Research roundup: September 2018

In this section, a range of brief synopses of recently published articles that may be of interest to health visitors is presented. The aim of this roundup is to provide an overview, rather than a detailed summary, of the research papers selected. Should you wish to look at any of the papers in more detail, a full reference is provided.

Nutrition and lifestyle in the preconception period

It is well known that a woman who is healthy at the time of conception is more likely to have a successful pregnancy and a healthy child. It is less well known that pre-pregnancy maternal health has an impact on child health both in the short and long term, the benefits of which extend across generations.

This review explored published evidence on maternal nutrition and lifestyle in the pre-conception period. Particular issues addressed included how women might plan for pregnancy; how planning influences pre-conception behaviours; and to what extent, if any, interventions offset risky behaviours.

Poor nutrition and obesity are prevalent among women of reproductive age, and differences between high-income and low-income countries have become less distinct over time. Similarly, diets considered to be falling short of nutritional recommendations are seen across all settings, especially among adolescents.

Obesity is associated with an increased risk of adverse perinatal and maternal outcomes. Complications in pregnancy include pre-eclampsia and gestational diabetes, and complications of delivery may include congenital anomalies, stillbirth, low birth weight, unsuccessful breastfeeding and even maternal death. Weight loss and a reduction of BMI reduces risk and improves outcomes.

In Canada, of 226 958 women (64% normal weight, 20% overweight and 12% obese) with singleton pregnancies, a 10% lower pre-conception BMI was associated with clinically meaningful risk reduction in pre-eclampsia, gestational diabetes, preterm delivery, macrosomia and stillbirth. Women undergoing bariatric surgery at least 2 years before conception also had a considerably lower risk of gestational diabetes, hypertensive disorders and large for gestational age neonates than women of a similar BMI who had no bariatric surgery.

ADOBE STOCK

Evidence highlights that micronutrient supplementation started in pregnancy can correct important maternal nutrient deficiencies

Drawing on data from low-, middle- and high-income countries, the authors illustrated that, overall and contrary to popular belief, pregnancy planning is more common than previously acknowledged. From a combination of survey information, it was estimated that 60% of the 213 million pregnancies worldwide in 2012 were intended (Sedgh et al, 2014). This pre-conception period, in which many women are contemplating and planning for pregnancy, at a time when research highlights women are most motivated to change, presents a real opportunity for public health interventions. The identification of women contemplating pregnancy is therefore significant. Supporting women at this stage may be more effective in securing improved child health outcomes than interventions in pregnancy.

Evidence highlights that micronutrient supplementation started in pregnancy can correct important maternal nutrient deficiencies and that interventions to improve maternal diet lead to modest reductions in gestational weight, but child health overall is

not fundamentally improved. Given the substantial time needed to reach a healthy weight, early intervention in the pre-planning stage is vital. Working at population level is also seen as essential to reduce obesity-related outcomes and improve child health outcomes in the longer term. Studies into specific interventions around weight reduction, nutrition and physical activity in the pre-pregnancy planning stages are yet to be established.

The authors concluded that, to improve global health, a more defined focus on intervention before conception is required. Alongside this, continued efforts to reduce smoking, alcohol consumption and obesity are needed in the population.

Most importantly, health professionals should be alerted to ways of identifying women who are planning a pregnancy so that early dialogue can take place with adequate time to promote and sustain change. Furthermore, population-level initiatives to reduce the determinants of pre-conception risks, such as obesity and smoking irrespective of pregnancy planning, remain essential to improve global health outcomes. JHV

Joanne Seal, Senior Lecturer, University of the West of England (UWE), Bristol

Stephenson J, Heslehurst N, Hall J. Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health. Lancet. 2018;391(10132):1830-1841

Public health failure in the prevention of neural tube defects

Anencephaly and spina bifida are two of the most common serious congenital malformations, and the evidence suggests that most cases can be prevented by consuming sufficient folic acid immediately before conception and in early pregnancy. The results of a randomised double-blind trial concluded that neural tube defects are due to vitamin deficiency disorder and require appropriate correction at individual level with the use of folic acid supplements started before pregnancy, and at population level through folic acid fortification of staple foods such as flour (MRC Vitamin Study Research Group, 1991).

Despite vigorous campaigning by public health authorities, many women do not take folic acid supplements before pregnancy (Beswick et al, 2014) and, although 81 countries have introduced mandatory folic acid fortification of flour, no EU country has yet implemented the measure. Of those that have, all studies of the consequences have shown a reduction in the incidence of neural tube defects (Honein et al, 2001), yet European neural tube defect rates have not declined between 1991 and 2011.

The authors assert that only unequivocal evidence of harm could weigh against this European decision, yet they discover that a flawed assessment of potential harm is impeding the introduction of this life-saving policy. They argue that the Institute of Medicine (IOM) interpretation of old and limited medical and scientific evidence, for an upper limit of folic acid was flawed (IOM, 1998) and that an upper limit for folic acid is not needed. The IOM put greater weight on the hypothetical possibility of harm than on the proven evidence of benefit, ignoring the fact that withholding a benefit is in itself a harm.

