Autonomous Region of the Azores	
Recommendation from a Physician/Nutritionist	
Recommendation from Friends and/or Family	
Own Initiative	
Social Networks	
Television entertainment programs	
Just because it's a multivitamin supplement, not due to their iodine content	
Other	
Q6: If you do not use iodised salt, what are the reasons why you do not consume it? (Can select multiple choices)	
I did not know the benefits of iodised salt	I did not know of the existence of iodised salt
Iodised salt is too expensive	I do not have any interest in implementing iodised salt
Other	
Q7: Has any health care professional (physician, nutritionist, etc.) ever recommended you to implement iodised salt or any multivitamin supplement that contains iodine in your diet?	
Yes	
Yes, but only for pregnancy/breastfeeding iodine supplementation	
Yes, but for another other nutrient deficiency other than iodine deficiency	
No	