

Pregnant Immigrant Nigerian Women: An exploration of dietary intakes.

KL Lindsay, BSc,¹ ER Gibney, PhD,² BA McNulty, PhD², and FM McAuliffe, MD, FRCOG, FRCPI¹.

¹UCD Obstetrics and Gynaecology, School of Medicine and Medical Science, University College Dublin, National Maternity Hospital, Holles St., Dublin 2, Ireland.

²UCD Institute of Food and Health, School of Agriculture and Food Science, University College Dublin, Bellfield, Dublin 4, Ireland.

Corresponding Author

Karen Lindsay

UCD Obstetrics and Gynaecology, School of Medicine and Medical Science, National Maternity Hospital, Dublin 2, Ireland.

Tel: +353 (0) 1 6373026. Fax: +353 (0) 1 6627586.

Email: karenlindsay88@gmail.com

Contribution to Authorship

KL Lindsay recruited participants, conducted dietary assessments, entered and analysed data and wrote the manuscript. ER Gibney helped design the study and contributed to the data analysis and writing of the paper. B McNulty assisted with the analysis of dietary intake data and approved the final manuscript draft. FM McAuliffe designed the study and contributed to the writing of the manuscript.

Abstract

Objective

The aim of the study is to explore the dietary intakes of a prominent ethnic minority group of women from Sub-Saharan Africa during pregnancy, in order to identify nutritional issues of concern which may impact on pregnancy outcomes and whether different food based dietary guidelines may be required to meet their needs.

Study Design

This is an observational study with quantitative assessment of nutrient intakes and an exploration of meal composition and food choices.

Methods

Fifty-two Nigerian pregnant women in their second or third trimester of pregnancy were recruited from antenatal clinics in the National Maternity Hospital, Dublin, Ireland. Early pregnancy weight was measured and body mass index recorded. A 24-hour dietary recall was used to assess food and nutrient intakes.

Results

Eighty-nine per cent of the study population were classified as overweight or obese. These women appear to be maintaining traditional African dietary habits and have a healthy macronutrient composition in the diet. The intake of key pregnancy micronutrients such as calcium, vitamin D and folate may be insufficient from diet alone to meet requirements and supplements may be inadequately utilised in a timely manner.

Conclusions

These women represent a vulnerable obstetric group that may be at risk of adverse pregnancy outcomes due to high obesity rates and inadequate micronutrient status in early pregnancy. Provision of dietary advice should be tailored to suit their cultural dietary practices and food preferences. Pre-conception counselling on healthy lifestyle and appropriate supplement usage

may be beneficial, although larger studies are required to assess the need for specific nutrition policy recommendations.

Keywords: Pregnancy, dietary intakes, immigrant women, Sub-Saharan Africa

Introduction

Pregnancy is a critical stage of development during which optimal maternal nutrition can positively influence obstetric and neonatal outcomes.^{1,2} Dietary guidelines and advice for pregnant women are often tailored to suit the cultural food preferences of the nation from where they are produced. For example, in Ireland, pregnant women are advised to consume five portions of fruit and vegetables and five portions of dairy products each day, and oily fish once per week³. A study which analysed the dietary patterns in a predominantly Irish pregnant cohort identified a 'health conscious' dietary pattern, which was characterised by greater compliance to dietary guidelines, lower intake of total and saturated fat and higher intake of folate, iron and vitamins A and C, compared to women identified as part of the 'unhealthy' cluster.⁴ However, with increasing migration trends worldwide, obstetric populations now consist of mixed ethnic groups with varying dietary practices and what is considered a healthy dietary pattern for one ethnic group, may not be applicable to another. Cultural and religious beliefs, as well as different taste preferences, are some of the factors which influence dietary habits among ethnic minority groups. Poor knowledge among healthcare professionals of ethnic diets and nutritional needs of minority populations, particularly during critical life stages such as pregnancy, may be a barrier to the provision of appropriate and effective dietary advice.⁵

Consideration of traditional foods and cultural and religious factors that affect dietary choices were highlighted in a recent review of studies describing the provision of dietary advice to type 2 diabetic patients from ethnic minority groups.⁶ Furthermore, a pilot study of dietary approaches to the treatment of gestational diabetes among a multi-ethnic pregnant cohort reported that the provision of ethnic-specific meal plans improved pregnancy outcomes compared to standard dietary advice.⁷ Given the importance of maternal nutrition for optimal

health and pregnancy outcomes, there is a need to identify women from minority ethnic groups that may be at risk of marginal nutritional status in the preconception and antenatal periods, and to adapt established nutritional policies and dietary advice to meet their individual and cultural needs.

