Pregnant women in poor rural areas of Indonesia have low iodine intakes


Background
Iodine deficiency is a recognized public health problem in Indonesia, and there have been extensive efforts to reduce its impact on the population, particularly through the use of iodized salt. Household coverage with iodized salt has been monitored regularly since 1998: as part of the annual National Socio-Economic Survey (Susenas) until 2003, and as part of the National Basic Health Research (Riskesdas) survey in 2007 and again in 2013.

Household coverage with any iodized salt (assessed by the qualitative rapid test kit, RTK) has improved from 80.3% in 1998 (Susenas), reaching 86.6% in 2005 (Susenas), 86% in 2007 (Riskesdas) and 91.9% in the latest survey (Riskesdas 2013). However, the coverage with adequately iodized salt (>15 ppm) is currently thought to be below the target of universal salt iodization (i.e., >90% households). At the same time, the Riskesdas surveys have continued to report optimal iodine nutrition at the national level: in 2007, the median urinary iodine concentration (MUIC) in school-age children was 224 µg/L; in 2013, the MUIC was optimal in all surveyed populations, including school-age children, women of reproductive age, and pregnant women (respectively, 215 µg/L, 189 µg/L, and 169 µg/L).

Comparing iodine status of children, non-pregnant and pregnant women
Aware that national-level data may mask sub-national variation, this study compared the iodine status of school-age children (SAC), women of reproductive age (WRA), and pregnant women (PW) from the same household according to their place of residence (urban/rural), geographical regions, socio-economic status (Figure 1a and b), and consumption of iodized salt (Figure 2). The analysis included 13,811 households, with 6,149 SAC (aged 6–12 years), 13,218 WRA (aged 15–49 years), and 578 PW (aged 15–49 years) from the 2013 Riskesdas survey.

FIGURE 1  Median urinary iodine concentration (µg/L): (a) according to residence, (b) according to socio-economic status

School-age children Women of reproductive age Pregnant women

Urban Rural National

Horizontal lines mark the threshold indicating sufficient iodine nutrition (100 µg/L for SAC and WRA, and 150 µg/L for pregnant women).
In all population groups, rural residence was associated with lower median UIC than urban residence (Figure 1a), although both rural and urban residents were iodine sufficient. The median UIC varied by region in all groups, and the school-age children and non-pregnant women were iodine-sufficient in all regions. For SAC, the MUIC ranged from 168 µg/L in East Nusa Tenggara (NTT)/West Nusa Tenggara (NTB) to 260 µg/L in Central Java; and for WRA, it ranged from 137 µg/L in NTT/NTB to 240 µg/L in Central Java. In pregnant women, the MUIC fell below the UIC threshold of 150 µg/L, suggesting iodine deficiency in three regions: East Java (140 µg/L), Maluku/Papua (131 µg/L), and NTT/NTB (122 µg/L). The largest variation in pregnant women UIC was in NTT/NTB, where the 25th and 75th percentile were, respectively, 64 and 488 µg/L. However, as none of the median UICs were greater than 300 µg/L, there is no evidence of excessive iodine intake.

Socio-economic status and access to iodized salt

The iodine status of SAC and WRA was adequate even when their household salt contained less than 5 ppm iodine, which implies that there may be other sources of dietary iodine (Figure 2). The highest median UIC was associated with consumption of over-iodized salt (>50 ppm); however, the overall proportion of over-iodized salt was very small. On the other hand, almost a half of all households were consuming inadequately iodized salt, which was associated with lower iodine status.

Households from lower socio-economic quintiles had lower median UIC than the higher quintiles, demonstrating a wealth-related disparity in iodine consumption (Figure 1b). The median UIC was adequate in SAC and WRA in all economic quintiles, regardless of whether they were consuming non-iodized (<5 ppm iodine) or inadequately iodized salt (5–17.9 ppm iodine). However, pregnant women from households consuming non-iodized salt had insufficient iodine intakes across all wealth quintiles.

Pregnant women may be at risk of iodine deficiency

Iodine deficiency during pregnancy can cause pregnancy loss and infant mortality, cretinism, and neonatal hypothyroidism in the offspring, and even mild deficiency in women during pregnancy has been found to cause subsequent educational and cognitive impairments in their children (1,2). In Indonesia, pregnant women from the lowest wealth quintiles and those consuming non-iodized salt may be at risk of IDD. In order to eliminate IDD, the coverage of adequately iodized salt should be improved to ensure that all socio-economic strata and all population groups can be reached.

As it appears that there are additional sources of dietary iodine (most likely iodized salt used in processed foods), efforts should be made to confirm and maintain these sources, particularly those that are most frequently and commonly consumed by populations in iodine-deficient regions and amongst poorer communities.

Conclusions

Indonesia needs to ramp up its salt iodization program to maintain optimal iodine status across all regions and in all populations, particularly in pregnant women. It is also recommended that iodine status be regularly monitored in all vulnerable groups to ensure that both deficiency and excess iodine intakes are avoided.

References