Qualitative study of healthy behaviours and weight gain in women during and after pregnancy

By

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Submitted to Manchester Metropolitan University Department of Food and Tourism Management as part of the requirement of the MSc Nutrition and Health

Date: 8th September 2015
Declaration

I, Andrea Carolina Roman Sanchez, declare that the work contained in this submission, it is my own work and to the best of my knowledge the work has not been conducted previously. All results other than my own are cited clearly and referenced. No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification to this University or any other institution of learning.

Student ID: 14052099

Signature: ...........................................

Date: 8th September 2015
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Abstract

Reducing the prevalence of obesity has become one of the major and most difficult public health approaches. It has been proven that an unhealthy nutritional behaviour during pregnancy can lead the mother to gain excessive weight, which can predict adverse pregnancy outcomes and predispose her and the unborn child to chronic diseases later in life. The main goal of the current study was to explore attitudes and behaviours towards weight control during and after pregnancy among white British and South American women with children up to 5 years old using a qualitative approach. During this research, a semi-structured interview was conducted with each participant. Data collection was developed until theoretical saturation (22nd interviewees). The data obtained during interviews was fragmented, codified and analysed using thematic analysis. This study identified four main themes. The first theme is related to the participants’ lifestyles during pregnancy, which explore their concept of ‘healthy diet’ and the physical activity practiced during pregnancy. The second theme contains the major influential factors of weight management in pregnancy such as awareness of weight, health behaviors and knowledge. The third theme is related to how women managed their post-pregnancy weight. This theme includes the nature of feelings such as sadness, anxiety or body dissatisfaction. The fourth and last theme linked the health system and the women’s perceptions about the help provided to weight management during pregnancy. This study concludes that it is fundamental for women to realize the need of reaching the recommended weight during pregnancy to ensure a healthy life for themselves and their unborn children. Furthermore, it is vital that health providers communicate and encourage a healthy lifestyle during pregnancy in a more effective way.
Acknowledgement

Sincere gratitude is hereby extended to the following who has helped me to achieve this Master:

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To my little girl, this achievement is yours Camila because you give me all the strength and the desire of being a better person.

But most of all, to Carlos, my dear husband. Without you I would not be writing this chapter in my life.
Chapter 1. Introduction

1.1 Background

Health outcomes of relevance to health promotion are the result of a complex interaction between biological, social environmental and psychological factors (Bennett and Murphy, 1997). At present, the world is going through an obesity epidemic, placing it as one of the major public health concern. There are a combination of factors that are associated with obesity, such as genetic contribution, which has been estimated to be between 40 to 70%. Dietary intake, physical activity, increasing energy intake and an obesogenic environment are all contributors and there are even non-genetic factors that can be transmissible between generations (Casas-Agustench et al., 2014; Simmons and Breier, 2002). Since, women of reproductive age are part of this predisposition, the effect of maternal obesity on the developing foetus has been investigated (Simmons and Breier, 2002). There are several child health effects including macrosomia, premature birth, large for gestational age infants, shoulder dystocia, late foetal death, congenital abnormalities, overweight in the offspring and lower breastfeeding initiation rates (Chuang et al., 2014; Heslehurst et al., 2007; Schlaff et al., 2014; Waring et al., 2013). According to Arrish et al., (2014), adult diseases like cardiovascular diseases or diabetes are proposed to have a foetal origin and are linked with nutrition during pregnancy. Additionally, high pre-pregnancy BMI (>30) increases the risk for adverse maternal health outcomes like, gestational diabetes, preeclampsia or pregnancy-related hypertension, thromboembolic events, caesarean delivery and maternal post-partum weight retention (Schlaff et al., 2014).

The UK prevalence of women with a known BMI ≥35 (Class II and Class III obesity) at any point in pregnancy, who give birth ≥24+0 weeks’ gestation, is 4.99%. This translates into approximately 38,478 maternities each year in the UK (CMACE, 2010). Likewise, first trimester maternal obesity has significantly increased from 7.6% to 15.6% over 19 years (P<0.001) (Heslehurst et al., 2010). Due to the serious health implication, the National Institute for Health and Care Excellence (NICE) has produced public health guidance on dietary and physical activity interventions for weight management in pregnancy for United Kingdom (Nice.org.uk, 2010). This guidance was the same as that in the Institute of Medicine (IOM) guidelines (2009), which recommended that normal, overweight and obese women during pregnancy gain no more than 25 to 35, 15 to 25 and 11 to 20 pounds, respectively (Rasmussen and Yaktine 2009). According to NICE (2010), there are no formal, evidence-based parameters of gestational weight gain (GWG) for the UK population.
Although there are clear guidelines, 40–60% of women have excessive GWG (Waring, et al. 2013). This increasing incidence has led to deeper explorations of the pregnant women’s weight-related attitudes and behaviours in relation to a constellation of psychosocial characteristics (DiPietro et al., 2003). Several factors, such as culture, socio-economic status or parity may influence GWG (Streuling et al., 2010). There is substantial evidence that social class may influence health status, at least in part as a consequence of unequal distribution of life opportunities and stress throughout society (Bennett and Murphy, 1997). For example, one vulnerable group in society are immigrants. Cultural, attitudinal and behavioural differences may contribute to ethnic variation in weight (Hennegan et al., 2015). Therefore, it is important to evaluate if the current NICE guidelines are well communicated to all ethnic groups in UK in order to decrease excessive GWG in all population.

1.2 Purpose of this study and theoretical framework

Promoting healthy gestational weight gain (GWG) is a way of safeguarding the long-term health of both women and their children (Chuang et al., 2014). It is important to look for the most effective and cost-effective ways of helping women to manage their weight before, during and after pregnancy. Pregnancy is a time when women are often more motivated to make healthy choices and communicate with health services, so this opportunity must not be lost (Gilmore, et al., 2015). However, most of women are not receiving all the necessary information and some minority groups, including immigrants may face other barrier, such as relocation, distant support networks or language. Therefore, the incidence of overweight pregnant women is increasing continuously. Before producing new interventions it is important to determine the main causes for women’s health behaviours during pregnancy. Likewise, it is essential to know how women felt and what they thought about the health support they had for managing their weight during this period.

1.3 Contributions offered by this study

It is expected that this research will provide an overview of the causes of unhealthy gain weight during pregnancy in two different ethnic groups: white British and South American women, in order to tailor effective interventions to achieve recommended gestational weight. There are few studies that explore the views immigrant women have on the maternity care they received in their new homelands. It is essential to know that pregnancy is a time of optimum motivation for many women to make positive behavioural changes in order to improve their own health and the health of their unborn child (Gilmore, et al., 2015).
1.4 Aim of the study
To explore attitudes and behaviours towards weight and weight control during and after pregnancy among white British and South American women with children up to 5 years old using a qualitative approach.

1.5 Objectives of the study
- To analyse the access and the sources of nutritional information mothers had during pregnancy
- To know if women received specific information or recommendations for managing their weight during pregnancy.
- To investigate the women’s diet to have an idea if they consumed the recommended calories proposed by the guidelines.
- To ask them about the weight they gained and how they managed the subsequent weight loss.
- To find out if they feel supported and received the appropriate advices from health professionals about managing their weight.

1.6 Overall structure of dissertation
This dissertation is structured in five chapters. The second chapter reflects the literature review about nutrition in childbearing years, maternal and foetal outcomes and health behaviours. The third chapter covers the research methods applied during the data collection and the data analysis. The fourth chapter presents the results divided in four main themes, with their respective subthemes and the discussion of those results. Finally, the fifth chapter is the conclusion of this research, including the limitations of this study and suggestions for further research.
Chapter 2. Literature Review

2.1 Importance of nutrition in childbearing age

The nutrients required by humans vary from age, size and gender. Women’s nutritional requirements can differ significantly from those of men. Moreover, in a woman’s reproductive life, there are phases, such as adolescence, menstruation, pregnancy, lactation and menopause, in which nutritional needs can be affected (O’Connor and Kovacs, 2003). Due to the fact that pregnancy is a period that not only involves the development of a new individual but also a period with profound alteration within the maternal system, it implies remarkable adaptation that impacts upon physiology and metabolism, more than any other stage in a woman’s life (Langley-Evans, 2009). Overall, this is an anabolic state and the maternal hormonal environment is transformed in order to maintain the maternal homeostasis and provide support for the growth of the placenta and foetus, and prepares for later lactation (Derbyshire, 2011; Langley-Evans, 2009). The importance of this recent topic is based on the last evidence showing that maternal food restriction and over nutrition during pregnancy predispose offspring to develop obesity and metabolic syndrome. As a consequence of nutritional and other environmental expositions during development, the structure, homeostatic systems, and functions of the body can be permanently altered (Barker et al., 2006). Arrish et al. (2014) and Stuebe et al., (2007) suggest that adult diseases like cardiovascular diseases or diabetes have a foetal origin and are linked with nutrition during pregnancy. Therefore, nutrition and a healthy lifestyle must be taken in account at all the stages that involve pregnancy from the pre-conception period until lactation.

2.1.1 Pre-conception care

The phase before pregnancy is a critical time period that is often overlooked (Derbyshire, 2011). It is necessary to change all the elements that can interfere with a woman’s lifestyle, such as attitudes, good nutrition, food safety and food choices. The aim of improving nutrition before pregnancy is to maximize the health of both prospective parents, minimize the embryo’s exposure to harmful factors and control some risk factors for adverse pregnancy outcomes (Langley-Evans, 2009). Moreover, Langley-Evans (2009) states that men should collaborate with women in maintaining a healthy body weight and reducing the exposure to alcohol and tobacco smoke. What is more, there are some crucial changes from the nutritional point of view, which women should reach before pregnancy such as,
increasing folic acid intake, reducing the exposure to high doses of vitamin A and being the right weight (Derbyshire, 2011; Langley-Evans, 2009).

First, a key aspect for prevention of congenital diseases is the intake of folate and reducing vitamin A intake. Folic acid is essential for the closure of the neural tube that is an early embryonic event that takes place over approximately 48 h and is completed by about day 28 of gestation (Molloy, 2005). That means that before many women know they are pregnant, foetal neural tube defects (NTDs) have already been originated. NTDs are among the most significant congenital causes of morbidity and mortality in infants, which comprise open spina bifida, anencephaly and encephalocoele. Therefore, it is crucial for women to have enough folic acid in their system before conception (Vollset et al., 2013).

Nowadays, 400 micrograms (µg) daily of folate is routinely recommended as a supplement before pregnancy and throughout the first 12 weeks (NICE, 2015; De-Regil et al., 2013). Nevertheless, if there was a pregnancy previously affected by NTDs or diabetic women need to take 5mg/d of folic acid (BDA, 2015).

In addition, there is a well-established correlation between birth defects and excessive Vitamin A intake during pregnancy (Dolk et al., 1999; Langley-Evans, 2009). Many skin treatments contain retinoid derivatives such as isotretinoin, which can alter the migration and differentiation of the cranial neural crest cells that occur during the second through fifth week after conception (Miller et al., 1998). Therefore, these kind of skin treatments can cause embryopathy in humans. The EFSA (2006) recommended a vitamin A intake not more than 3000ug/day in childbearing years especially during pregnancy. B-Carotene has not been found to be teratogenic in animals even at high doses (Dolk et al., 1999).

Secondly, according to FAO/WHO/UNU (2004) the ideal situation for a woman is to enter pregnancy at a normal weight and with good nutritional status. Both extremes of weight are associated with increased risk for the mother and baby in pregnancy (O'Connor and Kovacs, 2003). The embryo is most vulnerable to the effects of poor maternal diet during the first few weeks of development, often before pregnancy has been confirmed (Williamson, 2006). Being overweight or obese is linked with pregnancy related complications, miscarriage, stillbirth and high birth weight deliveries (Derbyshire, 2011). Increasing proportions of women in their childbearing years are now falling into the overweight or obese weight categories (Langley-Evans, 2009; Siega-Riz et al., 2009). The Confidential Enquiry into Maternal and Child Health (CEMACH) reported that between 1993 and 2002, obesity prevalence among women aged 25–34 years rose by 10%. Olson et al. (2008) determined that maternal early pregnancy BMI was positively and significantly associated with overweight in offspring ($P \leq 0.01$). Genetic and environmental factors are important in establishing the foetal growth trajectory; environmental factors include transgenerational influences and the mother’s body
composition, endocrine profile, diet, and physical activity around the time of conception (Inskip et al, 2005). Thus, the National Institute for Clinical Excellence (NICE) guidelines on maternal and child nutrition recommend that women with a pre-pregnancy body mass index (BMI: kg/m² > of 30 kg m²) or more, should be encouraged to lose weight either before, but not immediately before they become pregnant or post-partum (NICE, 2010).

ACOG (2013) recommends that ideally there should be a preconception assessment with the calculation of body mass index (calculated as weight in kilograms divided by height in meters squared) to evaluate a woman for normal, overweight or underweight (detailed in Table 1). Likewise, the assessment should include the provision of specific information about maternal and foetal risks of obesity in pregnancy, as well as encouragement for a weight-reduction program before getting pregnant. NICE (2010) states that encouraging and helping women with a BMI of 30 or more to reduce weight before becoming pregnant is the responsibility of health professionals working in weight management, fertility, pre-conception advice and care services, contraceptive services and children's centres. They should explain that losing 5–10% of their weight would have significant health benefits.

Table 1. The International Classification of adult underweight, overweight and obesity according to BMI (WHO, 2015)

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²)</th>
<th>Principal cut-off points</th>
<th>Additional cut-off points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underweight</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe thinness</td>
<td>&lt;16.00</td>
<td>&lt;16.00</td>
<td></td>
</tr>
<tr>
<td>Moderate thinness</td>
<td>16.00 - 16.99</td>
<td>16.00 - 16.99</td>
<td></td>
</tr>
<tr>
<td>Mild thinness</td>
<td>17.00 - 18.49</td>
<td>17.00 - 18.49</td>
<td></td>
</tr>
<tr>
<td><strong>Normal range</strong></td>
<td>18.50 - 24.99</td>
<td>18.50 - 22.99</td>
<td>23.00 - 24.99</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>≥25.00</td>
<td>≥25.00</td>
<td></td>
</tr>
<tr>
<td>Pre-obese</td>
<td>25.00 - 29.99</td>
<td>25.00 - 27.49</td>
<td>27.50 - 29.99</td>
</tr>
<tr>
<td><strong>Obese</strong></td>
<td>≥30.00</td>
<td>≥30.00</td>
<td></td>
</tr>
<tr>
<td>Obese class I</td>
<td>30.00 - 34.99</td>
<td>30.00 - 32.49</td>
<td>32.50 - 34.99</td>
</tr>
<tr>
<td>Obese class II</td>
<td>35.00 - 39.99</td>
<td>35.00 - 37.49</td>
<td>37.50 - 39.99</td>
</tr>
<tr>
<td>Obese class III</td>
<td>≥40.00</td>
<td>≥40.00</td>
<td></td>
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</tbody>
</table>
2.1.2 Pregnancy care

Diet and lifestyle play a vital role before and during early stages of pregnancy (Derbyshire, 2011). What is more, pregnancy is recognised as a unique time for behaviour modification and is no longer considered a condition for confinement (Artal and O’ Toole, 2003). Evidence suggests that woman's lifestyle is among the most important factors on her child's quality of life. Moreover, adequate nutrition and optimal gestational weight gain (GWG) in a pregnant woman are important to allow her foetus to grow and develop physically and mentally to its full potential (Van Teijlingen et al., 1998). Streuling et al., (2010) proposed several non-modifiable factors that influence GWG, such as maternal age, height, pre-pregnancy BMI, parity and socio-economic status; additionally, modifiable factors like positive energy balance, which may be modifiable by diet or physical activity. Optimising woman's diets, physical activity and controlling gain weight during pregnancy is an approach that is feasible and affordable for Public Health (Derbyshire, 2011).