Migrant women from developing countries, such as those in Sub-Saharan Africa (SSA), are one such ethnic group at risk of poor pregnancy outcomes, arising from a background of poverty, food insecurity, suboptimal healthcare facilities, frequent infections and frequent pregnancies.⁸ Nigerians are the most prevalent African population living in several developed countries, including the United States,⁹ United Kingdom¹⁰ and Ireland.¹¹ Studies conducted among pregnant Nigerian women living in Nigeria have revealed a high prevalence of both under- and over-nutrition, various micronutrient deficiencies and subsequent obstetric complications including hypertension, anaemia, low birth weight and maternal and perinatal mortality.¹² However, there are few published studies to date which describe the pregnancy outcomes of immigrant Nigerian women living in Western countries, and no studies to our knowledge which examine the link between nutrition, diet and pregnancy outcomes among this immigrant group.

Although there is a paucity of literature on the dietary habits of pregnant immigrant Nigerian or other SSA women living in developed countries, this ethnic minority group in the UK has been identified as being at high risk of obesity and deficiencies of calcium, iron and vitamin D outside of pregnancy.⁵ If such nutritional issues translate into pregnancy, it would be imperative that these women receive appropriate nutritional and antenatal care to reduce their risk of adverse pregnancy outcomes. The current study aims to explore the dietary intakes of a sample of Nigerian pregnant immigrant women living in Ireland, in order to identify any nutritional issues of concern and whether different food-based dietary guidelines may be required to meet their needs.

Methods

The study group comprised of Nigerian women in the second and third trimesters of pregnancy, attending antenatal clinics at the National Maternity Hospital, Dublin, Ireland. Healthy, non-diabetic women, of Nigerian ethnicity, aged ≥ 18 years and >12 weeks gestation were recruited into the study. Exclusion criteria were diabetes (gestational or pre-gestational), patients attending the clinic as an emergency case, non-Nigerian ethnicity, age <18 years, ≤ 12 weeks gestation and poor understanding of the English language. Recruitment took place between May and September 2011 and informed written consent was obtained from all participants. This study was conducted according to the guidelines laid down in the Declaration of Helsinki and ethical approval for the study was granted by the National Maternity Hospital Ethics Committee in April 2011.

Each participant was interviewed once by the research dietitian at the time of recruitment, which involved an informal discussion about the study aims, an explanation of the questionnaire and completion of the dietary assessment. A structured questionnaire was used to obtain background information including number of years lived in Ireland, level of education, smoking habits, alcohol consumption and nutritional supplement usage. Pre-pregnancy anthropometric data was unavailable, however, weight and height are routinely measured by clinical staff on first antenatal visits and these were recorded from participants' charts to calculate early-pregnancy body mass index (BMI). Women were considered 'late-bookers' to the antenatal clinic if they were greater than 22 weeks gestation at their first hospital visit and in such cases, a reliable early-pregnancy BMI could not be calculated.

Dietary intakes were assessed by means of a single 24-hour recall for a weekday, which was conducted by the same research dietitian for all participants using the multiple pass method. . The 24 hour recall method was chosen as it is simple to administer in a busy clinical setting and is also recommended by the European Food Safety Authority (EFSA) for assessing dietary intakes among adults across Europe, including pregnant women and ethnic minority groups.¹³ EFSA report it to be a cost-effective method which increases participation rates and does not rely on literacy levels of participants. Furthermore, dietary recalls are frequently used in

clinical studies to assess dietary intakes in pregnancy.¹⁴⁻¹⁷ Portion sizes were quantified using household measures and converted into metric weights using the Food Standard Agency book of Food Portion Sizes.¹⁸ Additional information on recipes and cooking methods were obtained as required to improve the accuracy of nutrient intake data and to allow further exploration and understanding of traditional meal compositions.

