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Evaluation of knowledge of the Importance of Iodine among Women

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ABSTRACT

Iodine is an essential component of thyroid hormones; required for normal cognitive function and metabolism throughout life. During pregnancy, maternal iodine and thyroid hormones are required for fetal neurogenesis, including axon and dendrite growth, synapse formation, myelination and neuronal migration. This paper measured the extent to which women and health practitioners were knowledgeable about the importance of iodine. Findings indicate that midwives' knowledge of iodine and its role in healthy pregnancies is poor according to the limited studies. This is further reflected by poor knowledge in women of childbearing age, even in those who have received dietary advice as part of routine antenatal care. Globally, there was poor knowledge of iodine among health practitioners; however the effects of this may be mitigated by the implementation of fortification and supplementation.

Keywords: Poor Knowledge, Iodine, Pregnant women, Health practitioners, Diet.

INTRODUCTION

Iodine is an essential component of thyroid hormones; required for normal cognitive function and metabolism throughout life [1]. During pregnancy, maternal iodine and thyroid hormones are required for fetal neurogenesis, including axon and dendrite growth, synapse formation, myelination and neuronal migration. Iodine is solely obtained from dietary sources, primarily dairy products, and seafood in the United Kingdom (UK), or supplements [2-3]. The most recent National Diet and Nutrition Survey found that, although children met the World Health Organization (WHO) definition of iodine sufficiency, women of child-bearing age (16–49 years of age) did not. Iodine requirements increase by approximately 50 % during pregnancy, leaving this population potentially vulnerable to iodine deficiency [1]. This may be compounded by the exclusion of iodine-rich foods due to the following of vegetarian or vegan dietary patterns or the exclusion of foods during pregnancy such as smoked fish, raw shellfish, marlin and shark as well as advising to limit portions of oily fish to two per week due to concerns regarding heavy metal toxins, as well as difficulties with the symptoms of nausea and vomiting [4]. Iodine deficiency in pregnancy is the leading cause of mental retardation in children worldwide. The effects of severe iodine deficiency on fetal development are well recognized; the effects of mild to moderate iodine deficiency are less well established [5]. It has been suggested that mild iodine deficiency in pregnancy may result in lower intelligence quotient (IQ) scores in offspring; as well as increased risk of perinatal complications. Some population studies have supported this, as maternal iodine deficiency-induced thyroid dysfunction has been, albeit inconsistently, linked to impairments in intellectual and behavioural function in offspring [6]. Iodine fortification in the form of iodised salt has been implemented in a number of countries since its recommendation by the [7]. For example, in 1996, China implemented a universal salt iodisation policy following in the footsteps of the United States of America and Switzerland who have iodised salt since the 1920s. [6] studied the urinary iodine concentration of schoolgirls (14–15 years old) across the UK and found this population to be iodine deficient. Meanwhile, despite the lack of high-quality evidence or trials concerning the effect of iodine supplementation on fetal outcomes, a number of health authorities worldwide, including in Australia and Croatia where iodine fortification is mandatory, have decided to include the recommendation for iodine supplementation during pregnancy and lactation in their guidelines for antenatal care [8] . Despite the public health campaigns to improve awareness of and uptake of folic acid, another

micronutrient with a vital role during early pregnancy, less than half of women are aware of the role of folic acid or the need to take supplements in the perinatal period. This review aims to identify and evaluate studies relating to knowledge of the role of iodine during pregnancy among health practitioners and patients.