2.1.2.1 Diet

Women should be aware that healthy diet before and throughout pregnancy can help to optimise their infants' health in short and long term (Derbyshire, 2011). Although, gestational diet and nutrition has traditionally focused on preventing nutritional deficiencies in the maternal diet, nowadays there is a growing interest in the potential for dietary changes among pregnant women with gestational diabetes mellitus or obesity to minimise the risk of macrosomia and associated adverse outcomes (Gardner et al., 2012). It is now recognised that pregnant women do not actually have to ‘eat for two’ (Williamson, 2006). In fact, the energy requirements of pregnancy are those needed for adequate maternal gain to ensure the growth of the foetus, placenta, associated maternal tissues, and to provide for the increased metabolic demands of pregnancy and energy stores to assist in proper lactation after delivery FAO/WHO/UNU. (2004). For an average weight gain of 12 kg, the increase in energy required would be 20, 85 and 310 kcal/day for each trimester (Williamson, 2006). Nevertheless, NICE (2010) recommends an extra 200 kcal/day during the third trimester only. Food Standard Agency (2002) suggest that a healthy and varied diet is important for both the mother and the baby. The healthy eating guidelines for pregnant women are actually very similar to those for non-pregnant women, with a few exceptions. The main recommendation is to eat a healthy, balanced diet based on plenty of starchy carbohydrates and at least five portions of fruit and vegetables per day. Women may benefit with non-starch polysaccharides, to within a range of 12–24 g per day, along with increased fluid intakes to encourage regular bowel movement and prevent constipation (NHS, 2015).
Besides, moderate amounts of dairy foods and protein containing foods, e.g. lean meat, fish, eggs and pulses. The joint FAO/WHO/UNU consultation determined that an average increase in protein intake of 6 g per day was required during pregnancy in order to achieve a total intake of 51 g per day and in addition, limited amounts of foods high in fat or sugar (FSA, 2002). However, pregnant women and those planning a pregnancy need an adequate dietary intake of essential fatty acids and their longer-chain derivatives, which are necessary for the development of the brain and nervous system of the foetus, particularly in late pregnancy (Williamson, 2006). As there are many changes in metabolism, leading to more efficient utilisation and absorption of nutrients during pregnancy, it is not necessary to increase the dietary intake of many nutrients, such as calcium (Williamson, 2006). Nevertheless, other nutrients such as folate and Vitamin D need to be supplemented (NHS, 2015). Vitamin D is important for the absorption and utilisation of calcium, needed for the calcification of the foetal skeleton, particularly during the later stages of pregnancy (Williamson, 2006). Thus, currently pregnant women are recommended to take supplements of 10 µg per day are (FSA, 2002; Van Teijlingen et al., 1998). Similarly, iron requirements are increased during pregnancy to supply the growing foetus and placenta and for the production of increased numbers of maternal red blood cells. Therefore, pregnant women are advised to consume plenty of iron-rich foods during pregnancy and in some cases, iron supplementation may be necessary (FSA, 2002; Williamson 2006). Equally, pregnant women in the UK are advised not to smoke, avoid alcohol or drink not more than one or two units once or twice a week, and to consume maximum 200 mg of caffeine per day (Nhs.uk, 2015).

### 2.1.2.2 Physical activity

Evidence suggests that physical activity is among the most important factors for GWG (Melzer et al., 2010; Stuebe et al., 2007). Since 1980, it started to proliferate physical conditioning programs for pregnant women and recommendations for physical activity were based on culture and traditions rather than scientific evidence (Melzer et al., 2010). Due to this popular tendency, physical activity became part of the recommendation of healthy lifestyle during pregnancy (Wolfe et al., 1989). However, both pregnancy and aerobic conditioning are biological processes that involve striking physiological adaptations (Wolfe et al., 1989). Consequently, there is significant disagreement among the quality, quantity and intensity of exercise prescribed to pregnant women. Melzer et al., (2010) carried out a systematic literature review in which state that regular physical activity is associated with improved physiological, metabolic and psychological parameters. Moreover, it reduces the risk of morbidity and mortality from chronical diseases. Furthermore, pregnant women
benefit from regular physical activity the same way as non-pregnant subject. Maternal benefits include improved cardiovascular function, limited pregnancy weight gain, decreased musculoskeletal discomfort, reduced incidence of muscle cramps and lower limb oedema, mood stability, attenuation of gestational diabetes mellitus and gestational hypertension (Melzer et al., 2010). Foetal benefits include decreased fat mass, improved stress tolerance, and advanced neuro-behavioural maturation. (Melzer et al., 2010). Conversely there has been suggestions that intensive levels of exercise could affect the fetus birth weight. Campbell and Mottola, (2001) found that maternal structured exercise frequency of ≥5 times per week in the third trimester was strongly associated with low birth weight (adjusted odds ratio, 4.61). The effect of exercise frequency on foetal size did not differ for subjects who were fit, in comparison with those who were unfit, before pregnancy. Even exercise frequency of ≤2 times per week was modestly associated with low birth weight (adjusted odds ratio, 2.64) (Campbell and Mottola, 2001). There are some hypothesis to support those findings. Wolfe et al., (1989) suggested that there is a risk of a redistribution of blood flow to the mother’s exercising muscles, a resultant decrease in utero-placental blood flow, thus a decrease in available nutrients and oxygen for the foetus.

Over the past decade, most research in physical activity in pregnancy has emphasized in the prevention of GWG. In a cohort study Stuebe et al., (2007) assessed 1388 women. The results of this trail was that vigorous physical activity in the second trimester was inversely associated with excessive gain (OR, 0.76; 95% CI, 0.60-0.96 per 30 minutes per day) with a trend toward decreased risk for walking (OR, 0.92; 95% CI, 0.83-1.01 per 30 minutes per day). Moreover, sedentary lifestyle (<2.5 hours per week total activity) was associated with a non significant increased risk of excessive gain (OR, 1.26; 95% CI, 0.95-1.69). Schlaff et al., 2014 found that leisure-time physical activity (LTPA) level did not differ among pre-pregnancy BMI categories and was not related to appropriateness of GWG. These results could be different because leisure pursuits are characterized by a tendency toward greater social orientation and a less frequent occurrence than in structured exercise routines. Therefore leisure pursuits are less likely to induce a fitness effect and more likely to influence birth weight negatively (Campbell and Mottola, 2001). Streuling et al., (2010) concluded in a systematic review that GWG was lower in the exercise group compared with the control group, suggesting that physical activity during pregnancy might be a successful strategy in restricting GWG. The actual recommendation from NHS and the Centres for Disease Control and Prevention and the American College of Sports Medicine (CDC-ACSM) are 30 minutes or more of moderate intensity physical activity on most, and preferably all, days of the week. If a women is not active before pregnancy, she should start an aerobic exercise program (such as running, swimming, cycling, walking or aerobics classes) no more than 15 minutes of continuous exercise, three times a week. Increase this gradually to at
least four 30-minute sessions a week (NHS.uk, 2015; Artal and O’ Toole, 2003). Although, pregnancy is associated with profound anatomical and physiological changes, exercise should be avoided in few circumstances. **Table 2.** and **Table 3.** Show the absolute and relative contraindications to aerobic exercise (ACOG Committee on Obstetric Practice, 2002).

<table>
<thead>
<tr>
<th><strong>Table 2.</strong> Absolute Contraindications to Aerobic Exercise During Pregnancy (ACOG Committee on Obstetric Practice, 2002)</th>
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<tbody>
<tr>
<td>• Hemodynamically significant heart disease</td>
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<tr>
<td>• Restrictive lung disease</td>
</tr>
<tr>
<td>• Incompetent cervix/cerclage</td>
</tr>
<tr>
<td>• Multiple gestation at risk for premature labour</td>
</tr>
<tr>
<td>• Persistent second- or third-trimester bleeding</td>
</tr>
<tr>
<td>• Placenta previa after 26 weeks of gestation</td>
</tr>
<tr>
<td>• Premature labour during the current pregnancy</td>
</tr>
<tr>
<td>• Ruptured membranes</td>
</tr>
<tr>
<td>• Preeclampsia/pregnancy-induced hypertension</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Table 3.</strong> Relative Contraindications to Aerobic Exercise During Pregnancy (ACOG Committee on Obstetric Practice, 2002)</th>
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</thead>
<tbody>
<tr>
<td>• Severe anaemia</td>
</tr>
<tr>
<td>• Unevaluated maternal cardiac arrhythmia</td>
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<tr>
<td>• Chronic bronchitis</td>
</tr>
<tr>
<td>• Poorly controlled type 1 diabetes</td>
</tr>
<tr>
<td>• Extreme morbid obesity</td>
</tr>
<tr>
<td>• Extreme underweight (BMI &lt;12)</td>
</tr>
<tr>
<td>• History of extremely sedentary lifestyle</td>
</tr>
<tr>
<td>• Intrauterine growth restriction in current pregnancy</td>
</tr>
<tr>
<td>• Poorly controlled hypertension</td>
</tr>
<tr>
<td>• Orthopaedic limitations</td>
</tr>
<tr>
<td>• Poorly controlled seizure disorder</td>
</tr>
<tr>
<td>• Poorly controlled hyperthyroidism</td>
</tr>
<tr>
<td>• Heavy smoker</td>
</tr>
</tbody>
</table>
2.1.2.3 Weight manage in pregnancy

Pregnancy is recognised as a high-risk period for excessive weight gain, weight that women may find difficult to reverse, thereby increasing any risk for subsequent pregnancies and their longer-term health (Harrison et al., 2011; McGiveron et al., 2014). Siega-Riz et al. (2009) determined that women have increasingly gained weight during pregnancy even after the publication of 1990 IOM weight gain guidelines. Heslehurst et al., (2010) found that first trimester maternal obesity has significantly increased from 7.6% to 15.6% over 19 years (P<0.001). In the United States with rates of overweight and obesity in women of childbearing age exceeding 60%, 2 million infants were likely born to overweight or obese mothers in 2003 (Sarwer et al., 2006). Excessive gestational weight gain (GWG) is emerging as an important predictor of maternal and offspring obesity and obstetric complications (Schlaff et al., 2014; Stuebe et al., 2007). Therefore, it is important for women to be aware of ‘how much’ weight to gain during pregnancy (Langley-Evans, 2009). Recent evidence suggests that mothers who gain excessively during pregnancy are more likely to become overweight or obese in later life (Harrison et al., 2011; Schlaff et al., 2014; Stuebe et al., 2007). The maternal approach is to balance the amount of weight gain needed to optimize the size of the baby without jeopardizing the health of the mother (Siega-Riz et al., 2009). Because of the serious health implication, the National Institute for Health and Care Excellence (NICE) produced a public health guidance on dietary and physical activity interventions for weight management in pregnancy for United Kingdom (Nice.org.uk, 2010). This guidance was the same as that in the Institute of Medicine (IOM) guidelines (2009), which recommend that normal, overweight and obese women during pregnancy gain no more than 25 to 35, 15 to 25 and 11 to 20 pounds (Table 4), respectively (Rasmussen and Yaktine 2009). Failure to gain weight within the recommended guidelines may affect the short and long-term health both mother and child (Langley-Evans, 2009). According to NICE (2010), there are no formal, evidence-based parameters of gestational weight gain (GWG) for UK population. The more recent NICE guidelines emphasise pre and post-pregnancy weight management. However, they are conservative regarding weight management during pregnancy, recommending that weight loss should be avoided. The evidence from underweight and normal weight women suggests that there is a greater risk of pregnancy complications in those who diet during pregnancy (Williamson, 2006).
Table 4. Institute of Medicine Gestational weight gain recommendations (2009)

<table>
<thead>
<tr>
<th>Pre-pregnancy category (kg/m2)</th>
<th>Recommended gestacional weight gain (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5 (underweight)</td>
<td>28 – 40 (12.7 – 18.2)</td>
</tr>
<tr>
<td>18.5 – 24.9 (normal weight)</td>
<td>25 – 35 (11.4 – 15.9)</td>
</tr>
<tr>
<td>25.0 – 29.9 (overweight)</td>
<td>15 – 25 (6.8 – 11.4)</td>
</tr>
<tr>
<td>&gt;30.0 (obese)</td>
<td>11 – 20 (5 – 9.1)</td>
</tr>
</tbody>
</table>

Schlaff et al. (2014) reported that 56-60% of women of their sample experienced excess GWG. As other studies, overweight and obese women had significantly higher odds of excess GWG compared to normal weight women. This trial suggested that GWG counselling should focus not only on obese women but also on overweight women who have a great possibility of excessive GWG.

2.2 Health outcomes

All industrialized countries are reporting high levels of obesity among women of childbearing age and this has important consequences for maternal and foetal health during pregnancy, and potentially for the longer-term health of the children of obese women (Normia et al., 2013; Langley-Evans, 2014; Taylor et al., 2014). In the UK, by 2007 13% of 21 to 30 year old women and 22% of 31 to 40 year old women were estimated to be obese, and this is expected to rise to 30% and 47%, respectively, by 2050 (Foresight, 2007). Increased maternal weight or excessive weight gain in pregnancy is associated with adverse pregnancy outcomes. Half the women who die during pregnancy, childbirth, or puerperium in the United Kingdom are either obese or overweight (Thangaratinam et al., 2012). Norman and Reynols (2011) indicated that obese and overweight pregnant women not only have more incidence of ‘minor’ complications such as, heartburn, chest infection and symphysis pubis discomfort but also obese pregnant women appear to be at increased risk of death during pregnancy. Schlaff et al., (2014) states that high pre-pregnancy BMI (>30) increases the risk for adverse maternal health outcomes like, gestational diabetes. Torloni et al. (2009) showed that for every 1kg/m2 increase in BMI the risk of developing hyperglycaemia and diabetes in pregnancy increase as well. In addition, overweight and obese women have more risk of preeclampsia or pregnancy-related hypertension, thromboembolic events (Brown and Avery, 2012). According to Norman and Reynols (2011), 78% and 61 % of deaths from thromboembolism and cardiac causes during pregnancy were overweight or obese women. Besides, there is more probability to require either caesarean
section or instrumental delivery. Given the high possibility of operative delivery, even if vaginal delivery is attempted, the chance of an ‘emergency’ caesarean section carries greater risks than ‘elective’ caesarean section (Norman and Reynols, 2011). Lastly, GWG is also independently associated with maternal postpartum weight retention (Streuling et al., 2010). Postpartum weight retention can contribute to the development of obesity and chronic diseases in women. Siega-Riz et al. (2009) showed consistent evidence in support of an association between weight gain in excess of the IOM recommendations and higher weight retention in the immediate postpartum period. One in five women retain 5 kg or more in connection with a single pregnancy and failure to lose pregnancy weight by 6 months postpartum has been shown to be a significant predictor of long-term obesity and, by the end of the first year postpartum, weight retention has been found to predict maternal overweight 15 years later (Østbye et al., 2010; Wilkinson et al., 2013). There are also other factors that influence in postpartum weight retention, such as lactation status, depression, high energy intake, maternal insulin concentrations during pregnancy and age (Nuss et al., 2007).

