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Iodine status of consumers of milk-alternative drinks in the United Kingdom: data from the National Diet and Nutrition Survey

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Iodine is an essential component of the thyroid hormones which are required for brain and neurological development during fetal and early life[1]. Milk is the main contributor to iodine intake in the United Kingdom (UK)[2]. In recent years, there has been an increase in the consumption of milk-alternative drinks (e.g., soya, almond, rice drinks), particularly by women and younger age groups[3,4]. These milk-alternatives, however, unless fortified, have a lower iodine content than cows' milk (median 7 *vs* 438 μg/kg, respectively)[5]. This is of concern because the consumers of milk-alternative drinks might be at risk of iodine deficiency. The aim of this study, therefore, was to investigate the iodine intake and status of milk-alternative consumers in the UK.

We used data from the National Diet and Nutrition Survey collected between 2014/15 and 2016/17 (Years 7–9) (i.e., prior to several manufacturers fortifying their milk-alternative drinks with iodine). Data on the consumption of milk-alternative drinks and cows' milk were derived from four-day food diaries. Daily iodine intake (μg/day) was also estimated from the food diaries. Iodine status was assessed using urinary iodine concentration (UIC, μg/L) measured in spot-urine samples.

A total of 3976 individuals were included [1353 from Year 7 (2014/15), 1370 from Year 8 (2015/16) and 1253 from Year 9 (2016/17)]. Milk-alternative drinks were consumed by 4.6% (n = 185) of individuals; 2.2% (n = 88) of those consumed these drinks exclusively while 2.4% (n = 97) also consumed cows' milk. There was a non-significant increase in the proportion of milk-alternative consumers from 3.9% in 2014/15 to 5.0% and 5.1% in 2015/16 and 2016/17, respectively ($P = 0.282$). Females were more likely to consume these drinks than males (5.4 *vs* 3.8%, $P = 0.015$) and the highest proportion of milk-alternative consumers was in the 16–49-year age group (6.3%, n = 85). Those who consumed milk-alternatives exclusively (n = 62) had a significantly lower UIC than cows'-milk consumers (n = 2426) [median (25–75th percentile): 79 (38–135) μg/L *vs* 132 (80–209) μg/L; $P < 0.001$]. When comparing to the median-UIC cut-off defined by the World Health Organisation for iodine sufficiency in populations or groups (i.e., median-UIC > 100 μg/L), only the group of cows'-milk consumers was iodine-sufficient. Those who exclusively used milk-alternatives had a lower dietary iodine intake than those who consumed only cows' milk [median (25–75th percentile): 94 (63–158) μg/day (n = 88) *vs* 129 (92–181) μg/day (n = 3399), respectively; $P < 0.001$)].

These data, collected prior to manufacturers fortifying their milk-alternative drinks with iodine, show that consumers of unfortified milk-alternatives are at risk of iodine deficiency. With the continuing rise in consumption of milk-alternative drinks, it is important for manufacturers to fortify them appropriately with iodine (i.e., with potassium iodide) to provide a similar iodine content to that of cows' milk and thus reduce the risk of iodine deficiency in milk-alternative consumers.

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