P-14

Impact Evaluation of the Universal Salt Iodization Intervention in Sarawak, Malaysia from 2008-2018

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INTRODUCTION

Iodine deficiency disorders (IDD) is a major public health problem which may affected the human health from early foetal life throughout to adulthood [1,2].

The spectrum of IDD in foetus is associated with iodine deficiency (ID) in mother during pregnancy which may cause abortions, stillbirths, congenital abnormalities, increased perinatal and infant mortality. While, IDD in children may impair mental function and retard physical development [3].

2. Sarawak, the largest state in Malaysia, has long been well-known that endemic IDD is common over wide areas of the state. During the 70s, most of the interior and coastal regions of the state have been endemic for IDD [4,5].

In 2008, a national IDD study was conducted in Malaysia including Sarawak have revealed the median urinary iodine concentration (UIC) in Sarawak was at a borderline-adequate level, but the median UIC in rural areas was inadequate [6].

Thus, a mandatory universal salt iodization (USI) law was passed in Sarawak in 2008 which requires all salt for human consumption to contain iodine at a concentration of 20-40 mg per kg of salt [7].

OBJECTIVE

The aim of this study is to evaluate the impact of the mandatory USI among school-aged children in Sarawak, Malaysia, based on two state-wide IDD surveys conducted in 2008 and 2018.

METHODS

1. The IDD data were extracted from the 2008 and 2018 Sarawak state-wide IDD surveys. Briefly, both surveys were cross-sectional surveys covering information on the school-aged children socio-demographic, status of goitre, status of urinary iodine and Iodine content in the salt samples from home.

2. A total of 1104 and 988 school-aged children (8 to 10 years old) were involved in the surveys in year 2008 and 2018, respectively.

3. Thyroid size enlargement of the thyroid gland in school-aged children was determined by palpation by trained staff nurses and are classified based on the WHO/UNICEF/ICCIDD classification [3].

4. Spot urine samples were collected using urine containers with screw cap from all the respondents and the samples were stored in cool, dry place before sent to the regional IDD Laboratory in Kota Kinabalu, Sabah, Malaysia for analysis by using in-house micro method [8].

5. SPSS software version 21 for windows was used for data analysis. Differences between population in prevalence of goiter. While differences in median urinary iodine and median salt iodine between groups were evaluated using Mann-Whitney test.

RESULTS

1. The overall prevalence of goitre among the school children in Sarawak was significantly lower in the 2018 (0.1%, n=1) compared to 2008 (2.9%, n=32).

2. While, the median urinary iodine concentration (UIC) in urine samples were rose significantly from borderline adequate (101.9 µg/L; IQR,62.3-146.5 µg/L) in 2008 to adequate (126.0 µg/L; IQR, 71.2 – 200.0 µg/L) in 2018. (Figure 1)

3. In addition, the condition where school children having UIC of ≥100 µg/L (adequate) had improved significantly from 50.7% in year 2008 to 62.3% in years 2018. (Table 2)

4. In terms of iodine content in salt samples, the median salt iodine concentration also improved significantly in 2018 (35.4 µg/L; IQR, 20.5 – 43.9 µg/L) compared to 2008 (14.7 µg/L; IQR, 0.00 – 27.0 µg/L). (Figure 2)

5. The distribution of salt iodine concentration of ≥20 µg/L (adequate) had also improved significantly from 32.5% in year 2008 to 75.4% in years 2018. (Table 3)

Table 1: Socio-demographic characteristic among SC in 2008 and 2018

Characteristic	2008 Frequency (%)	2018 Frequency (%)	P
Age (Years)			
8	378 (34.2%)	315 (31.9%)	0.51
9	396 (35.9%)	363 (36.7%)	
10	330 (29.9%)	310 (31.4%)	
Gender			
Male	576 (52.2%)	495 (50.1%)	0.34
Female	528 (47.8%)	493 (49.9%)	

Table 2: Distribution of Urinary Iodine Concentration (UIC) 2008 and 2018

Year	n	Frequency (%) <20	20-49	50-99	100-199	200-299	≥300	P
2008	1104	50 (4.5)	162 (14.7)	332 (30.1)	455 (41.2)	60 (5.4)	45 (4.1)	<0.01
2018	988	32 (3.2)	132 (13.4)	208 (21.1)	367 (37.1)	177 (17.9)	72 (7.3)	

Table 3: Distribution of Salt Iodine Concentration (IC) 2008 and 2018

Year	n	Frequency (%) <20	20-40	>40	P
2008	120	73 (60.8)	38 (31.7)	9 (0.8)	<0.01
2018	382	94 (24.6)	145 (38.0)	143 (37.4)	