Nutrient intake analysis was conducted using WISP software version 3.0 (Tinuviel Software, Llanfechell, Anglesey, UK), which includes nutritional composition of various traditional African foods such as cassava, yam, plantain, okra and egusi seeds. However, where traditional Nigerian foods were consumed that were not included in the WISP database, nutritional information was obtained directly from manufacturers' food packaging sourced in local ethnic food stores. The WISP database was manually updated by the research dietitian by creating new foods codes and entering the complete nutritional composition of these foods. Macronutrient intakes, as a percentage of total energy, were compared to Irish national recommendations developed by the Irish Health Promotion Policy Unit¹⁹ which are similar to the World Health Organisation guidelines²⁰, and micronutrient intakes were compared to the Irish Recommended Dietary Allowances (RDAs) for pregnant women²¹ using the population compliance method of Wearne and Day²² i.e. the percentage of the population whose mean intake achieved the RDA for each micronutrient.

Food intakes were aggregated into 18 food groups, as developed by the Irish Universities Nutrition Alliance (IUNA) for the assessment of national Irish dietary intakes.²³ These groups were: Grains, rice, pasta and savouries; Breads and rolls; Breakfast cereals; Biscuits, cakes and pastries; Milk and yoghurt; Creams, ice-creams and chilled desserts; Cheeses; Butter, spreading fats and oils; Eggs and egg dishes; Potatoes and potato dishes; Vegetables and vegetable dishes; Fruit and fruit juices; Fish and fish dishes; Meat and meat products; Beverages; Sugars, confectionery, preserves and savoury snacks; Soups, sauces and miscellaneous foods; Nuts, seeds, herbs and spices. The percentage contribution of each food group to energy and macronutrient intakes was also calculated.

Schofield equations were used to calculate each woman's basal metabolic rate²⁴ and the Goldberg method was employed to predict levels of energy underreporting.²⁵ A cut-off value of 0.9 was used to identify definite under-reporters as this value has been previously used to assess underreporting in pregnant populations.^{26,27} Statistical analysis was carried out using PASW statistics version 18.0 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were used to describe baseline characteristics, anthropometric data and nutrient and food group intakes. The one-way ANOVA test was used to compare differences between women in each BMI category and levels of under-reporting. Post-hoc comparisons were carried out using Tukey's test.

Results

Of 56 Nigerian women that were approached and invited to participate in the study, 52 women gave consent and four women declined. The demographic details of the study participants are presented in Table 1. Seven women were late-bookers to the antenatal clinic and thus, BMI was not calculated for these women. The mean BMI of the remaining 45 women was 31.2 kg/m², which falls into the obese category according to the World Health Organisation (WHO).²⁸

Ninety per-cent of the entire study population (N=52) reported taking at least one type of nutritional supplement at some stage during pregnancy or pre-conceptionally. Pure folic acid supplements were taken by 71% of women during pregnancy and 15% took folic acid in the pre-conception period. Other supplements commonly consumed by subjects were iron (52%), vitamin D (2%) and pregnancy multivitamin/mineral supplements (38.5%).

In total, eight women (15%) had a Goldberg ratio below 0.9, indicating underreporting of energy intake. The breakdown of EI:BMR ratio by BMI is presented in Table 2. The rate of underreporting was significantly higher among overweight and obese women compared to normal weight women. Underreporters were excluded from further analysis of nutrient and food intakes, reducing the sample size to forty-four women. Details of the energy, macronutrient and micronutrient intakes among normal-reporters and comparison to recommended intakes for pregnancy are presented in Table 3 and food group intakes are

displayed in Table 4. Food group intake data is presented as mean and standard deviation for 'consumers only' of any given food group and for the 'total population' of normal reporters (N=44). The most frequently consumed source of starchy carbohydrate foods was the 'grains, rice, pasta and savouries' group (80% of population), making this food group the primary contributor to total energy (18.5%) and carbohydrate intake (32%). Within this food group, white long-grain rice was most commonly consumed. The groups 'vegetables and vegetable dishes', 'meat and meat dishes', 'milk and yoghurt' and 'butter spreading fats and oils' were also frequently consumed and prominent contributors to energy and macronutrient intakes. The food groups with the lowest level of consumption on both a consumers only and total population basis were 'cheeses', 'creams, ice-creams and chilled desserts' and 'biscuits, cakes and pastries'.