Additionally, there are several child health effects including macrosomia, premature birth, large for gestational age infants, shoulder dystocia, late foetal death, lower breastfeeding initiation rates, congenital abnormalities and overweight in the offspring (Chuang et al., 2014; Heslehurst et al., 2007; Johnson, 2015; Schlaff et al., 2014; Waring et al., 2013). Parker et al. (2013) suggest that pre-existing diabetes mellitus and obesity have been identified as independent risk factors for spina bifida. Not even folic acid eliminates the risk of spina bifida that is associated with these maternal morbidities. Overall, Stothard et al. (2009) highlighted the chances of overweight and obese women of delivering child with certain birth defects, such as spina bifida, cardiovascular abnormalities, cleft lip and palate, anorectal atresian hydrocephaly and limb abnormalities. Similarly, it has conclusively been shown that excessive GWG is linked with the actual child obesity epidemic (Adamo et al., 2012). Mamun et al. (2008) showed that for every 0.1 kg/week gain over the average pregnancy weight gain, offspring BMI at age 21 was 0.3 kg/m2 greater. Olson et al. (2008) determinate that excess GWG is associated with increased risk of child overweight at age 3 years and its impact is greater among high and obese BMI women than it is in normal BMI women. In addition, there is increased risk of obesity in female offspring in both adolescence and adulthood when mothers had either below normal or above normal gestational weight gain, and the risk was increased if the mother was obese prior to pregnancy (Stuebe et al., 2009). Offspring fat mass and weight circumference in adulthood are also positively related to maternal BMI during pregnancy (Norman and Reynols, 2011). Inskip et al (2005) in the Southampton Women’s Survey (SWS) collected information from women aged 20 -34 years before conception and then followed-up those women who subsequently become pregnant and the children they had. The focus of this study was on the regular diet and body composition of all
the stages. Crozier et al. (2010) analysed 948 children born to women in the SWS who had been measured body composition with dual-energy X-ray absorptiometry at birth, 4 y, or 6 y. Afterwards, they compared with their mothers’ measured weights before pregnancy and at 34 week gestation. They found that greater pregnancy weight gain was associated with greater neonatal fat mass (SD: 0.10 per 5-kg weight gain; 95% CI: 0.04, 0.15; P = 0.0004) and was weakly associated with fat mass at 6 y (SD: 0.07 per 5-kg weight gain; 95% CI: 0.00, 0.14; P = 0.05) but not at 4 y (SD: 0.02 per 5-kg weight gain; 95% CI: −0.04, 0.08; P = 0.55). This trial concluded that an appropriate pregnancy weight gain, as defined by 2009 IOM recommendations, is linked to lower levels of adiposity in the offspring. Equally important, as stated before recent evidence suggests that adult diseases like cardiovascular diseases or diabetes, proposed to have a foetal origin and are linked with nutrition during pregnancy (Arrish et al., 2014; Stuebe et al., 2007). Nutritional and other environmental expositions during development can permanently alter the structure, homeostatic systems, and functions of the body. This phenomenon has been referred to as ’programming’ (Barker et al., 2006)

2.2.1 Programming for obesity

Crozier et al (2010) suggested that the intrauterine environment may be a critical period for the programming of obesity and an alteration in pregnancy weight gain may not only influence foetal growth, but also alter body composition. Epigenetic effects are increasingly being recognized as playing important roles in influencing growth and body composition of offspring (Giraudo et al., 2010). According to Ravelli et al. (1976) intrauterine nutritional deprivation affected the differentiation of hypothalamic centers regulating food intake and growth, following an accumulation of excess fat in an organism growing to its predetermined maximum size. “Barker hypothesis” articulates the developmental origins of adult disease suggesting that adipose tissue development could be affected by nutritional status in a critical time of the foetus development (Sen et al., 2012). Fall et al. (1995) determined that foetal growth was related to such factors as blood pressure, waist: hip ratio, serum lipid levels, and plasma glucose and insulin concentrations, all of which help to predict the risk of cardiovascular disease. Additionally, researchers have begun to explore possible relationships between maternal birth weight and the subsequent risk of the development of medical complications of pregnancy (Dempsey et al., 2004).
2.3 Psychosocial risk factors for excessive gestational weight gain

The physiological causes and consequences of excessive weight gain in pregnancy has been widely studied; however, the maternal psychosocial characteristics have an important influence on achieving the recommended weight gain. These factors include ethnicity, socioeconomic status, age, education, pregnancy intendedness and psychosocial characteristics such as attitude toward weight gain, social support, depression, stress and anxiety (Hartley et al., 2015). Moreover, it seems that the psychological and physiological conditions are linked to each other. Hickey (2000) suggested that maternal psychosocial stress may function to affect pregnancy outcome through neuroendocrine-mediated alterations in prenatal energy metabolism, for example poor psychosocial status may interfere with the achievement of a positive energy balance through stress-related changes in sleep patterns, physical activity, appetite, food intake, tobacco use, or other behaviours.

Pregnancy presents unique positive and negative stresses that challenge overall psychological adaptation (DiPietro et al., 2003). After childbirth some women may have trouble associated with self-esteem and tiredness or just adjusting to their altered figure, stretch marks and scars left by caesarean section (O’Connor and Kovacs, 2003). Besides, anxiety appears to be especially common in postpartum (Kuo et al., 2014). Carter et al. (2000) found that during pregnancy, symptoms of depression or anxiety were not significantly correlated with concurrent eating attitudes or measures of BMI. However, overweight women were at risk for elevated anxiety at 4 months and depressive symptoms at both 4 and 14 months postpartum. Bliddal et al. (2015) determined that mothers who had lost weight or gained ≥2 BMI units 6 months after delivery compared to their pre-pregnancy BMI had a small but consistent increased risk of depression/anxiety in the following years. Furthermore, postpartum anxiety or postpartum depression, has been associated with a number of adverse outcomes, including diminished feelings of efficacy in the parenting role.

Hickey (2000) hypothesized that negative attitudes about weight gain and reports of weight-restrictive behaviours during pregnancy is associated with a constellation of general psychosocial factors related with distress, while women who experience pregnancy in a more positive manner have more accepting attitudes about weight gain and body changes of pregnancy. Thus, the key question is whether positive or negative attitudes predict pregnancy weight gain.

There is substantial evidence that behaviours influence health status. However, there are other factors than interact in the complexity of weight management, such as socio economic status, social support and ethnicity. For instance, the place a person occupies in society also impacts substantially on his/her health, indeed such factors may overwhelm the impact of individual behaviours (Bennett and Murphy, 1997). There is also a strong association between ethnicity and health status. In the UK, rates of ill-health and mortality amongst
ethnic minorities differ from those of white population (Bennett and Murphy, 1997). Additionally, low levels of support is also associated with greater weight gain. Hartley et al., (2015) suggest that women receiving social support in an intimate relationship with a spouse or a partner may be more averse to change their body size and appearance by gaining too much weight during pregnancy. On the other hand, turning to friends or family is a useful way of coping with adversity. However, when social support is lacking for some women, they may use other coping strategies such as emotional and comfort eating increasing their risk of gaining excessive weight during pregnancy (Hartley et al., 2015). Migrant women represent a significant proportion of women birthing in UK. These women are likely to face many barriers throughout their maternity care, including challenges of relocation, distance from family and support networks, a language barrier, and potentially culturally insensitive care from maternity service providers (Hennegan et al., 2015). The main goal of the current study was to explore attitudes and behaviours towards weight control during and after pregnancy among white British and South American to have a better understanding of how certain events, like immigration, can influence a woman’s weigh-related perceptions and attitudes.
Chapter 3. Methodology

3.1 Qualitative research in Nutrition

Traditionally, quantitative research has dominated health care (Pilnick and Swift, 2010); nevertheless, qualitative research has become an important tool in the field of health research. More recently, the methods of social research have become an accepted part areas such as, public health, primary care, health promotion and nursing (Green and Thorogood, 2014). Moreover, there is a recognition that it should be a vital part for tailoring health policies and practices (Swift and Tischler, 2010). In fact, qualitative methods have already contributed much to the understanding of health because it is particularly relevant for health research that investigates human behaviour and relationships (Pilnick and Swift, 2010).

Weight management is directly related with a healthy lifestyle, which includes adequate food choices and exercise. Food is a complex entity with multiple functions in a person’s life including generating feelings as confusions and anxiety, particularly in relation to health. Therefore, qualitative research is particularly well placed to deal with this complexity because it investigates how and why people behave in certain ways (Swift and Tischler, 2010). Much of the work conducted in dietetics and nutrition health promotion is aimed at changing people’s eating behaviour to improve their health. (Swift and Tischler, 2010).

3.2 Qualitative research

Using qualitative research in this study offers a unique insight into all the factors that may influence women’s difficulties with weight management during and after pregnancy. To simplify, qualitative research normally deals with words; indeed it is often defined as ‘research beyond numbers’ (Fade and Swift, 010). Moreover, it requires an active population involvement (Garbarino and Holland, 2009). This kind of research might be best viewed as an umbrella term (Swift and Tischler, 2010). That means that it encompasses an enormous range of approaches and techniques developed from disciplines, such as anthropology, philosophy, sociology and psychology. To have a better view of what qualitative research is, it is important to understand the philosophical assumptions that support it. Swift and Tischler (2010) proposed that qualitative research tends to have a relativist ontology, be located in an epistemology that embraces subjectivity and its research designs is based on inductive reasoning. As ontology relates to a person’s understanding of the nature of the world, relativist ontology considers reality to be socially constructed it means that a person’s perceptions and thoughts about the world are always influenced by social factors such as culture, history and language (Fade and Swift, 2010). Therefore, no matter how controlled
research techniques are, there will always be bias because they are conducted and interpreted by human beings (Swift and Tischler, 2010). Likewise, a qualitative researcher attempts to produce subjective findings (Fade and Swift, 2010). Although subjectivity contributes with extensive and rich data, acknowledging and working with it can lead to researchers being accused of being unscientific and anecdotal (Swift and Tischler, 2010). Besides, quantitative research favour the process of inductive reasoning, it means that data collection and analysis is guided by one or more, open-ended research questions. In addition, in this process a researcher create codes aiming to explain the current data (Fade and Swift, 2010; Swift and Tischler, 2010). Accordingly, qualitative research, on the whole, is not produced by passively following predefined ‘recipes’ (Pilnick and Swift, 2010). Lastly, many qualitative researchers work within a particular strategy of inquiry or qualitative methodology. This helps the researcher with an overall strategy for formulating, articulating, analysing, and evaluating their methods (Fade and Swift, 2010). The most commonly used strategies of inquiry in health research include Phenomenology, Grounded Theory, Discourse Analysis, Ethnography, Ethnomethodology and Action Research (Swift and Tischler, 2010).

The current research is based on a relativist ontology because it is a fact that weight managing is linked to social influences and complex interaction of factors. It embraces a subjective viewpoint and recognise multiple realities based on the participants experiences and opinion. Additionally, it aims an inductive research to explore all the obtained data in order to understand and generate hypothesis rather than answer it. Besides, this study uses thematic analysis to organized and present the results.

3.3 Project context

The research was conducted in Manchester, Lancashire, UK. Two centres formed part of this research, ‘The International Society’ and ‘Z-arts’. The researcher (AR) assisted to the two groups since September 2015.

Z-arts is a not for profit organization and registered charity that was formed in 2000. It is a space for participatory activities for children and families. It is currently part funded by Manchester City Council and by private donations. Z arts organized activity groups for babies, toddlers and children of all ages, such as ‘Paint Pots for Tots’ for mothers and children up to four years old.

The International Society is an independent, not-for-profit organisation in Greater Manchester. It was founded in 1966, its aim is to provide cultural and social support to international students. It organizes a ‘Families Group’ to support international mothers and children in Manchester and helps them find friends.
3.4 Data collection
The present study examines experiences, attitudes and perceptions to weight gain during pregnancy. Therefore, this served as a starting point for developing a semi-structured interview to allow a flexible discussion of topics. It followed a flexible outline of themes explored via open-ended questions to guide the participant. This kind of interview allows the experiences, meanings, values and priorities of participants to emerge with minimal interference on the part of the researcher (Draper and Swift, 2010). The interview contained four quantitative questions to obtain general data as age or gained kilograms and seven qualitative topics that refers to knowledge and perceptions of women (Appendix 1). All the interviews were recorded with the authorization of the participants (Appendix 2). Following each interview, the researcher (AR) took immediate reflections in the form of field notes. A number of steps were taken to ensure a dynamic and productive interview. Ensuring a convenient location of the participants’ choice, provide a private environment, pay attention to the terminology used and body language and address any questions. To reach a “power balance” between the researcher and the researched, a simplified language to describe the research was used. As stated by making these considerations, it is hoped that the researcher will be “accepted” enough for responses to be honest; consequently this will add positively to the data collected (Draper and Swift, 2010; Fade and Swift, 2010).

A pilot study was carried out to ensure reliability and validity of the interview to the two groups of participants. Green and Thorogood (2004) explain that the initial pilot work look at feasibility and predict problems with implementation. Four women were interviewed (two of each group). Afterward, the interviews were transcribed and coded in the software NVIVO™ 10 (QSR International Pty Ltd., 2002) to ensure that the software would be helpful in the data analysis stage. After piloting the interview guide, a further improvement was made including a topic about physical activity, feelings about actual weight and a question referring about what they would do differently in other pregnancy. These topics emerged spontaneously during the piloting interviews. Therefore, they were add to the interview guide.

3.5 Participant recruitment
By their nature, qualitative studies often involve small sample sizes and/or single settings, and this can create concerns about their generalisability (Swift & Tischler, 2010). However, one of the key ways to enhance generalisability is through proper consideration of sampling at the
design stage of the study (Pilnick and Swift, 201). Draper and Swift (2010) stated that although, power calculations cannot be employed to calculate what will be an adequate sample size, an adequate sample size is the one that is large enough to answer the research question but not so large that interferes with in-depth analyses. On the other hand, the size of a qualitative sample is determined by the theoretical saturation that happens when no new concepts or themes emerge from reviewing the data from a theoretically sensitive sample of participants (Bradley et al., 2007). Fade and Swift (2010) suggested that coding should cease when it no longer adds anything substantial to the overall analysis.