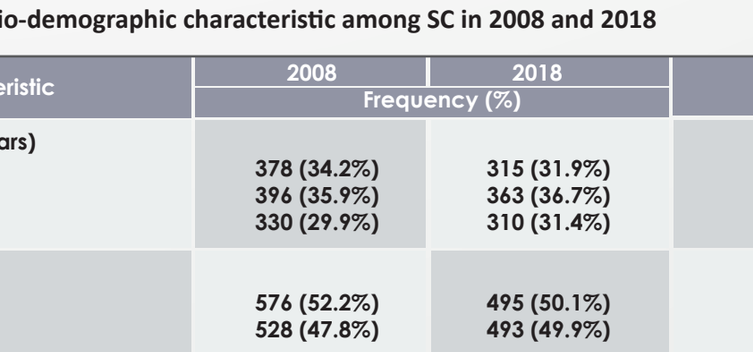

Fig 1: Median Urinary IC (µg/L) in 2015 and 2018

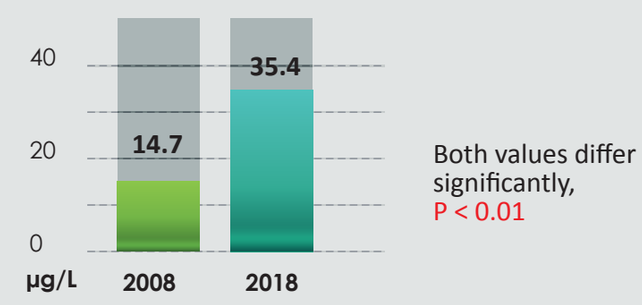

Fig 2: Median Salt IC (ppm) in 2015 and 2018

DISCUSSION/CONCLUSION

1. After 10 years of mandatory universal salt iodization (USI) implemented in Sarawak, the results from the both state-wide surveys confirmed the effectiveness of mandatory USI in improving the status of iodine in Sarawak.

2. In future, different subgroups such as pregnant women, lactating mothers and neonates should be included in the study.

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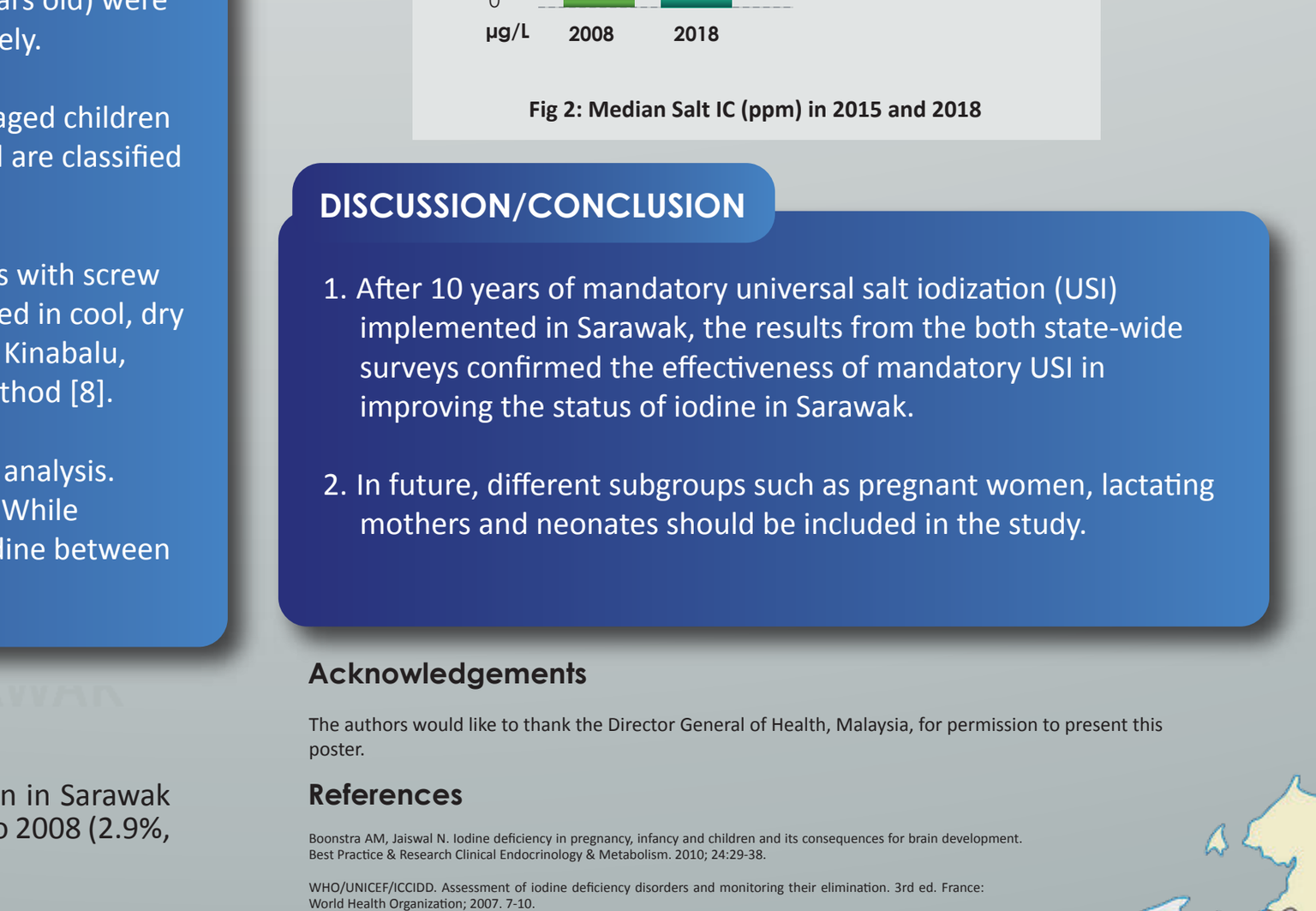

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