Further exploration of the dietary recall data revealed that traditional African dishes were consumed by virtually all participants, which were predominantly composed of rice and other grains, meat, fish, vegetables, tubers and oils. The most popular dish consumed was the traditional Nigerian 'stew', a spicy tomato-based stew containing vegetables (onion, chilli pepper, okra and green leafy vegetables were most popular) and meat (usually chicken or beef) or fish (usually mackerel or dried 'stockfish') and cooked in a large volume of oil, such as palm, groundnut or vegetable oil. This dish was often eaten with rice (usually white, long-grain) or other starchy carbohydrates such as pounded or ground yam or cassava, and flavoured with herbs, spices, garlic, stock cubes, salt and pepper. Homemade soups were another common dish, which were predominantly vegetable-based, highly seasoned, with a few pieces of meat or fish added and often thickened with seeds, such as Egusi (melon) seeds, to make the popular Egusi soup. Snacking between meals was uncommon and the main meal was usually consumed early-afternoon, with a slightly smaller portion of the same meal often consumed in the evening. For many women, breakfast was the smallest meal of the day, consisting of some fruit and a hot drink such as tea. However, the main time that 'Western' type dietary patterns appeared, if at all, was at breakfast time, with a few women reporting consumption of white bread toasted,

processed meat such as sausages and occasionally, sugar-sweetened breakfast cereals with full-fat milk.

Discussion

To our knowledge, the present study is the first of its kind to investigate the dietary intakes of pregnant immigrant women from a Sub-Saharan African country. Overall, it appears that traditional African dietary practices remain in this population group, despite the majority having lived in Ireland for several years. The distribution of macronutrient intakes as a percentage of total energy reveals a healthy dietary pattern which is compliant to healthy eating guidelines.^{19,20} However, after exclusion of underreporters, mean total energy intake is 9.2 MJ which is higher than the 8.0 MJ reported by McGowan and McAuliffe⁴ among the general antenatal population attending our centre. Despite low intakes of typical Western-style processed foods and snacks, the obesity prevalence was high in this group, which may have serious implications for adverse pregnancy outcomes.

Calcium, iron, folate and vitamin D are key pregnancy micronutrients which have also been cited as nutrients of concern among ethnic minority groups²⁹ and among Black African immigrant women in particular,⁵ as well as among pregnant Nigerian women in Nigeria.^{30,31} Although the sample size in the current study is small, comparison of these key pregnancy micronutrient intakes to the recommended dietary allowances for pregnancy²¹ reveals evidence for inadequate dietary intakes. However, similarly inadequate intakes of these micronutrients have also been reported among a predominantly Irish cohort of healthy pregnant women attending our centre⁴, as well as among a cohort of obese pregnant women from the general hospital population.³² Reported total nutritional supplement usage in the current study was high, which may compensate for dietary inadequacies. Calcium, however, is not commonly present in the majority of pregnancy multivitamin/mineral supplements.

Food intake data reveals that these Nigerian women did not commonly consume cheese, and although the majority were consumers of the 'milk and yoghurt' group, the absolute daily intake

for the population was under 200g/day. This would equate to approximately one glass of milk but currently in Ireland, pregnant women are recommended to consume at least three portions of dairy products daily.³³ Dietary advice to increase calcium intake among these women may be beneficial but care should be taken to tailor such advice to cultural preferences, by focussing on milk intake rather than the less commonly consumed yoghurts and cheese. It would also be prudent to advise consumption of low-fat milk to avoid excess saturated fat among a population group with already high obesity rates. However, healthcare professionals should also consider the possibility of lactose intolerance when advising on dairy intake to these women, as lactase deficiency is common among populations of African heritage.³⁴ If lactose intolerance is believed to exist, advice regarding alternative calcium sources in the diet would be required, such as fortified soya, rice or nut milks, the soft bones of canned fish, almonds, beans and green vegetables.

