Maltese Parents’ Perceptions of Their Child’s Weight

By

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A dissertation submitted in partial fulfillment of the requirements for the degree of Masters of Health Science in Nursing

University of Malta
Institute of Health Care
May 2008
To:

My husband George,

My mum Frances,

and

The baby growing inside me.
STATEMENT OF AUTHENTICITY

I, the undersigned, hereby declare that this is entirely my own work carried out in partial fulfillment for the Masters in Health Science (Nursing Studies).

Rose Marie Cutajar
ACKNOWLEDGEMENTS

First of all, I would like to express my sincere thanks and appreciation to my academic supervisor, Ms. Norma Buttigieg, M.Sc. (Public Health), for her precious dedication, support and guidance throughout this study. Her advice was essential to the completion of this dissertation. I would also like to thank Dr. Donia Baldacchino, Ph.D., for her added help in supervision.

My thanks also go to Dr. V. Sant'Angelo and her team for kindly sharing their work and reviewing the questionnaire for content validity. I am also greatly thankful to Ms. E. Dutton and Ms. M. Ellul for reviewing the questionnaire for content validity. My thanks are also extended to Ms. Maryanne Massa, Principal Officer (Health Promotion), Health Promotion Department for supplying me with copies of the booklet 'ikel Bnin Ghat-Tfal ta' l-Iskola' (Healthy Food for Schoolchildren) to disseminate to all parents who participated in this study.

My gratitude also goes to Eckstein, K. C., Mikhail, L. M., Ariza, A. J., Thomson, J. S., Millard, S. C., and Binns, H. J. (2006) for granting me permission to use, modify and translate their tool and Truby, H., and Paxton, S. J. (2002) for allowing me to use their pictorial scale. Acknowledgement is also due to Dr. S. Fenech B.A. (Hons) (Maltese), L.L.D., A.L.C.M. and Ms. J. Saliba B.A. (Hons) (English) P.G.C.E. for helping me translate the original version of the questionnaire into Maltese and then back-translate it into English, respectively.

Thanks are also due to Mr. R. Camilleri, Assistant Director, Research and Planning in the Education Department, for granting me permission for having access to all the state primary schools where the study was to be conducted. I would also like to thank the head teachers and teachers of the schools involved in the study for their cooperation in data collection. Thanks go to all the parents and children who participated in this study with great enthusiasm and without whom this study would have been impossible.

Many thanks are also due to my husband George, M.Sc. for greatly assisting me with the data transfer from questionnaire to computer for data analysis and for driving me to the various schools. I am also grateful to the Health Division statistician, Dr. Neville
Calleja M.D., M.Sc. (Malta), M.Sc. (Lond), DLSHTM, Grad. Stat. and Dr. L. Camilleri B.A. (Educ), M.Sc., Ph.D. (Lancaster), a statistician at the Department of Mathematics and Physics, University of Malta for all their help and advice during various stages of the study, including statistical analysis of the reliability of the tool and the final findings of the study.

Finally, I would like to express my heartfelt appreciation to my husband George and my mother Frances for giving me so much help and constant support to see it through. I also greatly thank my brothers and sisters, in-laws, friends and colleagues, especially my shift mates, Sharon, Mark, Silvanne, Charles and Helen for their endless encouragement and understanding which enabled me to make this study become a reality.
ABSTRACT

It is widely known that obesity increases risk of morbidity and mortality. Malta has a prevalence of 36% of overweight and obese children aged seven to eleven years, the highest prevalence among European countries (International Obesity Task Force [IOTF], 2005). Hence, achieving higher standards of children’s nutrition and physical activity to improve their well-being and protect their health is a major public health priority (IOTF, 2005). Adopting wide ranging and effective childhood obesity prevention/reduction strategies may necessitate an understanding of Maltese parents’ perceptions of their child’s weight status.

The aim of this quantitative cross-sectional survey design was to examine Maltese parents’ perceptions and concern about their child’s weight as well as influencing factors. Data was collected through self-administered questionnaires disseminated to parents with children in Year 1 of randomly selected state primary schools in the six regions of Malta, including Gozo. The response rate was 86%.

The findings of this study were based on 408 parental questionnaires and their child’s measurements. The majority of parent participants were mothers (87.9%). Findings showed that overall, 38% of five to six-year-old children were overweight or obese (n=155) according to IOTF criteria (2000). A significant difference was found in overweight prevalence among the different regions. Findings indicated that 16% of respondents with overweight and obese children had a correct image perception of their child’s physical stature in contrast to 21% of parents who correctly classified their overweight or obese child’s weight status in verbal terms. Moreover, among parents of overweight and obese children, 33% were concerned about their child’s weight at the time of data collection, whilst 62% were concerned about their child’s future weight. A number of factors, including parental recall of doctor’s concern about their child’s weight, parental perception that their child was slower or less active than other children and the child’s body mass index, were found to influence parental perceptions and their concern about their child’s weight.