In the currently research, two groups (11 women in each group) where selected in order to study the perception and experiences around pregnancy. The importance of obtaining the data from two different cultures is based on the multiple ethnic groups that live in Manchester. According to the Manchester City Council, 33.5% of Manchester population are non-white groups. Moreover, 4.7% corresponds to mixed groups like, South American people (Manchester City Council, 2015). It is important to analyse how British women manage their weight during and after pregnancy, but there are also vulnerable groups of women who come with their families to UK to study or work. Indeed, this research analysed two ethnic groups to have a better understanding of how certain events like immigration can influence on women’s weigh-related perceptions and attitudes. It also essential to explore if international women found themselves involved with the health system in spite of their different cultural experiences.

Purposive sampling technique was chosen as the most appropriate method in which participants are selected due to the nature of information or characteristics that they poses (Draper and Swift, 2010). All study participants were recruited through family and toddler groups in Manchester. The International Society leads a family group that meet every Thursday in order to gather non-British people living in Greater Manchester. Z-arts organizes each Monday ‘Paint Pots for Tots’ an activity group for women with children up to 5 years old. The researcher (AR) carried out the recruitment personally on Mondays and Thursdays. Women were invited to participate with an information sheet containing information about the study (Appendix 3). Participating women signed a written consent to be part of the research (Appendix 2).

Comparison was made between the experiences with the health system in UK and abroad if was the case. Besides this, the role of social pressure, culture, awareness and knowledge in each group was also explored. This enabled the reflection of the main influences on the weigh manage during and after pregnancy. The comparison of white British and Hispanic
participants was made in order to generate a total picture of the physiological and psychological complications that women can be experiencing during the way of pregnancy, breastfeeding and overall family live.

3.6 Data analysis

All data were collected prior to analysis and interviews were transcribed verbatim. Fade and Swift (2010) stated that the major advantage of researchers transcribing their own interviews is the opportunity to develop familiarity with the data, and familiarity is essential for effective analysis. The qualitative data analysis software NVIVO™ 10 (QSR International Pty Ltd., 2002) was used to retrieve and code data, as well as to develop themes building. Computer assisted qualitative data analysis software (CAQDAS) is being welcomed as an important development with the potential to improve the rigour of analysis, however it cannot replace the intellectual work associated with coding (Pope et al., 2000; Fade and Swift, 2010). The main approach of this study is exploratory. Guest et al. (2012) stated that an exploratory analysis requires the researcher to read and reread the data, looking for key word, trends, themes or ideas before any analysis take place. Afterwards, a thematic analysis was conducted. This allowed the identification and reporting of patterns within qualitative data in accordance with the procedure described by Braun and Clark (2006) (Table 5). Applied thematic analysis as Guest et al. (2012) comprises a bit of everything, grounded theory, positivism, interpretivism and phenomenology, synthesized into one methodological framework. Moreover, thematic analysis evolves not only from the conceptual codes and sub-codes as in the case of taxonomy but also from the relationship codes, which link concepts to each other (Bradley et al., 2007). However, this analysis is not a ‘linear process’ where the research simply move from one phase to the next, it is more ‘recursive process’, where you move back and forth as needed, throughout the phases (Braun and Clarke, 2006). Consequently, the interviews were read and reread by one coder, the researcher (A.R) in order to identify preliminary themes. Then the interview was broken down into codes, which were organized into categories and subcategories (Boyatzis, 1998). Comparisons were made between codes. Themes where then refined, and their names were revised according to the different code extracts and the entire data set. Finally, in order to report the results of the analysis the most representative extracts were selected.

Table 5. Phases of thematic analysis (Braun and Clarke, 2006).
3.7 Validation and Reliability

Validity refers to the issue of whether the researcher’s description truly reflects what actually happened (Pilnick and Swift, 2010). In the absence of replication, there are two main techniques for validation: triangulation and respondent validation (Harding, 2013). In this study, respondent validation could have been used by taking results back to those who have participated in the research and asking them to comment on the adequacy of the descriptions that have been produced. However, Pilnick and Swift (2010) stated that it is important to recognise that the use of a validation technique is not necessarily straightforward. Respondent validation can be particularly difficult for the researcher. Indeed, it is necessary to bear in mind that the researcher’s purposes are not the same as the participants. In case of external reliability, it is more difficult for qualitative research because the identical social circumstances can never be recreated (Harding, 2013). According to Pilnick and Swift (2010), what is possible is for researchers to provide clear and explicit definitions of the concepts they have used and how they have used them. Moreover, that every effort has been made to represent the participant truthfully (Bryman, 2001).

3.8 Ethical considerations

As this study neither involved interventions nor implied emotional consequences that impact on the lives of participants, no ethical approval was required for this study. However, the research proposal was previously analysed by the Manchester Metropolitan University (Appendix 4). Green and Thorogood (2004) suggested that when the interview is done with empathy and understanding, it can be a very positive experience for the participant. Furthermore, some interviewees felt that the interview had been a good experience, giving them the opportunity to talk about their concerns and to reflect on their experiences. The present study reports the analysis of outcomes of the interviews using wholly anonymised data provided by participants. Fadn and Swift (2010) highlighted that to safeguard the confidentiality essential in healthcare research, it is essential that participants’
real names or any information that could be used to identify them, are not reported. Hence, this research uses a study number for each participant to refer to a passage of speech.

Chapter 4. Results and discussion

Twenty-two participants (11 South American and 11 white British) were recruited and interviewed. South American participants were recruited while attending to the ‘Families Group’ weekly meeting at the ‘International Society of Manchester’, which aim is to provide social support international mothers and children in Manchester. White British participants were enrolled during a weekly toddler session ‘Paint pots for Tots’ in ‘Z-Arts’, which is a space for participatory activities for children and families. All the interviews were performed in Manchester and Stockport either in the home of the interviewee (n=8) or at Z arts/International Society Building (n=14). Socio-demographic data of participants was collected during the course of the interview, shown in Table 6. Women had children who were age between 1 and 5 years at the time of the interview. The study participants were all women aged between 25 and 46 years (detailed description Appendix 5). All of them were married or lived with their partners (n=22). The white British participants had lived in Manchester more than 12 years (n=11). South American participants were born in Chile, Venezuela, Colombia and Ecuador. Most were students (n=3) or students’ wives (n=5) at the University of Manchester. The remainder lived and worked in Manchester, none of which had lived in Manchester less than 1 year. Most participants had either one (n=10), two or more children (n=12). All white British women were attended by the NHS during their pregnancies (n =11) this was also the case of South American women who lived in Manchester during pregnancy (n=5). The women who lived in their native country attended a private practice (n=6). The data was collected in June and July 2015, until it was determined that no new themes were appearing and the same themes were being repeated (Bradley et al., 2007). Theoretically, saturation of data had been achieved when there were 22 subjects in the study.
Table 6. Participant characteristics, N = 22.

<table>
<thead>
<tr>
<th></th>
<th>White British (N)</th>
<th>South American (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, years (median)</strong></td>
<td>37 (26-46)</td>
<td>36 (31 -41)</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than college graduate</td>
<td>(1)</td>
<td>Less than college graduate</td>
</tr>
<tr>
<td>College graduate or higher</td>
<td>(10)</td>
<td>College graduate or higher</td>
</tr>
<tr>
<td><strong>Age of first pregnancy (median)</strong></td>
<td>32 (23-43)</td>
<td>31 (25-33)</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>(4)</td>
<td>One</td>
</tr>
<tr>
<td>2 or more</td>
<td>(7)</td>
<td>2 or more</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>(9)</td>
<td>Married</td>
</tr>
<tr>
<td>Living common law</td>
<td>(2)</td>
<td>Living common law</td>
</tr>
<tr>
<td>Not Married</td>
<td>(0)</td>
<td>Not married</td>
</tr>
</tbody>
</table>

After a thematic analysis, four main themes emerged from the qualitative analysis. Although data from South American and white British participants was analysed separately, the similarity between themes emerging, enabled the findings from both groups to be presented together. Within each main theme, three levels of importance (subthemes) were identified. The main factors to influence women’s weight in childbearing years were:

- Lifestyle during pregnancy
- Weight management during pregnancy
- Weight after pregnancy
- Health System

Secondary to the above there were elements, which are part of the main factors, such as:

- Diet and physical activity
• Weight perception
• Awareness about weight gained
• Women's knowledge
• Attempts to lose weight
• Health providers’ recommendations
• Differences between pregnancies and others.

Lastly, the third level factors are details that helped women to approach a healthy weight:
• Explanations of the health provider’s recommendations
• Sources of information
• Social support

Themes and subthemes are shown in Figure 1.
Figure 1. Hierarchy of Weight Management in Childbearing years
4.1 Theme 1: LIFESTYLE DURING PREGNANCY (Figure 2)

The first topics emerged from the interviews were the dietary habits and physical activity that women had during pregnancy, which constitutes the first theme related to lifestyle.

4.1.1 Diet

Most of the participants knew that it is necessary to maintain a ‘healthy diet’ in order to have a healthy baby. Some participants indicated that they just follow their usual pre-pregnancy diet, which they considered to be healthy already. All women reported compliance with avoiding foods they were recommended by their prenatal providers, such as raw/undercooked meats, soft cheeses, mercury-containing fish, alcohol, tobacco and caffeine. Although, there were different concepts about the healthy diet they followed when they were pregnant. As two interviewees said:

'I keep my normal diet but in general I always eat salad twice a day and a lot of fruit.' (Participant 11, 37 y/o South American, 2 children, PhD student’s wife)

'I was pretty sure I took care of my diet. I avoid everything they told me. I usually cooked from scratch, rarely ate take away. I obviously did not drink any alcohol. I normally eat my five portions a day’ (Participant 18, 46 y/o British, chronic lung disease, first and only child at 43y)
Crozier et al (2009) and Mathews & Neil (1998) stated that there is little overall change in dietary patterns in pregnancy compared with non-pregnant. This result was also found in this study, many participants did not see the necessity of changing habits during pregnancy. However, Mathews and Neil (1998) found that the reference nutrient intake (RNI) of UK pregnant women (considering both intakes from food and supplements) for iron and folate were not reached by 82.8% and 82.6% respectively. Moreover, Vitamin D intakes reached the RNI of 10 ug for only 1.2% of the subjects. Crozier et al. (2009) measured smoking, alcohol, fruit and vegetable, and caffeinated drink consumption before pregnancy and in early and late pregnancy in the Southampton Women’s Survey (SWS). Overall, 81% of women in early pregnancy complied with at least three of the recommendations. There was a notable reduction in smoking (12%), alcohol consumption (44%) and intake of caffeinated drinks (23%). However, the proportion of women consuming less than the recommended five portions of fruit and vegetables similarly showed little change between before (47%), early (46%) and late pregnancy (445). The strength of this study is that the information before pregnancy was collected at the time when they were not pregnant, on the contrary with other retrospective studies. Besides, Stuebe et al. (2007) suggested that excessive calorie intake mediates part of the associations of fried foods and dairy products with excessive GWG. This study found a stronger association between fried food intake and excessive GWG (OR, 6.36; 95% CI, 1.34-30.31 per serving per day). These results show that counselling pregnant women about ‘healthy eating’ should be offered on a wider scale and more specific or, on the contrary, they will just continue with their usual diet. Additionally, Thangaratinam et al. (2012) identified 44 relevant randomised controlled trials (7278 women) evaluating three categories of interventions: diet, physical activity, and a mixed approach. They concluded that dietary intervention resulted in the largest reduction in maternal gestational weight gain (3.84 kg, 2.45 to 5.22 kg), with improved pregnancy outcomes compared with other interventions. Among the interventions, those based on diet were the most effective and were associated with reductions in maternal gestational weight gain. All women admitted knowing that portion size was a key to control their weight. Some tried to control portion size and others increase their portions during pregnancy as the comments below illustrate:

‘I tried to eat normal, never the double, just for me.’ (Participant 13, British woman, 33 y/o, only one 1y old child)
Chuang et al. (2014) conducted qualitative interviews with postpartum women who were overweight or obese prior to pregnancy. These authors found that women with excessive GWG welcomed “eating-for-two” and all women reported a significant increase in calories to get enough nutrients for the baby, while women with recommended GWG made careful choices not to increase their portion sizes and usually reported eating smaller meals with healthy snacks throughout the day.

In this study, participants also reported cravings not only for sweets but also for fish in the case of two vegetarian participants. One participant commented:

“I also increased my portions, I knew you do not need more and I read that you should eat and drink the same amount, just a little bit more, but in fact I increased my portions because I was very hungry.” (Participant 21, 41 y/o British, 2 children, PhD in Mathematics, decided to stay home until her children grew up)

Chuang et al. (2014) conducted qualitative interviews with postpartum women who were overweight or obese prior to pregnancy. These authors found that women with excessive GWG welcomed “eating-for-two” and all women reported a significant increase in calories to get enough nutrients for the baby, while women with recommended GWG made careful choices not to increase their portion sizes and usually reported eating smaller meals with healthy snacks throughout the day.

In this study, participants also reported cravings not only for sweets but also for fish in the case of two vegetarian participants. One participant commented:

“I could not eat fruit just carbs. High fat food. I did not stand oily fish I knew it was good but I could not I hate it.” (Participant 20, 41 y/o British, 2 children, working as a midwife)

After conducting qualitative interviews, Chuang et al. (2014) reported that less healthy eating during pregnancy was due to cravings for sweets, junk food and high fizzy drinks. Crozier et al. (2009) reported that the consumption of breakfast cereals, processed meat, non-citrus fruit, sweet spreads, cakes and biscuits and hot chocolate drinks increased further only in late pregnancy (all P = 0.0001). Whereas consumption of puddings, cream, milk, cheese, full-fat spread, cooking fats and salad oils, red meat, and soft drinks did not change in early pregnancy, they increased in late pregnancy (all P = 0.001). Therefore, dietary cravings in pregnancy may be one of the potential predictors of excessive GWG (Stuebe et al., 2007).

4.1.2 Physical activity

Another important factor used for this analysis is the physical activity level of each woman during pregnancy. In this subtheme, there were some differences between South American and British. Although most South American women received a specific recommendation to participate in aerobic exercise, just half of the participants did it. On the contrary, three of the eleven white British participants mentioned receiving physical activity recommendation; however, all of them did some aerobic activity such as aqua natal by NHS, swimming or yoga for pregnant women. Talking about this issue, the interviewees said:
Melzer et al. (2010) reported that a substantial proportion of women stop exercising and decrease their overall physical activity level after they discover they are pregnant, and it is uncommon for them to begin participating in exercise activities during pregnancy. Physical activity habits may be influenced by the widespread belief that exercise during pregnancy can be dangerous, as well as by physical limitations to exercise as women advance through pregnancy (Chuang et al. 2014). NICE (2010) states that pregnant women should receive advice and explanation. In the first appointment, healthcare professionals should clarify the dangers of being sedentary and the importance of walking and being active in daily life.