The frequency of fish consumption in small quantities in the current study was high (63%) and many women reported consuming oily fish such as mackerel, which is a dietary source of vitamin D. However, these women may still be at risk of suboptimal vitamin D status on entering pregnancy due to the limited sunlight exposure at Northerly latitude combined with their darker skin pigmentation, which reduces their ability to synthesise the vitamin.³⁵ Indeed, a recent study from our centre reported high rates of vitamin D deficiency across four ethnic groups, which included a rate of 68% among Sub-Saharan African women.³⁶ The association between vitamin D deficiency in pregnancy and infantile rickets is well established but recently, a poor status in early pregnancy has also been associated with maternal insulin resistance in later pregnancy.³⁷ Although 21 women (40%) reported taking a supplement containing vitamin D, only three women commenced this in the pre-conception period. Recommendations by primary healthcare staff for all immigrant SSA women to consume vitamin D supplements could be considered. During pregnancy, dietary advice to encourage regular consumption of oily fish and fortified milk may also be beneficial.

As all women in the current study were interviewed in the second or third trimester, folate intake during the first trimester was not captured, which is the critical period for the prevention of neural tube defects (NTDs).³⁸ Of particular concern is that only 15% of Nigerian women reported taking a supplemental source of folic acid in the pre-conception period, although such low usage has been a familiar trend associated with immigrant status and non-Western ethnicity.³⁹ There have been reports of a high prevalence of NTDs in Nigeria, as well as in other countries of SSA,^{40,41} which may largely be attributed to suboptimal pre-conceptual intake of folic acid.⁴² Furthermore, obesity increases the risk of NTDs⁴³ which is particularly relevant to this population group in which 51% were found to be obese. Counselling on pre-conceptual use of folic acid should be a critical focus for NTD prevention among SSA immigrant women. Dietary advice could also be utilised to increase the dietary intake of folate. However, it should be borne in mind that typically fortified foods, such as breads and breakfast cereals, are not commonly consumed among this ethnic group and thus, promoting a greater intake of fruit and vegetables would be more culturally appropriate.

Immigrant women from SSA are a vulnerable ethnic minority group who are often difficult to reach and engage in research. The current paucity of literature investigating their habitual dietary intakes during pregnancy is a potential barrier to the provision of optimal antenatal and dietetic care. The present study has sought to fill this gap by focussing on one of the more prominent immigrant groups living in developed countries. The main limitations of this study are the small sample size and assessment of dietary intakes using a single 24-hour recall, although this dietary assessment method has been recommended for ethnic minority populations¹³ and single 24-hour dietary recalls have also been used in previous studies of pregnant women.¹⁴⁻¹⁶ Ideally, follow-up dietary assessments would have been conducted but were restricted by time constraints at hospital visits and a general reluctance among participants to be contacted further by researchers. Thus, the dietary data described herein may not provide an accurate picture of the habitual intakes of pregnant immigrant Nigerian women and it also precludes the ability to analyse compliance to dietary recommendations for pregnancy.

However, this study has made the first step in exploring the dietary intakes of this potentially vulnerable obstetric group and it is strengthened by the inclusion of both food group and nutrient intake data. By highlighting potential nutrients of concern during pregnancy and their primary sources in the typical diets of SSA immigrant women, the current study may aid healthcare professionals and public health workers to optimise the dietary intakes of these women during pregnancy, using culturally appropriate and individually tailored dietary advice. Furthermore, the inclusion of anthropometric measurements reveals the critical issue of obesity among this population group; a major public health concern that requires further investigation into its causes and possible approaches to address the issue.

In conclusion, the nutrient intakes of pregnant immigrant Nigerian women appear to be similar to those of pregnant women from developed societies, although larger dietary intake studies would be required to assess the need for specific dietary policies and recommendations. The dietary sources of nutrients differ significantly from a Western style diet, with traditional African food choices being largely maintained and little evidence of consumption of unhealthy processed foods and confectionery. High obesity rates and inadequate intakes of certain key pregnancy micronutrients, particularly among non-supplement users, are the main issues of concern in this group of immigrant women. Careful provision of ethnic-specific dietary and supplement advice to these women, in both the pre-conception and antenatal periods, will likely improve nutritional status for optimal pregnancy outcomes.

Acknowledgements

The authors would like to thank all mothers who participated in the study.

Competing Interests

None declared.

Funding

This study was funded by the Health Research Board, Ireland. The funder had no role in the study design; collection, analysis and interpretation of data; writing of the manuscript; or decision to submit the manuscript for publication.

Ethical Approval

Full ethical approval was granted for this study from the National Maternity Hospital Ethics Committee.

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