

Impact of wheat flour fortification program on micronutrient status in Jordan (2002-2010)

Objective

To decrease micronutrient deficiency level, Jordan has under taken two national micronutrients fortification programs, a salt iodization initiated in 1995 and wheat flour fortification program initiated in 2002.

Background

Micro nutrient malnutrition is a public health problem in Jordan. The flour fortification program was officially launched in 2002. Bread made from wheat flour is a staple food in Jordan. Since the inception of the program, the government of Jordan has provided premix for fortification of wheat flour at no cost to mills in support of the government's mandate that all mills fortify wheat flour. Wheat flour millers fortify Mowahad wheat flour (73–78% extraction rate). Flour was initially fortified with iron (dried ferrous sulfate) and folic acid. In March 2006, the program was expanded to include zinc, niacin, and vitamins A, B1, B2, B6, and B12. In June 2010, ministry of health formally added vitamin D. Since the inception of the flour fortification program, the Government of Jordan allocated an annual budget to provide premix at no cost to all wheat flour mills in Jordan in support of the government's mandate that all wheat flour mills fortify flour.

Method

A nationally representative cross-sectional surveys was conducted in 2002, and 2010 to measure the change in micronutrient deficiency levels in 2002 compared to 2010. The target population for this survey was defined as the universe of all Jordanian households, with recruitment of all eligible preschool children (12-59 months) and women of childbearing age (15 – 49 years of age) within selected households.

Result

Among women, mean serum ferritin concentrations were significantly higher in 2010 compared with 2002 (21.3 vs. 18.3 ng/mL), there was no statistically significant difference in mean hemoglobin concentrations or prevalence of anemia (29.2% vs. 29.3%), iron deficiency (35.1% vs. 38.7) or iron deficiency anemia (19.1% vs. 20.0).

Among the subsample of women (n=393) for whom RBC folate concentrations were measured in 2010, 13.6% of women were deficient 82.9% of women were folate insufficient.

Children

Among children, mean serum ferritin concentration was significantly higher in 2010 compared with 2002 (24.4 vs. 18.1 ng/mL), but there was no statistically significant difference in mean hemoglobin. In 2010 and 2002, the prevalence of anemia was 16.6% vs. 20.2%; prevalence of iron deficiency, 13.7% vs. 26.2; and prevalence of iron deficiency anemia, 4.8% vs. 10.1, respectively.

Conclusion

Between 2002 and 2010, significant improvement was observed in the prevalence of iron deficiency in children, but not in women. The mill monitoring data show that program was only partially implemented in the beginning. Ministry of Health established an effective monitoring system for all flour mills to measure the extent of compliance to the fortification program. Fully implemented program could be expected to improve the micronutrient status of the population. 2018 micronutrient deficiency survey, will be conduct to assess micronutrient status and the effectiveness of the flour fortification program.

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