Regarding these two important subthemes, diet and exercise, Chuang et al. (2014) highlighted that women who achieved appropriate GWG reported deliberate dietary habits and physical activity planning, with appropriate GWG goals during pregnancy.

4.1.3 Differences between pregnancies

Twelve women out of all the participants have two or more children. A repeating pattern during the interviews was mothers comparing their pregnancies experiences. Participants felt more confident, knowledgeable and relaxed about the weight changes they were inevitably going to experience, as one participant said:

‘I read because in my first pregnancy I was worry about how much weight but in second baby I was no that worried because I knew what was going to happen and what was really important to me’ (Participant 12, 37 y/o-old British, vegetarian, 2 years old and 5 months children)

However, participants also reported feeling tired more often, managing a pregnancy and looking after the other children, as one participant commented:

‘The difference between the first and the second was mainly energy because the second and the third are 10 months a part. When I was pregnant, the other baby was 6 weeks, which was a shock. So I have no energy so I was craving high energy food, looking for food that keep me going.’ (Participant 14, British 42 y/o old, PhD in Eating Behaviours, 3 children of 9, 5 and 4 years old )
Regardless of whether these women had enough knowledge about a healthy lifestyle, there are some factors that can influence lifestyle when comparing it to the previous pregnancy. For instance, most women felt exhausted managing the pregnancy and taking care of the other children. The thought of knowing more than in the first pregnancy was a repeating pattern, so there was less reading, fewer questions and they felt more confident. Hence, most women gained more weight in the second and third, than in the first pregnancy.

Merkx et al. (2015) found that weight gain below or above the guidelines was seen more often in women who perceived a greater sleep deprivation. In addition, stress appears to alter overall food intake in two ways, resulting in under- or overeating, which may be influenced by stressor severity. In a cross-sectional, observational study, DiPietro et al. (2003) assessed the psychological characteristics related to weight gain between 28 and 36 weeks’ gestation. These authors concluded that chronic life stress seems to be associated with a greater preference for energy- and nutrient-dense foods. Links between the sub-themes were established for ‘differences between pregnancies’ and ‘physical activity’, as shown in Figure 3.

![Figure 3](image)

Figure 3. Link between codes in Theme 1

Prevention of reduced physical activity during pregnancy appears a promising approach to promoting healthy weight gain (Merkx et al., 2015). However, most participants in this research, with two or more children stated not having enough time to follow a physical activity program during or after pregnancy, even if this is free. The principal cause was having other children to look after, as one participant explained:

> ‘In the first pregnancy I did yoga but in the second baby I did not exercise because I did not have any minute to expend in things like exercise. But I was moving all the time because I have already a 3 year old girl.’ (Participant 8, 38y/o, 2 children born in Chile with 3 years apart)

It is important to notice that several women with excessive GWG have reported in other studies, they were physically active during pregnancy. However, they were far from meeting
the CDC-ACSM guideline recommendations of 150 min of moderate-intensity physical activity per week (Artal and O’Toole, 2003), with physical activities described as casual walking for 5 min a day, standing while at work, stretching, and light yoga (Chuang et al., 2014). Merkx et al. (2015) found that a decline in physical activity was associated with weight gain above the guidelines (OR 0.54, 95 per cent CI 0.33–0.89).

Five of the twenty two participants expressed that they should have exercised more during and after pregnancy to prevent excessive weight gain. Indeed, they highlighted the importance of having affordable child care services in the leisure centers to help women by taking care of their children while they exercise. An interviewee said:

‘There are exercise classes that are free, swimming pool and that make thing easier, the problem is that there are just some places that take the children while you exercise but those are places you pay for but nothing is free. That could be helpful.’ (Participant 20, 41y/o British, 2 children)

Two participants mentioned a lack of support from their partners when helping them with their children in order to have more free time to exercise. For example one interviewee said:

‘For example the nutritionist said this is the class and takes place at this time, ok but my husband said ok I will be there to stay with the kids. It is important to work all the same. An expert saying to my husband that it is important maybe it would take seriously. It is important to prioritize exercise.’ (Participant 21, 43 y/o British, 2 children)

4.1.4 Health factor that interfere with lifestyle

Although healthy nutrition and physical activity is based on the same principles for both pregnant and non-pregnant women, pregnancy is influenced by morning sickness or worsening of gastrointestinal reflux symptoms (Chuang et al. 2014). The participants experienced some of the common ailments relating to pregnancy. Two participant had symptoms of indigestion, and one of them got complication with her hiatal hernia. Three participants mentioned having nausea and/or vomiting in the whole pregnancy. Moreover, one of them developed hyperemesis gravidarum (HG), which is excessive nausea and vomiting that needed hospital treatment multiple times. Two participants developed pelvic pain in pregnancy, known as symphys pubis dysfunction (SPD). This disease is a collection of uncomfortable symptoms caused by a misalignment or stiffness of women’ pelvic joints causing severe pain around the pelvic area, which makes it difficult to move (NHS, 2015). These participants indicated how contradictory these conditions were to healthy eating and exercise:
These specific diseases related to the physiological changes in pregnancy, can appear in any woman. However, it is essential to adjust some recommendations for them. For instance, as mentioned by Participant 14, SPD prevented her from exercising completely in her last two pregnancies, thus, she gained excessive weight, weight she has never lost. NICE (2010) suggests that strategies must be tailored to individual needs and choices in order to prevent someone from becoming overweight or obese. In conclusion, these theme reflects the difficulties that women can face to achieve a healthy lifestyle during pregnancy. There is a plethora of evidence that supports a healthful diet and greater physical activity during pregnancy for a reduced risk for excessive gestational weight gain (GWG) (Stuebe et al., 2007)
4.2 Theme 2: WEIGHT MANAGE DURING PREGNANCY (Figure 4)

Figure 4. Hierarchy Theme 2

This theme contains all the important factors the participants consider as critical for their weight gain during pregnancy. For example: awareness, behaviours, attitudes and knowledge about weight in pregnancy.

4.2.1 Awareness about weight gained

The first step to knowing how much weight was gained during pregnancy was to explore if participants knew what their weight was and how it change, also if this was measured by health care professionals or by themselves. Being weighted during pregnancy was normal for some people but not for others. There was a big difference found between the UK and South American groups when asking them about the weight gain during pregnancy. Ten of eleven South American women knew how much weight they gained, considering that 3 of them were attended in NHS. On the other hand, four of the eleven white British participants knew the amount they gained. One interviewee said:

‘I gained a lot of weight but I was aware of each pound I was putting on. I weighted myself in the pregnancy.’ (Participant 15, 33 y/o British, one child, returned to her pre-pregnancy weight)
Another interviewee, when asked about the GWG said:

‘I asked them to weight me at month 7, but after that as I knew I gained a lot I just did not want to know. Until the month 7, I gained 10 kilograms. They did not talk about weight.’

(Participant 10, 34 y/o South American, PhD student, one 1 y/o child born in the UK)

Not only preventing excessive weight gain in pregnancy, but also reducing maternal BMI in the preconception period in overweight and obese women appear to be appropriate and applicable strategies to prevent the obesity epidemic (Olson et al., 2008). Therefore, the identification of at risk groups as overweight or obese will allow tailoring proper lifestyle modification for counselled women and elicit optimal results (Schlaff et al., 2014). Women should be aware of a healthy body weight and try to achieve a goal weight. Nursing interventions should consider body weight perception to motivate effectively overweight and obese women to lose weight, as necessary (Boo, 2013). Although a high amount of participants in this study did not know their weight, none had a specific weight goal to reach during pregnancy. This finding corresponds with the recommendation of NICE (2010) of not to weigh women repeatedly during pregnancy as a matter of routine. Moreover, this guideline states to only weigh again if clinical management can be influenced or if nutrition is a concern. However, if health care professionals do not measure weight and neither does a patient, how can pregnant women know if they are not above GWG recommendations? NICE (2010) recommends health providers not to rely on self-reported measures of weight and height. Accordingly, Danubio et al. (2008) found that both sexes overestimate height (2.1 and 2.8 cm for males and females, respectively), and underestimate weight (1.5 and 1.9 kg for males and females, respectively) and conclude that the BMI is underestimated (1.1 and 1.5 points for males and females, respectively). On the other hand, Roth et al. (2013) found that self-reported BMI (29.0 ± 8.37 kg/m2) was slightly lower than measured BMI (29.1 ± 8.38 kg/m2) (p = 0.4). Eighty percent of participants reported a BMI in the same category in which their BMI was measured. Losing weight is not an indication in pregnancy; however, it is important to look for strategies to help them gain the recommended gestational weight according to the guidelines. It is important to investigate if encouraging self-weighting or having permanent weight control by health professionals during pregnancy could be a strategy. Additionally, Streuling et al., (2010) proposed that factors, such as maternal age, education and socio-economic status may influence GWG. In South American groups, first pregnancy age had a range of 8 years (25 -33y); however, white British group had a wider range of 20 year (23-43y). In fact, there were some differences in pregnancies before 35 years and after this. The comments below illustrate the comments of two women of different ages:
There are enormous differences between these two cases. In the first case, participant 18 stated that her priority was not weight at any point; she had struggled to finish the pregnancy and weight stopped being an issue for her. On the other hand, participant 16 highlighted that she used to be slim and she had had to change the way she dresses because of her new body shape. Moreover, she feels overwhelmed all the time. Hartley et al. (2015) suggest that body dissatisfaction is more likely to be experienced in younger women who may have more trouble accepting changes to the body that occur during pregnancy and its related transformations. Crozier et al. (2009) found that there was also a detrimental effect associated with age, younger women were more likely to smoke and to eat fewer portions of fruit and vegetables, although in late pregnancy there was also a small effect of younger women tending to drink less than four units of alcohol per week. Additionally, participant 16 pointed out that when she was pregnant she thought she was eating for two, and now that she receives food vouchers, she does not know what healthy food to buy. These thoughts could be related with her age or with her educational background. Crozier et al. (2009) found

‘I was not particularly worried about the weight during pregnancy. I did not care about my weight after the baby was born either. I lost weight during breastfeeding but I put on weight in these last year. I am still breastfeeding (3 years). I put on weight because I got a car and I am not working right now. I never weight myself but I am starting Slim world this weeks. As I have a chronic lung problem, I take medication and it is more difficult to exercise. I just understood that big things happened to my body, big changes have taken place. It was not and it is not an issue. Especially for elder you know how much it is gonna take to get back. (Participant 18, 46 y/o British, long history of miscarriages, high-risk pregnancy at 43y/o, one 2 y/o child)
that education was strongly associated with health behaviours for example, women with fewer educational qualifications tended to smoke, eat less fruit and vegetables and drink more caffeinated drinks at all-time points. In the current research, 1 woman did not finish high school and twenty one had college education or higher (9 undergrad, 5 masters, 5 PhD). Women with more qualifications tended to have more knowledge and interest about nutrition for them and for their children, however it was not related at all with their lifestyle and the GWG. For example, this interviewee explained everything she did to avoid excessive weight but she gained more than the recommended 12 kilograms.

‘I read many books about nutrition in pregnancy and many studies about iodine and omega 3. So, I ate a lot of sea food to increase the iodine and magnesium to improve the brain development in the baby. I never read a magazine, just journals. I went to the best Nutritionist in Santiago Chile and he gave me a paper with any specific information in pregnancy.’ (Participant 3, 31 y/o South American, pregnancy in Chile, one 4 y/o child, Masters student, GWG 15kg)

4.2.2 Behaviours

While looking for the most important reasons for the excessive weight gained in some participants, an essential subtheme emerged: ‘behaviours’. All women who consider having gained too much weight during pregnancy had their own explanation why this happened. For example, one interviewee said:

‘During the pregnancy I ate a lot of sweets, the last trimester I increased pastries, cookies and chocolates. I was bored because I was not working. So, I tried to learn a lot of recipes. I really know that I ate because I was bored I was not hungry.’ (Participant 7, 36 y/o, born in Chile, PhD student, one child born in UK)

Another interviewee said:
Pregnancy poses a significant challenge to women concerned with their weight and shape. One important point to analyse is the psychological attitudes or behaviours that can impact food choices that increase their calorie intake. A participant commented:

‘What I would do different? It would have been better to make a meal of fresh vegetables everyday instead of rice. I would like to do it differently but not, I won’t do it. I think that if I was pregnant tomorrow I would do the same. I think that is because of lots of reasons. I wish it is just control but I think it is really complicated. For example, if I am bored I ask myself what shall I eat it is the first think I think that we are entirely made by our habits, I got this habits. When I lost weight I know that I changed some habit and the running is a habit. First it is hard to wake up early and start running but once it becomes a habit then it is ok. Eating is a habit. I always think that it is too much on my plate but then I think oh it looks nice so I just eat it and I will make a better decision tomorrow. It is just a habit.’ (Participant 21, 43 y/o British, takes care of her two children of 4 and 2y)

Pregnancy has the potential to raise central issues in the psychology of eating behaviours, 40% of UK primigravidae women fear weight gain in pregnancy and 72% fear that they will be unable to return to their pre-pregnancy weight (Conti et al 1997). Even knowing how to achieve (healthy diet and exercise) the recommended GWG, a woman’s actual eating style and associated habits could interfere her attempts for reaching a healthy pregnancy weight. Van der Wijden et al. (2014) proposes three types of eating styles: emotional eaters, external eaters, and restrained eaters. Emotional eating is a learned behaviour where food intake is triggered by emotion, with mainly negative emotions. External eating is triggered by cues in their environment and food intake is driven by food-related stimuli. Finally, restrained eaters restrict their dietary intake, or use other strategies for weight control to adhere to an ideal body image. In most people, one of the three styles is more dominant.

From the interviews it can be determined that during pregnancy, only 4 of the twenty two participants remained stable as far as individual eating habits are concerned during pregnancy and after childbirth. They followed their usual diet and exercise routine during and after pregnancy. Four of eighteen participants could be classified as emotional eaters and
one as restrain eater during pregnancy. However, after childbirth half of the eighteen participants were classified as emotional eaters and half of them as restrain eaters. None of them mentioned increasing in food eating from external stimuli. Nevertheless, if there were a deeper exploration during the interview of this specific topic certain indicators would have emerged. Van der Wijden et al. (2014) suggest that being an emotional eater was associated with higher GWG. Moreover, they claimed that of the psychosocial factors, a better healthy pregnancy attitude was associated with less weight gain. This statement agrees with Di Pietro et al. (2013), who say that it is essential to assess the degree to which women experience their pregnancy because it is a an important indicator of weight-related attitudes.

