Scientific Advisory Committee on Nutrition

Paper for discussion: Proposed SMCN consideration of the influence of maternal, fetal and child nutrition on the development of disease later in life

Agenda item: 6

Please see the attached paper

1. At the previous meeting, Members were informed about the planned SMCN work on the effect of early diet on later life. It was agreed that there was a need for SACN to prepare a report which addresses the issues it sees as being important, and which would complement the on-going MRC review covering a similar area. A proposed outline of work is attached and members are invited to comment.

Scientific Advisory Committee on Nutrition

The influence of maternal, fetal and child nutrition on the development of disease later in life:
Proposed outline of report:

1. **Preface**
2. **Summary of main findings**
3. **Introduction**
4. **Terms of reference:**
   - ***4.1 To review the evidence on the influence of maternal, fetal and child nutrition including growth and development in utero and early childhood on the development of disease later in life.***
   - ***4.2 To identify opportunities for nutritional intervention that could influence the risk of disease later in life.***
5. **Burden of chronic disease**
   - **5.1** ***Population distribution, time trends, and changing age of presentation for relevant disease outcomes***
     - 5.1.1 Cardiovascular disease
       Including blood cholesterol, blood pressure, CHD, diabetes (insulin resistance, glucose tolerance), obesity, and obesity (catch-up-growth). Comment on the epidemic in obesity, increase in type 2 diabetes, and decline in cardiovascular disease, especially in the UK. Also discuss the increasing prevalence of childhood obesity, and the earlier onset of type 2 diabetes
     - 5.1.2 Neurological and psychiatric illness
     - 5.1.3 Bone disorders (such as osteoporosis)
     - 5.1.4 Cancer
     - 5.1.5 Growth, stature and reproductive potential
   - **5.2** ***Ethnic, social and gender differences in disease outcomes***
6. **Aspects of nutritional status in early life**

6.1 Characterising nutritional status

What is nutrition and what influences it? How is it quantified?

6.1.1 Diet and nutrient balance

6.1.2 Body composition

6.1.3 Function

6.2 Mechanisms by which early nutrition might influence later disease

6.2.1 Adaptation, homeostasis, and nutritional programming
Including critical periods of development and biological processes

6.2.2 Changing effects of early feeding through the life cycle
Consider the emergence of adult influences on dietary patterns, which are independent of early feeding

6.2.3 Genes vs. environment; genetic polymorphism, gene environment interactions
Consider the effect of the thrifty genotype, the peroxisome proliferator activated receptor - gamma 2 gene (PPAR - γ2) and the insulin gene variable number of tandem repeats (VNTR) on size at birth and diabetes in later life

6.3 Methodology: Types of study and reviewing the evidence

6.4 Human studies

6.4.1 Epidemiological studies
These will include mostly observational studies and a small number of experimental studies

6.4.2 Limitations
Limited size and statistical power of studies may lead to false negative associations. Consider the effect of lack of adjustment for confounding factors, response and follow-up rates, the potential for bias, and difficulty of ascertaining certain exposures

6.4.3 Interpretation
Consider methods used to review the evidence, including narrative approaches, systematic reviews and meta-analysis. The role of publication and reporting bias will also be considered. The approach used in this report will be outlined in chapter 6.7.

6.5 Animal studies

6.5.1 Experimental
These will consist predominantly of experimental studies

6.5.2 Limitations
The difficulties in relating experimental studies in animal models to humans will be discussed

6.6 Reviewing the evidence

Describe the approach that will be used in this report

7. Review of the evidence

This will represent the core of the report. The importance of maternal (antenatal to postnatal), fetal, infant and childhood nutrition on major health outcome will be reviewed. Inter-generational effects of nutrition and dietary influences on fertility and childbearing potential will be considered. Major health outcomes will include cardiovascular risk, neurological development, bone development, cancers, growth, stature and reproductive potential. The amount and consistency of evidence, as well as comparisons with animal studies will be considered throughout. Potential implications for policy and future work will be discussed in chapter 8. The role of proteins, fats (fatty acids), carbohydrates, vitamins, and pertinent minerals will be examined.

8. Conclusion

8.1 Summary of the key findings

8.2 Potential relevance of these findings to disease outcomes

8.3 Feasibility of early intervention?

The implications for health policy will be considered.

8.4 Key questions of public health importance which remain unanswered

8.5 Future work

9. Appendices

9.1 Membership of the Scientific Advisory Committee on Nutrition: Subgroup on Maternal and Child Nutrition

9.2 Tables of supporting data

9.3 References