The review concludes that there is no scientific basis for setting an upper limit of intake for folic acid, as this has acted as a barrier to the wider introduction of mandatory fortification of flour in the prevention of neural tube defects. They call for the upper limit to be discarded, which would remove the scientific obstacle to the introduction of mandatory folic acid fortification in all countries. JHV

Joy Murray, SCPHN Programme Leader and Senior Lecturer, UWE, Bristol

Wald NJ, Morris JK, Blakemore C. Public health failure in the prevention of neural tube defects: time to abandon the tolerable upper intake level of folate. Public Health Rev. 2018;39:2

Diet during pregnancy and infancy and risk of allergic or autoimmune disease

Garcia-Larsen et al (2018) undertook a systematic review of research surrounding dietary supplementation in pregnant and lactating women to understand the links between women taking supplements, and the risks of atopic allergy and illness in their infants and children. As recommendations vary in individual countries on supplementation during pregnancy and lactation, this systematic review was undertaken to advise national guideline committees in the UK.

Intervention-based trials or observation-based studies were collated from 1946 to 2017 as part of the systematic review. Studies that investigated pre-existing medical disease, premature babies or low birthweight babies were excluded and timing of allergenic foods or the use of hydrolysed formula were also not included in the results.

The researchers reviewed atopic illnesses and autoimmune diseases in children aged 0–15, which included asthma, eczema, food allergy, allergic sensitisation, conjunctivitis, inflammatory bowel disease, type 1 diabetes, coeliac disease, juvenile arthritis, psoriasis, vitiligo and autoimmune thyroid disease.
The findings from the 381 analysed and reviewed studies indicated that maternal use of probiotics from 36 weeks gestation and during the first 3–6 months of lactation may reduce the risk of atopic eczema in children until 4 years of age by 20–30%. There were also links found between maternal probiotic use and reduced cow's milk allergic sensitisation at 1–2 years old in their children. The use

of prebiotics in either the mother or child was found to have no impact on atopic illness or autoimmune diseases. Fish oils such as omega 3 are known to have anti-inflammatory effects (Dunstan et al, 2003). The use of omega 3 fish oil supplementation from 20 weeks gestation in pregnancy and the first 3–4 months of lactation was found to decrease the likelihood of egg allergies in children at 1 year old.

A small correlation was found between omega 3 supplementation and decreased peanut allergy, although there are not enough studies available to draw this as a strong conclusion. Excluding certain foods during pregnancy and lactation had no impact on the likelihood of a child developing food allergies, nor did the timing of introducing solid foods.

This systematic review of the evidence highlights the importance of the maternal diet during pregnancy and lactation. Recommendations from this review will be made to the UK national guideline committees on the use of omega 3 supplements and probiotics in pregnancy and breastfeeding to reduce eczema and food allergies such as eggs in children. Further research is required to investigate the links between vitamin D during pregnancy or the postnatal period and asthma in children. JHV

Angela Willis, Midwife, SCPHN alumnus, UWE, Bristol

Garcia-Larsen V, Ierodiakonou D, Jarrold K et al. Diet during pregnancy and infancy and risk of allergic or autoimmune disease: A systematic review and meta-analysis. PLoS Med. 2018;15(2):e1002507

Bestwick JP, Huttly WJ, Morris JK, Wald NJ. Prevention of neural tube defects: a cross-sectional study of the uptake of folic acid supplementation in nearly half a million women. PLoS One. 2014;9(2):e89354

Dunstan JA, Mori TA, Barden A, Beilin LJ, Taylor AL, Holt PG, Prescott SL. Fish oil supplementation in pregnancy modifies neonatal allergen-specific immune responses and clinical outcomes in infants at high risk of atopy: a randomized, controlled trial. J Allergy Clin Immunol. 2003;112(6):1178-84

Honein MA, Paulozzi LJ, Matthes TJ, Erickson JD, Wong LY. Impact of folic acid fortification of the US food supply on the occurrence of neural tube defects. JAMA. 2001;285(23):2981-6

Institute of Medicine. Dietary Reference Intakes: Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. Washington, DC: National Academies Press; 1998

MRC Vitamin Study Research Group. Prevention of neural tube defects: results of the Medical Research Council Vitamin Study. Lancet. 1991;338(8760):131-7

Sedgh G, Singh S, Hussain R. Intended and unintended pregnancies worldwide in 2012 and recent trends. Stud Fam Plann. 2014 Sep;45(3):301-14

JHV Research Roundup is edited by Joy Murray, Specialist Community Public Health Nursing Programme Leader and Senior Lecturer, University of the West of England, Bristol

If you would like to contribute or have a paper to suggest, please email: joy.murray@uwe.ac.uk