### 4.2.3 Women knowledge

One of the topics to explore was the knowledge women had when they were pregnant and most of all the sources they used. All women indicated knowing which food to avoid (pate, raw eggs, raw meat, certain types of fish, etc.), how to avoid contamination and the risks of tobacco, alcohol and caffeine. However, all of them were recommended to stop drinking coffee but they did not mention other sources of caffeine such as tea or chocolate drinks. The three British vegetarian participants looked for information to continue their diets. In fact, the three of them ate fish during pregnancy and all said it was for the foetus brain development. For example on participant said:

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I did lots and lots of reading especially in internet about food, vitamins, nutrition in pregnancy. I also googled about the vegetarian diet and vegetables rich in iron. I also asked some friends in my situation of how lost a bit of weight. I was really worried about my milk supply because I was vegetarian but I read a lot. (Participant 12, 37 y/o British, vegetarian, 2 children)
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Internet and books/magazines were an important source for information among participants. Twenty of the twenty two participants referred having looked for what they were interested in within these sources. However, less than half of them were interested in nutrition or healthy lifestyle, most of them looked for information about birth and new-borns. Handfield and Bell (1996) highlighted being impressed by the observation that women embarked on their pregnancies with strong views about pregnancy, birth and breastfeeding. Nuss et al. (2001) found that higher knowledge test scores were observed among women who used the internet and books/magazines as their source for information. Furthermore, their results indicated that assessment of nutrition knowledge in early postpartum can identify women at risk of significant weight retention. Talking about this issue an interviewee said:
Roth et al. (2013) provided insight into the contribution of magazines to socially constructed factors that might influence negatively women’s body image and expectations during pregnancy and the early postnatal period. Moreover, Handfield and Bell (1996) carried out a content analysis of four monthly popular magazines over a period of one year and revealed that there were a number of meddlesome or destructive themes, especially weight gain in pregnancy and the negative impact childbirth has on marital relationships and careers. In this research the overall response, when talking about body image in pregnancy, was feeling calm about weight during pregnancy. However, half of the participants felt anxious or depressed after childbirth when they did not lose the pregnancy weight immediately. A minority of participants mentioned knowing that returning to pre-pregnancy weight would take a consider period of time.

Another source of information for women especially the ones whose pregnancy was attended in UK, was receiving leaflets about healthy eating. Nine of the seventeen women (British and South American) who attended the NHS referred receiving a leaflet about healthy eating, which helped them to know mainly what not to eat. Besides, five got a leaflet inviting them to NHS aqua-natal classes. Just one South American, who attended a private Nutritionist in her native country, mentioned receiving a recommended diet, which was not specific for pregnancy. Three women of all the sample double checked the information received by the midwife or the doctor in internet before following the recommendation. Six women of the twenty two took vitamins without medical prescription. Furthermore, as taking vitamins is not a general recommendation in UK (FSA, 2002), except for folic acid and vitamin D, all women bought them by themselves. In an animal trial, Pannia et al., (2015) concluded that maternal diets high in vitamins (supplements) exacerbate maternal weight gain when dams were exposed to high fat diets post-weaning.

‘Just at the end of the pregnancy I started to read because I think that all the information in internet confused more and sometimes give the wrong information’ (Participant 5, 34 y/o South American, pregnancy in Chile, GWG 15kg)
4.3 Theme 3: WEIGHT AFTER PREGNANCY (Figure 2, Figure 5)

4.3.1 Postpartum weight retention

Postpartum weight retention (PWR) is an important nutritional problem and a risk factor for long-term weight gain in women and health outcomes (Ma et al., 2015; Wiltheiss et al., 2013). One in five women retain 5 kg or more in connection with a single pregnancy and increasing parity is associated with higher BMI in middle age (Østbye et al., 2010). Thus, this topic was explored with the participants and another theme emerged from interviews. After delivery, some women faced difficulties losing the weight gained during pregnancy or even adjusting to their fuller or altered figure (broader hips, thicker waist, fuller breast) or to stretch marks or to scars left by caesarean section (O'Connor and Kovacs, 2003). The first set of questions about PWR aimed to know how much weight all the participants retained from the pregnancy and the possible reason for not recovering their pre-pregnancy weight. Six participants reached their pre-pregnancy weight in the first seven months, all of them with breastfeeding more than 6 months. Indeed, one participant currently weighs less than before pregnancy, one year ago, following a weight loss program (Slimming World) combined with breastfeeding for 10 months. On the other hand, fifteen of twenty two women retained some weight from pregnancies. Furthermore, eight of them weighed, on average, over seven kilograms more than before being pregnant. As one interviewee said:
Wiltheiss et al. (2013) determinated that PWR is not only associated to higher pre-pregnancy weight and GWG, but also with smoking cessation during pregnancy, not breastfeeding and less nutrition knowledge. GWG and nutritional knowledge was already analysed in Theme 2, however, it is important to highlight that GWG above the recommended amount increases the risk of PWR in all body mass index (Ma et al., 2015). In fact, Maddah and Nikooyeh (2009) found that total GWG was the most important determinant of weight retention at three years postpartum, this is more influential than a high BMI before pregnancy. Concerning smoking, none of the participants referred smoking during or immediately after pregnancy; however, there were no responses about smoking before pregnancy. Levine et al. (2015) claimed that maternal smoking during pregnancy is an important preventable health risk behaviour. However, quitting smoking is normally associated with weight gain approximately 4.5 kg during the first 6 months in non-pregnant women. Moreover, prenatal cessation may lead to increased GWG. Several recent studies investigating GWG have been carried out on women who quit earlier during pregnancy (Adegboye et al., 2010; Favaretto et al., 2007; Levine et al., 2013, Washio et al., 2011). All these studies found that women who quit smoking after conception gained more GWG than women who never smoked. In fact, quitters gained significantly more weight than both non-smokers and smokers (p < 0.001). Nevertheless, these findings highlight the need for supportive measures to help control weight gain among women who quit smoking during pregnancy (Levine et al., 2013).

4.3.2 Breastfeeding
The interviewees’ perceptions about breastfeeding and the PWR were also explored. Twenty one of the twenty-two participants breastfed, the duration of each one is detailed in Table 7. Breastfeeding duration in participants (n=22).
Table 7. Breastfeeding duration in participants (n=22)

<table>
<thead>
<tr>
<th>Time of breastfeeding</th>
<th>Number of participants (Two groups) = 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>No breastfeeding</td>
<td>2</td>
</tr>
<tr>
<td>3 months</td>
<td>2</td>
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<tr>
<td>6 months</td>
<td>2</td>
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<tr>
<td>One year</td>
<td>14</td>
</tr>
<tr>
<td>More than 2 years</td>
<td>2</td>
</tr>
</tbody>
</table>

One of the two participants who did not breastfed mentioned:

‘In the second pregnancy I was worried about the weight because I knew I was overweight. I did not breastfeed. My first baby got ill because I was trying and he did not receive what he should. Never worked for me.’ (Participant 14, 42y/o British, 3 children, excessive GWG after SPD)

Many women such as participant 14 can have trouble with lactation. In her case this prevented her from breastfeeding her second and third children. In her review of breastfeeding and metabolic syndrome, Stuebe (2015) suggests that women with pre-gravid obesity are less likely to initiate and sustain breastfeeding, apparently because of insulin resistance in the pathogenesis of low milk supply. This researcher stated that pre-existing metabolic dysregulation might prevent breastfeeding.

Participants who breastfed for less than 3 months reported some pathology in their children (lactose intolerance and cleft lip and palate). All women mention having reading or knowing about the positive effects of breastfeeding on weight loss. However, while some women lost weight during breastfeeding others mentioned being hungrier, eating more than in pregnancy; consequently gaining weight during breastfeeding. Stuebe (2015) points out that to meet breastfeeding nutritional needs, mothers expend approximately 500 calories per day, deriving energy from their fat stores accumulated during pregnancy. Accordingly, dietary intake should not increase during this period. The comment below illustrates that even when breastfeeding, women have to keep on with a healthy lifestyle in order to maintain or lose weight after childbirth.
Breastfeeding has a modest energetic cost, but it is a behaviour that occurs in the context of a wide range of environmental factors that influence women's returning to pre-pregnancy weight (Barker, 2015). Several studies have found a significant relationship between duration of breastfeeding on weight change early in the postpartum period (Krause et al., 2010; Baker et al., 2008). Baker et al. (2008) showed that breastfeeding as recommended (exclusively for 6 months and to any extent for 12 months) made an independent contribution to the reduction of postpartum weigh retention (PWR) at 6 months postpartum. Furthermore, this reduction was irrespective of pre-pregnancy BMI value, but it was achieved when GWG was according to the guidelines. In addition, Østbye et al. (2010) studied the association between breastfeeding and less weight retention from one pregnancy to the next. This trail found that breastfeeding for 20 weeks or more resulted less weight retention at the beginning of the second pregnancy related to no breastfeeding. Olson et al. (2003) studied the association between GWG and postpartum behaviours (exercise frequency, change in food intake and breastfeeding) with PWR, and found there were significantly associations with major weight gain with all the factors except for breastfeeding. Additionally, they found that lower income women with GWG above the IOM range retained 3.73 kg more and were 4.7 times more likely to experience major weight gain with childbearing. These studies explain some phenomenon found in this current research, where many women could not explain how they did not lose weight during breastfeeding. Losing the extra pounds from pregnancy implicates more effort than just breastfeeding; it requires the right intensity and duration of breastfeeding and the right balance from diet and physical activity. Talking about this issue an interviewee said:

‘During breastfeeding I ate everything I did not eat during the pregnancy. I had controls for my glucose but never control about the weight. After 6 months of the delivery I had gained so much weigh that I had to buy new clothes because mine did not fit me anymore. When I realized that I have gained so much weight was when any size large fit me. And then I weight myself and have gained 10 to 12 kilograms in the 6 months. The weight has never been an issue for me. I avoid weight scales. I have never lose the weight that I gained in breastfeeding. I went to a Nutritionist that put me auriculotherapy (weight loss treatment that uses ear acupuncture), and as I was breastfeeding, I did not diet at all. I thought I have to eat really good and a lot in order to have the best milk. I have never tried any diet after the breastfeeding. I have never recover the weight before the pregnancy.’ (Participant 2, 37 year-old South American, pregnancy in Chile, 4 year-old child, PhD student’s wife, Gestational Diabetes at 7th month of pregnancy)
4.3.3 Weight perceptions after pregnancy

The other subtheme related to weight after pregnancy was women's perceptions about weight and within this subtheme topics such as feelings, priorities, beliefs and social pressure related to their actual weight emerged. An issue that repeatedly arose in the interviews were the priorities that women with children have. Moreover, they highlighted that all their time is spent taking care of their children, house responsibilities and work/study in some cases. Therefore, they have no time to exercise or plan a diet. For example, one interviewee said:

‘I knew what to do but it is really hard to do it because I have three kids so it is just an endurance test all the time. I knew I should eat a healthy diet but it just never happened. There were other priorities.’ (Participant 14, British 42 y/o, PhD in Eating Behaviours, 3 children of 9, 5 and 4 years old)

Regarding their feelings about their self-body image, most participants talked about their pre-pregnancy clothes. Some of the ones who did not know the increased weight, knew actually how many sizes they increased. Moreover, three of the six women who have returned to their same pre-pregnancy weight, have not worn their old clothes either. Nineteen of the twenty two participants mentioned inconformity with their body shape, independently of the weight. According to O'Connor and Kovacs (2003) some women begin to dislike their body as they struggle to lose the excess pounds gained during pregnancy. Talking about how they feel about their weight and body, a participant responded:

‘Until this time my extra pounds bother me. It has been really hard for me to reconcile with my new body. I have never been into my looks but now it is like I do not recognize myself. After the babies I did not have time even to look myself in the mirror but after the kids are grown up and I had the time I really dislike what I look…... After having my babies I am another person I think different, I have other priorities but also your body is different and it is difficult to accept that.’ (Participant 9, 37 y/o South American, 2 children, PhD student’s wife)
Nowadays, in the Western world, a beautiful woman is supposed to be a slender one. In reality, most women are not slender and both men and women struggle with their body image and weight (Van der Wijden et al., 2014). However, for some women being overweight or obese goes further than just body image, it can evoke feelings of inferiority and disadvantages because of their weight. As one interviewee mentioned:

The weight is a problem, even just something like mobility even just sitting on the floor and getting up again. It is a problem for self-worth and for feelings, how you fells about yourself or how you think other people see you. So yeah, the weight is a big problem. When I got down to 12 and a half stones I supposed I felt good and at that time I even got a temporary job in the university. Maybe, it is just about my feelings and my confidence and my feelings with other people about my weight. (Participant 21, 43 y/o British, 2 children, PhD)

(Gow et al., 2012) suggest that currently, there are high levels of self-objectification, which is the internalization of the outsider's standard of attractiveness, and often manifests as continuous body surveillance. This effect can be associated with negative attitudes towards the physical changes associated with pregnancy, including weight gain and retained weight. According to Roth et al. (2013), sociologists and feminists have argued that the female body is constructed as a ‘problem’ in today's society. Moreover, society and media are major contributors to women’s expectations and beliefs about their body, childbirth and becoming a mother (Gow et al., 2012; Van der Wijden et al., 2014). For example, a meaningful difference was found between the social pressure felt by South Americans and British women. In fact, one South American participant who had a pregnancy in Venezuela and in UK mentioned:
Another factor that influences women’s beliefs is the media. Image-focused media exposure is linked with thin-ideal internalization, which, in turn, is associated with self-objectification and body dissatisfaction (Gown et al., 2010). Pregnancy weight gain is a popular topic to present celebrities’ experiences of pregnancy and new motherhood. Thus, it has a powerful role in shaping, outlining and propagating certain body image ideologies (Gown et al., 2010). Roth et al. (2013) studied the messages given from the three leading women’s magazines in Australia. Using the term ‘bouncing back’ to describe the postnatal body as one that needed or was required to ‘bounce back’ from pregnancy, considered to be the ‘normal’ body. The social message characteristic in the magazine stories was that one with ‘exemplary women’, such as celebrities, ‘bounce back’ quickly. This disparity is concerning as it might lead to unrealistic expectations about pregnancy and postpartum for both pregnant readers and a more general audience (Gown et al, 2010).