Literature Review

Key findings from studies in the UK found that iodine knowledge is low among women of child-bearing age, they are unsure of dietary sources of iodine and they are not consistently provided with relevant information from HCPs [9]. There was general agreement among participants that there was a lack of information provided on iodine. In the cohort studied by [10-11] quarter of women reported no discussion around nutrition in pregnancy and that advice regarding iodine was insufficient, with education, when given, focusing on foods to avoid and dietary supplements. In the cohort of women of child-bearing age studied by O'Kane et al., only 9 % had previously received information about iodine and 75 % reported this was during formal education rather than as part of clinical care [12]. The 12 % of participants in the study by Combet et al. who reported receiving sufficient iodine information in pregnancy did not have a significantly higher iodine intake, however, the 64 % who had received sufficient information on calcium did have significantly higher iodine intakes from food and supplements throughout pregnancy compared with those who had reported not receiving sufficient information. It was also noted that multiparous women reported receiving less information in their current pregnancy than during their first pregnancy, as prior knowledge was assumed [11]. Women were unaware of dietary sources of iodine. In the study by Combet et al., 56 % were unable to identify any iodine-rich food, but incorrectly identified dark green vegetables and salt as good sources of iodine in the UK, where salt is not required to be fortified with iodine and there is low availability of iodised salt. This was similar to the 45 % of participants who were unsure of dietary sources of iodine in the cohort studied by [11]. Milk and dairy products, the largest dietary contributors to iodine intake in the UK, were identified as iodine rich by only 9 % of women in this study and a similar proportion of the participants in the study by [10]. A great percentage of women in both cohorts identified fish as an iodine-rich food source with 30 and 39 %, respectively [11]. The study by O'Kane et al. was advertised through a local higher education institution, resulting in a cohort with greater knowledge than would be expected in the general population and included women of child-bearing age rather than those who are or have been pregnant, and therefore participants may not have been exposed to antenatal care. Despite this assumed greater knowledge, 46 % of participants did not meet the recommended daily intake of iodine calculated by food frequency questionnaire and few correctly identified dietary sources of iodine. This and one other study reported that increased maternal age and higher educational attainment were associated with significantly higher total iodine knowledge scores [12]. Higher intake of iodine-rich foods (fish and dairy products) was positively associated with iodine knowledge and knowledge of health problems associated with iodine deficiency [2, 12]. There was, in general, a willingness to change dietary behaviours in pregnancy when provided with specific advice by health practitioners with supplementary information for future reference [13]. For example, women reported reducing or eliminating fish in their diets due to concern regarding heavy metals and toxins resulting in potential harm to their baby, following nutrition advice [14].

Professional knowledge

The papers highlight that, although midwives are aware of the importance of their role as nutrition advisors, they do not feel adequately equipped to perform it and lack confidence in addressing nutritional concerns [15]. The study by McCann et al. focused on obesity and discussed midwives' experiences of weight management advice as well as the broader topic of healthy eating. This cohort reported high workload, along with the normalisation of obesity, and lack of knowledge as reasons for the lack of dietary advice provided as part of routine antenatal care. The midwives in this study were aware of the health risks associated with poor diet and obesity in pregnancy but lacked the confidence and skills to give appropriate advice [15]. It was recognised that a lack of support in midwifery training may impact on the qualified midwife's ability to perform their role as nutrition educator, and many midwives indicated the need for further education [15]. Barrowclough et al. developed open-learning materials for midwives on the topic of perinatal nutrition. Participants had a statistically significant increase in knowledge score after completion of training via the materials. Topics included weight gain and recommended an increase in calorie intake during pregnancy, folic acid supplementation and iron-deficiency anaemia [13]. However, it was noted that this style of learning is time-consuming, with a minimum of 6 h required to complete this package determined during a pilot study, although the time taken by each participant was not recorded. Implementation of this style of learning would require support from managers to ensure sufficient study time is allowed for busy practicing midwives [13]. This open-learning pack did not include the topic of iodine nutrition, although it could be developed to include this and other topics at a variety of academic levels [13]. The papers by Mulliner et al. and Williamson et al. addressed the subject of iodine knowledge in health practitioners, but only included midwives. There are similar findings in the two studies despite 17 years having elapsed between their publication. Each study encompassed only one health

authority within the UK, and both included small numbers (58 and 60, respectively) when compared with the estimated 39 000 currently registered midwives within the UK. In both cohorts, a need for further education and clinical guidelines was reported [14]. The questionnaire used by Mulliner et al. focused on knowledge and a marking scheme was established by circulating the relevant section to a dietician, a consultant obstetrician and three midwives and comparing key areas identified by them with the researcher 's expectation. They report that consensus was reached without difficulty and key questions were given extra weight. In contrast, Williamson et al. asked midwives to rate their con fidence on a Likert scale. Most midwives in this cohort saw women in the last two trimesters of pregnancy, 18 % were community based and only 2 % routinely provided advice on iodine nutrition [14]. Participants rated knowledge on general nutrition 'very confident ' and 'confident ' for dietary guidelines, but 'unconfident ' for all aspects of iodine nutrition, without any formal assessment of knowledge [14]. Since the publication of [5], NICE have published guidance on maternal and child nutrition, and antenatal care. However, neither guideline includes any information around iodine nutrition in pregnancy, instead focusing on folic acid and foods to be avoided in pregnancy [3].

Studies focusing on patient iodine knowledge were examined. The population studied by Wang et al. in China, a country with a well-established salt iodisation programme, showed a significant difference between the urinary iodine concentration of those with 'poor iodine knowledge score' and 'high iodine knowle*dge score'. They found that iodine-related knowledge, having a habit of consuming iodine-rich food (including iodised salt), actively seeking dietary knowledge and trimester of pregnancy were associated with significantly higher urinary iodine concentration [7]. Poor iodine knowledge has been recognised as a factor contributing to iodine deficiency [12]. However, improving iodine knowledge alone may not be sufficient for women to achieve iodine sufficiency in pregnancy, although it may affect behaviour around supplementation and these concerns are supported by the ongoing difficulties faced implementing changes to behaviour around folic acid for the prevention of neural tube defects (NTDs).

Iodine in the context of folic acid

There are potential lessons to be learned from the delays in policymaking around folic acid, preconception supplementation and fortification. Despite the recommendations regarding folic acid that women take a 400 µg supplement of folic acid before pregnancy and for 12 weeks after conception [3], and associated public health campaigns, compliance remains low. This low uptake is likely to be influenced by the rate of unplanned pregnancies and the fact that in the UK HCP contact and nutrition counselling occurs at the end of the first trimester. In 2006, the SACN recommended fortification of flour with folic acid in the UK. This was due to the poor compliance with folic acid supplementation, particularly in deprived socioeconomic groups, and the number of unplanned pregnancies in the UK making preconceptual supplementation difficult. It has been estimated that 2000 births have been affected by NTDs between 1998 and 2012, that may have been prevented if folic acid fortification had been implemented in 1998, the same year it was made mandatory in the US [17]. In one cohort, women reported receiving information on folic acid around 12 weeks gestation, at which time it was deemed redundant. However, the proportion of women taking folic acid does increase after confirmation of pregnancy. Women also reported no particular emphasis on the topic during antenatal care. This may be explained, as with iodine, by a lack of knowledge among health practitioners as there was confusion around the recommendations for folic acid in a cohort of midwives in the UK [7]. Factors linked to lower rates of folic acid supplement use are unintended pregnancy, age, socio-economic and ethnic group [16]. Initiatives, integrated into healthcare, can be effective, but are more likely to be successful if they include making supplements easily available. Using printed resources is less effective for women in lower socio-economic groups. There is also lower awareness of folic acid recommendations in these groups, and the current folic acid policy may exacerbate health inequalities. In contrast, information received from health practitioners has been associated with changes in modifiable behaviours, including taking folic acid supplements.

CONCLUSION/RECOMMENDATION

Midwives' knowledge of iodine and its role in healthy pregnancies is poor according to the limited studies. This is reflected by poor knowledge in women of childbearing age, even in those who have received dietary advice as part of routine antenatal care. Globally, there was poor knowledge of iodine among health practitioners; however the effects of this may be mitigated by the implementation of fortification and supplementation.

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