4.3.4 Attempts to lose weight

The next subtheme related to weight after pregnancy was their attempts to lose weight. In fact, a link was found between the last two subthemes that was their tendency to follow fad diets(Figure 6).
The latest body image in modern society leads many women to follow ‘fad’ diets often at the expense of nutritional well-being (Van der Wijden et al., 2014). Nineteen of the twenty two participants talked about trying to lose weight at some point. Seven of them tried to cut off calories and exercise by themselves when possible. Another five tried weight loss programs (Slimming World and auriculotherapy), two during breastfeeding and three after it. An interviewee commented:

‘I have lost a little bit more weight than before pregnancy. I went to Slimming World, the weighted me weekly. I paid five pounds a week. They have a breastfeeding friendly diet that you can follow so I reached my normal weight before I got pregnant and since I have lost more weight. I started the club when he was three months. They taught me to do menu plans. (Participant 15, 33 y/o, British, one child)

Seven participants have tried alternative diets without medical supervision. For example, two interviewees said:

‘In these years I have tried so many diets, from Dukan, genotype diet which was really really expensive, soup diet.’ (Participant 3, 31 y/o South American, 1 child)

‘I just knew it was not just the time to lose weight. I just knew that when the time is right I will just make all the effort to lose weight. I think that breastfeeding period is too tiring for women and you are the only one that attend the baby if the baby is not fed with bottle. So for me that is not the time to try to diet. When my last kid was 2 and a half years old I decided to follow a diet. My husband and I have been following the 5:2 diet for two years plus regular exercise. We have lost 2 and a half stones each, and we keep following the diet. I swim twice a week, 1 mille.’ (Participant 22, 40y/o British, 2 children)
The last factor that influences GWG on PRW is the health system. All white British and four South American participants attended the NHS for antenatal care. Seven South Americans attended the private health system in their native country. All of them reported having private health insurance. Another important factor is that all the participants who had their delivery in UK were attended by midwives. Five of them were attended once or twice by a consultant (Gynaecologist) because of age (>40y/0), comorbidities such as hypertension, or foetus diseases such as cleft lip. South Americans all attended a Gynaecologist and two of them had one visit to the midwife before the delivery. One of the South American participants experienced her pregnancies in her native country and in UK, when talking about the differences between the two systems she commented:
4.4.1 Weight control

One main difference stated by this quotation and found in all the participants was that in UK women are just weighed at the first appointment, while in South America they were weighed every month. Even participant 11 who was pregnant in United States was weighed each month. However, this is a national indication in UK. NICE (2010) indicates to measure weight and height at the first contact with the pregnant woman and calculate BMI. It states not to weigh women repeatedly during pregnancy as a matter of routine. On the other hand, South America follows American guidelines, which indicates to record height and weight at the initial prenatal visit, and state the recommendations for appropriate weight gain with periodical control throughout pregnancy. Besides, it advises to offer nutrition consultation to all overweight or obese women (ACOG, 2013). Another participant who had some consultations in Italy commented:

‘Both normal pregnancies, one in Venezuela Caracas and the other in Manchester. In Venezuela antenatal care with gynaecologists, paid with health insurance. In Manchester all the control were with the midwife, I did not pay anything. I have one check up with a doctor because of a problem in the week 20 (Cleft lip and palate). In Venezuela they weight me each month, here just in the first appointment. I asked the midwife that please weight me in the month 7. In Venezuela they controlled my blood sugar and iron three times, and here maybe just once. I read a lot by my own in the first pregnancy, I think that first mums always are worried and read more. In the second pregnancy in Manchester, they did not say anything about food but I think it was because it was my second baby and I did not ask what I already knew. In Venezuela they explain me about the weight, the risk of high pressure and those problems if I put on too much weigh. Here I did not talked about that. I have learned to understand this health system. I think that in Venezuela they took advantage that we have private insurance covers and they make a lot of exams and ultrasounds that are not necessary at all.’ (Participant 22, 40y/o British, 2 children)
Another issue that was established is that none of the participants was weighed after pregnancy, not even in the early stages. All participants who delivered their babies in UK received a visit from the health system to check the baby and breastfeeding. This is an important issue because this role is not delegated to midwives, GPs, nurses or health visitors. In fact, for a consultation with a Nutritionist or Dietitian a patient should get the previous GP authorization. NICE (2010) advises that there should be recommendations for healthy diet and being physically active to help women achieve a healthy weight after giving birth, and also advise women to seek information and advice on diet and activity from reputable sources. For example, advice on how to use Healthy Start vouchers to increase the fruit and vegetable intake.

4.4.2 Health professional recommendation

The next question was asked to participants about the recommendations they received from the health care provider. All South American in their country received recommendations and explanations about the importance of folic acid, three of them reported being told what Listeria monocytogenes is, and five of them received a weight goal to reach and explanations about Gestational Diabetes and Hypertension. However, just one participant was advised about foetal macrosomia and none heard about the effects of GWG on the baby. In UK, one participant received recommendations about excessive GWG, and none heard about foetus complications because of maternal weight. It is essential to point out that all South American women attended private practice, where protocols may differ greatly from the public health system of these countries. The comment below illustrates a point of view of a participant who is a midwife:

“I had also some check-ups there (Italy) and they were sort of obsessed with food and pregnancy. You can’t eat these or that but here they were more like tray to avoid too much of it. In Italy they are really concern about food allergies. I double checked this information here and when I came back they were laid back and they said don’t worry you can have everything in moderation. I saw a big differences in food and also there you have gynaecologist check-up. Here never. And also there they do blood check up every month, here I never got one, I know I have low iron but they never really check. So I just took pills. To be honest I think here they gave me a lot of advice about healthy eating and they also have aqua natal. Initially you have to pay for that (in Italy) and no everybody can afford that. And here they have a lot of support for parents, everything was really accessible. Plenty of information to read. I received really good support, the nurses and the midwives are really good, there was plenty of information and sport facilities. (Participant 19, 38 y/o British, 2 children born in UK)
They did not explain me anything about the consequences of gaining too much weight but I do know because of my job. I don't think that all women realize the implications because I work with them. In terms of weight loss it is really hard, isn’t it? It is an issue in overweight moms, there is anxiety by the midwife about compromising the relationship with the women although you can go away from the fact that being quite overweight has implications. We do weight if there is morbidity obese but not other than that. I know from me that when I was part of the research I looked away because I did not wanna know about my weight. When there is an obese women they go to a special clinic, in my place it is called Obese BMI clinic. They all get blood test.’ (Participant 20, 41 year-old British, 2 children. Midwife)

Oken et al. (2013) states that women who receive weight gain advice from their doctor are more likely to gain the recommended amount of weight. However, many health care providers do not counsel their patients regarding recommended weight gain. According to Arrish et al. (2014) midwives are the most trusted source of information and advice for pregnant women in primary health care. Most studies investigating whose role the management of gestational weigh is have been aimed at GPs, obstetricians, midwives, health visitors and dietitians, all those working in antenatal and postnatal services (Mulliner et al., 1995: Heslehurst et al., 2013). Currently, midwives in the United Kingdom do not have enough background knowledge or training to provide advice regarding weight management or healthy eating to pregnant women in their care (Arrish et al., 2014: Heslehurst et al. 2007: Johnson et al., 2015). Likewise, midwives require more education in nutrition (Mulliner et al., 1995). Furthermore, recent evidence suggests that midwives considered obesity to have direct implications for their practice, and felt that reading guidelines was the only ‘training’ they received. They described obesity as ‘delicate’, ‘emotive’, and felt that it is difficult to point it out without making women feel upset, stigmatised or scared. (Heslehurst et al., 2013).Oken et al. (2013) carried out in-depth interviews with16 obstetric clinicians. They reported that many respondents believed that GWG had “a lot” of influence on pregnancy and child health outcomes but that their patients did not consider it important. However, only 11 of the 16 believed that GWG influences longer term child health, but 4 responded that they don’t know. Lastly, many clinicians felt that their patients were either unconcerned about GWG, or were overly anxious about it.
4.4.3 Perception of the Health system

It is important to notice that in this research many South Americans are living in UK for more than a year. Therefore, not being in their native country and having a health system that knows little about their cultural practices can have different effects on them. For instance, Hennegan et al. (2015) points out that migrant women are likely to face many barriers throughout their maternity care, including challenges of relocation, distance from family and support networks or language barriers. In fact, Bandyopadhyay et al. (2010) found that immigrant mothers less proficient in English appear to face significant additional challenges post-childbirth. Additionally, they could face discriminatory or culturally insensitive care from maternity service providers (Hennegan et al., 2015). Small et al. (1999) found that women not fluent in English experienced problems in communicating with their caregivers and these were reflected in less positive experiences of care. Women in their study mentioned caregivers to be unkind, rushed, and to offer an unsupportive experience. Although three South American women in this study speak basic English, they mentioned feeling well attended by GPs when they have attended NHS clinics. Furthermore, the South American participants whose pregnancy was spent in UK, found the system less stressful than in their native country. As two South American interviewees said:

<table>
<thead>
<tr>
<th>I feel that all the midwives give a great support and they are really prepared for their job, If they did not give me nutritional advises was because I thing I did not needed. (Participant 4, 33 y/o from Colombia, one child born in UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I liked a lot way they manage weight here. It is good that they don't weight or controlled weight. I think that unless they see that somebody is obese they don't control it. I think that in the pregnancy women should be relax. I did not want to be bothered about my weight. I think that everybody knows if they gain too much weight or not. At least I knew exactly what I was doing and eating. I knew I was eating too much and that I was putting on a lot of weight. So I liked this system. (Participant 7, 36y/o South American, 1 child, PhD student)</td>
</tr>
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60
Chapter 5. Conclusion

5.1 Overview

Reducing the prevalence of obesity has become one of the major and most difficult public health approaches. Since weight management is the result of complex interactions among biological, psychological and environmental factors, health promotion strategies should account each aspect to get results. Moreover, it has been proven that the prevention of obesity should start right from nutrition during pregnancy, preventing the foetus to be exposed to an obesogenic environment that could affect his/her predisposition to chronic diseases later in life. Furthermore, an unhealthy nutritional behaviour during pregnancy can lead the mother to gain excessive weight, which can predict adverse pregnancy outcomes and later obesity risk for her. The National Institute for Health and Care Excellence (NICE) has stated clear guidelines for health providers to help women to achieve the recommended weight during pregnancy. However, the statistics of both mother and children increase continuously. Consequently, methods of social research have become more recognised in the weight management area because of its exploration approach in aspects as behaviours and attitudes that influence unhealthy lifestyles (Pilnick and Swift, 2010). The main goal of the current study was to explore attitudes and behaviours towards weight control during and after pregnancy among white British and South American women with children up to 5 years old using a qualitative approach.

Using qualitative research in this study offers a unique insight into all the factors that may influence women’s difficulties with weight management during and after pregnancy. Indeed, this research analysed two ethnic groups to have a better understanding of how certain events, like immigration, can influence a woman’s weigh-related perceptions and attitudes. During this research, a semi-structured interview was conducted with each participant. Afterward, the interviews were analysed using thematic analysis in order to highlight and order the main emergent topics (Braun and Clark, 2006).

In this chapter, conclusions on the findings of this study are reported.

First, there is an overview of the importance and the approach of the study. Secondly, the main findings and contribution of this research are highlighted. Afterwards, the limitations found during the research and finally the recommendations given by the researcher for future research studies.

5.2 Principal findings

A qualitative, inductive approach was undertaken. Data collection was developed until participant 22, when it was determined that no new themes were appearing. The data obtained during interviews was fragmented, codified and analysed using thematic analysis.
This study has identified four main themes with three levels of hierarchy. The findings are organized for the reader as theme by theme.

The first theme emerged was related to the participants’ lifestyles during pregnancy. Since each woman had her own concept of ‘healthy diet’, all diets were pretty different. For some women ‘healthy’ meant no sugar, for others was avoiding certain foods during pregnancy or eating more vegetables and fruits. However, all women received the same recommendation from health providers: ‘eat healthy’. Moreover, it was noticed that South American exercise less than British woman, they also have a lesser understanding of the importance of exercise during pregnancy comparing with British woman. These findings suggest that in general, the recommendation about diet and exercise need to be more detailed; moreover, it needs to be adapted to patient’s life. For instances, there are particular cases, such as pregnancy-related diseases or the presence of other children that can interfere with a healthy lifestyle during this period.

The second theme contains the major influential factors of weight control in pregnancy. The findings in this section showed that most women realized the weight they were gaining during pregnancy, even though some of them were not weighted more than once, they knew if it was or not too much. However, there were other factors besides awareness of weight, which influenced their food choices during pregnancy. Indeed, most women used the terms ‘bored’, ‘tired’ and ‘anxious’ to explain why the calorie intake increased. Besides, other factors as maternal age and education played a significant part in the decision related to maintain a healthy weight. Taken together, these results suggest that to prevent excessive weight gain in pregnancy, it is essential to take in consideration the influence of non-modifiable factors as age, parity and previous BMI that affect weight independently. Moreover, it is necessary to approach positive behavioural change to improve the women’s health and the health of their unborn child.

The next major finding was how women managed their post-pregnancy weight. Important issues came up within this theme. Fifteen of the twenty two participants retained weight from last pregnancy and even some became overweight or obese after breastfeeding. Moreover, most women, independently of the current weight and the ethnic group, did not feel confident with their body shape. They used terms as ‘sad’, ‘depress’, ‘annoyed’, ‘uncomfortable’ and ‘less confident’ to referred to their body. Furthermore, these kind of feelings have lead women to many attempts to lose weight, even by endangering their health. Nineteen of the twenty two participants tried to lose weight at some point, during or after breastfeeding, and some of them have done fad diets on many occasions without medical supervision. This theme has raised important concerns about the nature of these feelings and how social pressure and media may construct a ‘perfect body image’ increasing women’s body dissatisfaction.
The last theme related to the health system has shown that there is an enormous different, regarding weight control, between UK guidelines for pregnancy and South American guidelines. However, South Americans who have been attended by NHS felt more comfortable and in some way express less pressure from the system, which had a positive impact in their lives. This study has shown that immigrant women are likely to increase their weight in a new country, however it was not related with the health system. Moreover, it was influenced by the stress of relocation, non-employment, and distance from family. Nevertheless, it is important that health providers take in consideration those key factors when making recommendations to non-native people. This study has also identified an important and risky period, where any participant had support from health providers. The post-partum period is a moment when women are more susceptible of tiredness, anxiety and depression. Therefore, it is a period where high energy food intake can increase, physical activity decrease and they can lose control on their weight.

5.3 Principal contributions

It was demonstrated that qualitative research is an excellent approach for the exploration in the field of nutrition and dietetics. In fact, as qualitative method has already contributed much to the understanding of health, it contributes to this research that investigates women’s behaviour and interaction of factors related to weight management during and after pregnancy. A key strength of the present study is the comparison of two different views, British women and immigrant women, in order to obtain a broad perspective of some factors that might not be currently taken into consideration when building health policies.

By providing a better understanding of the participant’s thoughts, beliefs and behaviors, this research extends the knowledge of the importance of integrated health strategies. These findings not only prove that there is a lack of information of women to manage their weight, but also that there is an important period of time, postpartum, where women need professional assistance to achieve a healthy weight with non-harmful tools, as fad diets.

Overall, this study strengthens the idea that obesity is really a problem that needs to be solved from the beginnings, which are conception and intrauterine period. However, this goal will not be achieved until health providers and women in childbearing years realize the magnitude of exposing a fetus to an obesogenic environment. A concern raised from this study is that women are not being informed of the risks associated with obesity during pregnancy. Moreover, women could be receiving the wrong message from media and constructing a perception that their body will ‘bounce back’ from pregnancy easily. It is a hard task for health care professionals to change the concept of the ‘perfect body’ to the concept of ‘healthy weight’.
The present study confirms previous findings from Bliddal et al. (2015), Carter et al. (2000), DiPietro et al. (2003), Hartley et al. (2015), Kuo et al. (2014) and O'Connor and Kovacs (2003) and contributes additional evidence that suggests that excessive weight gain during pregnancy may predispose women later in their lives not only to chronic diseases, but also to psychological problems, such as feeling of inferiority, lack of self-esteem or self-confidence. Furthermore, this physiological or psychological problems could affect women’s marriage, family or employment.

### 5.4 Limitations of study

Although, this study has a qualitative approach, it is unfortunate that it did not include some quantitative data, such as pre-pregnancy BMI or actual BMI, which would help to relate behaviors and beliefs with the BMI category. Accordingly, it does not recognize the groups that are in risk of some unsafe behaviors, such as restrain eaters. Since the study was limited to the behavior during and after pregnancy, it was not possible to have a deeper exploration of pre-pregnancy behaviors, such as smoking, whose cessation increases weight gain during pregnancy. Additionally, this study was limited by the retrospective information of participants who could forget some details about health providers’ recommendations or even altered some information. An additional uncontrolled factor was that all South American participants were attended in paid private practice while UK participants attended to the National Health Services. An access to people attending to public/national health services in South America would have given a better overview of this countries’ health system and maybe the participants would have experienced different attention.

### 5.5 Recommendations for further research

Some ideas for future studies are proposed with the objective of tailoring new behaviour interventions, moreover new policies to help women to achieve a healthy gestational weight and to prevent them from weight retention. The main suggestions are:

- To determine the efficacy of health providers in communicating the recommendation of the guidelines to women in childbearing years.
- To analyzed the reasons why midwives and nurses are reluctant to talk about weight with pregnant women.
- To explore how body image perception could affect achieving the recommended weight gain during pregnancy.
- To pilot an intervention that includes the help of husbands and partners in reducing weight retention after pregnancy.
• To analyse if awareness about obesity would be better accepted coming from other institutions rather than NHS, for example, church or community centres.
• To explore and relate pregnant behaviours with the behaviours learned during childhood, such as vegetable and fruit intake.

5.6 Final conclusion

If all the applied health strategies related to obesity are not getting the expected results, it is time to look for a solution from the starting point of a human being that are conception and intrauterine life. Women need to realize that gaining the recommended weight is more important than keeping a ‘perfect body’; it is to ensure a healthy life for themselves and their unborn children. Furthermore, the most reliable source of information is the health providers, who need to communicate the importance of a healthy lifestyle during pregnancy. The antenatal care is a unique period that puts women into greater contact with health professionals. Moreover, women should be open to change behaviours that could benefit themselves, their babies and their family. Hence, it is an ideal time for health education.
References


Harding, J. (2013) *Qualitative data analysis from start to finish*. London: SAGE.


6. Appendices

6.1 Appendix 1. Semi-structured Interview

Title: *Qualitative study of healthy behaviours and weight gain in women during and after pregnancy*

**INTERVIEW**

Participant:
- Age :
- Educational level :
- Age during pregnancy:
- If possible gain kilograms during pregnancy:

**TOPICS**
- Level trust on the health system during pregnancy (nurse, midwife, physician) (Public or private)
- Knowledge about nutrition in pregnancy (what not to eat, which food eat more, why vitamins)
- Level of trust on the nutritional sources (magazines, internet, midwives)
- Common consumed food during pregnancy and physical activity
- Role of costumes and religion in food intake during pregnancy
- Changes in awareness of weight gain because of the midwives, doctors or health visitors’ advices.
- Weight loss after pregnancy (Time, how and why)
- How do you feel about your weight now?
- What different choices would you make if you were pregnant again?
6.2 Appendix 2. Consent Form

Department Food and Tourism Management

Informed Consent Form

Name of Participant:
Principal Investigator: Andrea Roman
Project Title: Qualitative study of healthy behaviours and weight gain in women during and after pregnancy

Ethics Committee Approval Number:

Participant Statement

I have read the participant information sheet for this study and understand what is involved in taking part. Any questions I have about the study, or my participation in it, have been answered to my satisfaction. I understand that I do not have to take part and that I may decide to withdraw from the study at any point without giving a reason.

I am aware that I am entitled to stop the recording of the interview at any time if I feel the subject matter has become too sensitive for me to discuss. I am also aware that I am entitled to stop the interview entirely should I wish to.

Any concerns I have raised regarding this study have been answered and I understand that any further concerns that arise during the time of the study will be addressed by the investigator.

I agree to allow the interview to be recorded. ☐ ☒ NO
I agree to allow direct quotations to be used. ☐ ☒ NO
I wish my identity to remain anonymous. ☐ ☒ NO

Signed (Participant) __________________________ Date __________________________

Signed (Investigator) __________________________ Date __________________________
You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please read the following information sheet carefully. If you have any question or queries please do not hesitate to contact the researcher. Contact details are provided at the end of this information sheet.

**Purpose of this research**
This research is being conducted as part of a Master’s degree dissertation project for a postgraduate student of the Manchester Metropolitan University.

**What I will be asked to do in this research?**
You will be asked to take part in an interview related to your eating behaviour during your last pregnancy and the factors that influenced your decisions. If you do decide to take part of the interview, the research may also answer any nutritional question you have.

**How will my information be used?**
The information you provide will be use to inform future practice in maternal nutrition. You may withdraw at any point of the study without giving a reason if you do not desire to take part of it.

**Will my information be kept confidential?**
No personal data will be used. All the data you provide will be kept highly secure and confidential from others. The researcher and Manchester Metropolitan University will comply with the Data Protection Act (UK) 1998.

Thank you for reading this information. If you decide to take part, you will be given a copy of this information sheet and a consent form to sign.

Contact detail: Andrea Roman  
E mail: andrea.c.roman-sanchez@stu.mmu.ac.uk
### 6.4 Appendix 4. Ethics Checklist

This checklist must be completed **before** commencement of **any** research project. This includes projects undertaken by **staff and by students as part of a UG, PGT or PGR programme**. Please attach a Risk Assessment.

| Full name and title of applicant: | Mrs. Andrea Roman |
| University Telephone Number: | 01612472000 |
| University Email address: | Andrea.c.roman-sanchez@stu.mmu.ac.uk |
| Status: (delete as appropriate) | Postgraduate Student: Taught |
| Department/School/Other Unit: | Food and Tourism Management |
| Programme of study (if applicable): | Nutrition and Health MSc |
| Name of DoS/Supervisor/Line manager: | Dr. Rebecca Gregg |
| Project Title: | Eating behaviour and weight gain in women during pregnancy |
| Start & End date of project: | 07/05/15 – 07/09/15 |
| Number of participants (if applicable): | 30 |
| Funding Source: | Scholarship |

#### Brief description of research project activities (300 words max):

The project consist in a semi-structured interview to mothers of children up to 5 year old in order to explore the nutritional behaviour during pregnancy. To accomplish this goal, some activities would be carry out:

- a) Ethical Approval
- b) Permission from the Centres to talk with women
- c) Select participants
- d) Carry out the interview individually
- e) Data analysis
- f) Interpretation of results

#### Does the project involve NHS patients or resources?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>If ‘yes’ please note that your project may need NHS National Research Ethics Service (NRES) approval. Be aware that research carried out in a NHS trust also requires governance approval. Click <a href="#">here</a> to find out if your research requires NRES approval. Click <a href="#">here</a> to visit the National Research Ethics Service website. To find out more about Governance Approval in the NHS click <a href="#">here</a>.</td>
<td></td>
</tr>
</tbody>
</table>

#### Does the project require NRES approval?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, has approval been granted by NRES? Attach copy of letter of approval. Approval cannot be granted without a copy of the letter.</td>
<td></td>
</tr>
</tbody>
</table>
NB Question 2 should only be answered if you have answered YES to Question 1. All other questions are mandatory.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are you are gathering data from people?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>For information on why you need informed consent from your participants please click <a href="#">here</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. If you are gathering data from people, have you:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. attached a participant information sheet explaining your approach to their involvement in your research and maintaining confidentiality of their data?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>b. attached a consent form? (not required for questionnaires)</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click here to see an example of a participant information sheet and consent form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Are you gathering data from secondary sources such as websites, archive material, and research datasets?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> to find out what ethical issues may exist with secondary data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Have you read the guidance on data protection issues?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>a. Have you considered and addressed data protection issues – relating to storing and disposing of data?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>b. Is this in an auditable form? (can you trace use of the data from collection to disposal)</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>5. Have you read the guidance on appropriate research and consent procedures for participants who may be perceived to be vulnerable?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>a. Does your study involve participants who are particularly vulnerable or unable to give informed consent (e.g. children, people with learning disabilities, your own students)?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>6. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited (e.g. students at school, members of self-help group, nursing home residents)?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click for an example of a PIS and information about gatekeepers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Will the study involve the use of participants’ images or sensitive data (e.g. participants personal details stored electronically, image capture techniques)?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> for guidance on images and sensitive data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Will the study involve discussion of sensitive topics (e.g. sexual activity, drug use)?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> for an advisory distress protocol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Could the study induce psychological stress or anxiety in participants or those associated with the research, however unlikely you think that risk is?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> to read about how to deal with stress and anxiety caused by research procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Will blood or tissue samples be obtained from participants?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> to read how the Human Tissue Act might affect your work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Is your research governed by the Ionising Radiation (Medical Exposure) Regulations (IRMER) 2000?</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Click <a href="#">here</a> to learn more about IRMER</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind? ☒

Click here to read about how participants need to be warned of potential risks in this kind of research

13. Is pain or more than mild discomfort likely to result from the study? Please attach the pain assessment tool you will be using. ☒

Click here to read how participants need to be warned of pain or mild discomfort resulting from the study and what do about it.

14. Will the study involve prolonged or repetitive testing or does it include a physical intervention? ☒

Click here to discover what constitutes a physical intervention and here to read how any prolonged or repetitive testing needs to managed for participant wellbeing and safety.

15. Will participants to take part in the study without their knowledge and informed consent? If yes, please include a justification. ☒

Click here to read about situations where research may be carried out without informed consent

16. Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants? ☒

Click here to read guidance on payment for participants.

17. Is there an existing relationship between the researcher(s) and the participant(s) that needs to be considered? For instance, a lecturer researching his/her students, or a manager interviewing her/his staff? ☒

Click here to read guidance on how existing power relationships need to be dealt with in research procedures

18. Have you undertaken Risk Assessments for each of the procedures that you are undertaking? ☒

19. Is any of the research activity taking place outside of the UK? ☒

I understand that if granted, this approval will apply to the current project protocol and timeframe stated. If there are any changes I will be required to review the ethical consideration(s) and this will include completion of a ‘Request for Amendment’ form.

☐ I have attached a Risk Assessment

Signature of Applicant: **Andrea Roman** Date: **19/05/15** (DD/MM/YY)

Independent Approval for the above project is (please check the appropriate box):
If the applicant has answered **YES** to **ANY** of the questions **5a – 17** then they must complete the **MMU Application for Ethical Approval**.

**Granted**

☒ I confirm that there are no ethical issues requiring further consideration and the project can commence.

**Not Granted**

☐ I confirm that there are ethical issues requiring further consideration and will refer the project protocol to the Faculty Research Group Officer.

Signature:  **Rebecca Gregg**  
Date:  **19/05/15** (DD/MM/YY)

Print Name:  __________________________  Position:  __________________________

**Approver:** Independent Scrutiniser for UG and PG Taught/ PGRs RD1 Scrutiniser/ Faculty Head of Ethics for staff
### 6.5 Appendix 5. Participants’ descriptions

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1 38 y/o, born in Ecuador, pregnancies in Ecuador, 8 and 5 year-old children, PhD student’s wife, lives 3 years in Manchester</td>
<td>1</td>
</tr>
<tr>
<td>Participant 2 37 y/o, born in Chile, pregnancy in Chile, 4 y/o child, PhD student's wife, Gestational Diabetes at 7\textsuperscript{th} month of pregnancy, GWG 6 kilograms</td>
<td>1</td>
</tr>
<tr>
<td>Participant 3 31 y/o, Chilean, pregnancy in Chile, one 4 y/o child, Master student, GWG 15kg</td>
<td>2</td>
</tr>
<tr>
<td>Participant 4 33 y/o, born in Colombia, one 5 y/o child, lives in Stockport for 8 years, GWG 11</td>
<td>1</td>
</tr>
<tr>
<td>Participant 5 33 y/o, born in Chile, 2 children with 1 year apart, student's wife, GWG 15kg</td>
<td>2</td>
</tr>
<tr>
<td>Participant 6 41 y/o, born in Venezuela, 2 children, 1 was born in Venezuela and the other in UK, last child with cleft lip, lives in Stockport for 7 years, works in the International Society part time</td>
<td>2</td>
</tr>
<tr>
<td>Participant 7 36 y/o, born in Chile, PhD student, one 4 y/o child born in UK, lives in Manchester for 6 years, first 4 years stay home until he husband study the PhD</td>
<td>2</td>
</tr>
<tr>
<td>Participant 8 38 y/o, born in Chile, PhD in Education, 2 children born in Chile with 3 years apart, lives in Manchester for 2 years</td>
<td>2</td>
</tr>
<tr>
<td>Participant 9 37 y/o, born in Venezuela, 2 children with 2 years apart, pregnancies in Venezuela, her husband works in UK</td>
<td>1</td>
</tr>
<tr>
<td>Participant 10 34 y/o, born in Chile, PhD student, one 1 y/o child born in UK, lives in Manchester for 1 year</td>
<td>1</td>
</tr>
<tr>
<td>Participant 11 37 y/o, born in Chile, 2 children, one born in United States during her husband Master and other born in UK during her husband PhD studies</td>
<td>1</td>
</tr>
<tr>
<td>Participant 12 37 y/o British, vegetarian, 2 year old and 5 months children, non-employed</td>
<td>2</td>
</tr>
<tr>
<td>Participant 13 33 y/o, British, only one year old child, non-employed at the moment</td>
<td>1</td>
</tr>
<tr>
<td>Participant 14</td>
<td>42 y/o, British, PhD in Eating Behaviours, 3 children of 9, 5 and 4 y/o, works at University</td>
</tr>
<tr>
<td>Participant 15</td>
<td>33 y/o, British, one child, reached her pre-pregnancy weight, attended to Slim World 3 months after delivery, non-employed</td>
</tr>
<tr>
<td>Participant 16</td>
<td>26 y/o British, 2 children of 4 and 2 y/o, took pain killers for hiatal hernia in both pregnancies, non-employed</td>
</tr>
<tr>
<td>Participant 17</td>
<td>27 y/o British, on 4 y/o child, hyperemesis gravidarum, child with lactose intolerance, non-employed</td>
</tr>
<tr>
<td>Participant 18</td>
<td>46 year-old British, chronic lung disease taking steroids, first and only child at 43y, long history of miscarriages, non-employed</td>
</tr>
<tr>
<td>Participant 19</td>
<td>38 y/o, British, lived in Italy and have lived in Manchester 12 years, 2 pregnancies attended by NHS, Master degree, non-employed at the moment</td>
</tr>
<tr>
<td>Participant 20</td>
<td>41 y/o British, 2 children, last child one year ago, working as Midwife</td>
</tr>
<tr>
<td>Participant 21</td>
<td>41 y/o, British, 2 children, PhD in Mathematics, decided to stay home until her children grow up</td>
</tr>
<tr>
<td>Participant 22</td>
<td>40 y/o, British, 2 children of seven and 4 years old, non-employed at the moment</td>
</tr>
</tbody>
</table>