As an outcome of this study, recommendations for practice, nursing education and further research are presented. It was anticipated that evidence from this study may facilitate the development of such strategies that are tailor-made to the local parent/child population.
## CONTENTS

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of authenticity</td>
<td>i</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>ii</td>
</tr>
<tr>
<td>Abstract</td>
<td>iv</td>
</tr>
<tr>
<td>Contents</td>
<td>v</td>
</tr>
<tr>
<td>Appendices</td>
<td>x</td>
</tr>
<tr>
<td>List of Tables</td>
<td>xi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>xiii</td>
</tr>
</tbody>
</table>

### Chapter 1

**Introduction to the Study**

1.1 European prevalence of overweight and obesity 2
1.2 Parents' role in preventing/managing childhood obesity 3
1.3 Purpose of the study 4

### Chapter 2

**Literature Review**

2.1 Introduction 7

2.1.1 Conceptual framework – the Health Belief Model 7
2.2 Defining Childhood Obesity 10
2.3 Childhood – A Critical Period in the Development of Adulthood 12

Overweight and Obesity 12
2.4 An Association between Childhood Obesity and Increased Morbidity 13
2.5 Parental Influence on Children’s Eating Behaviour, Physical Activity and Weight Outcome 15

2.5.1 Food availability and accessibility, and children’s eating behaviour 15
2.5.2 Parents’ modelling role and children’s eating behaviour 16
2.5.3 Feeding styles and children’s eating behaviour and weight outcome 17
2.5.4 Parental influence on children’s physical activity

2.6 Parental Perceptions of and Concern about their Child’s Weight
   2.6.1 Parents’ perceptions of their child’s weight
   2.6.2 Adolescents’ perceptions of their own weight
   2.6.3 Parents’ concerns about their child’s weight
   2.6.4 Determinants of parental perceptions

2.7 Local Research

2.8 Conclusion
   2.8.1 A general overview of the findings
   2.8.2 Limitations of the research studies

Chapter 3

Methodology

3.1 Introduction

3.2 Aim and Objectives

3.3 Operational Definitions

3.4 Research Design

3.5 Target Population and Sampling Technique
   3.5.1 Inclusion criteria
   3.5.2 Sample size
   3.5.3 Sampling technique

3.6 Research Instruments
   3.6.1 Advantages and disadvantages of questionnaires
   3.6.2 Parental questionnaire
   3.6.3 Translation of the questionnaire from English to Maltese
   3.6.4 Children’s weight and height measurements

3.7 Reliability and Validity
   3.7.1 Reliability testing of the questionnaire
   3.7.2 Validity measures of the questionnaire

3.8 Pilot Study

3.9 Ethical Considerations

3.10 Data Collection for the Main Study

3.11 Data Analysis
3.11.1 Questionnaire and measurement data management
3.11.2 Statistical analysis of data
3.11.3 Presentation of findings

Chapter 4
Findings of the Study

4.1 Introduction
4.2 Participation of Parents and Children
  4.2.1 Response rate
  4.2.2 Demographic characteristics of participants
4.3 Children’s Body Mass Index
4.4 Parents’ Education Level and Children’s Weight
4.5 Children’s Weight according to Region
4.6 Parents’ Perceptions of their Child’s Weight in Verbal Terms
  4.6.1 Parents’ perceptions of their overweight child’s weight in verbal terms by child’s gender
  4.6.2 Parents’ perceptions of their child’s weight in verbal terms by parents’ education level
4.7 Parents’ Perceptions of their Child’s Weight in Visual Terms
  4.7.1 Parents’ perceptions of their overweight child’s weight in visual terms by child’s gender
4.8 Parental Recall of Doctor’s Concern about their Child’s Weight
  4.8.1 Association between recall of doctor’s concern by parents of overweight and obese children and their perception of their child’s weight in verbal terms
4.9 Parents’ Perceptions of their Child’s Physical Ability/Activity Levels
  4.9.1 Parents’ perceptions of their child’s physical ability/activity levels associated with children’s measured BMI categories
  4.9.2 Association between parents’ perceptions of their child’s weight and their perceptions of their child’s physical ability/activity levels
4.10 Parents’ Concern about their Child’s Weight at Data Collection
and their Child’s Future Weight

4.10.1 Parents’ concern about their child’s weight at data collection and their child’s future weight associated with children’s measured BMI categories

4.10.2 Association between parents’ concern about their child’s Weight at data collection and their child’s future weight and parents’ perceptions of their child’s weight in verbal terms

4.11 Parents’ Opinions Regarding the Health Consequences of Child Overweight

4.12 Health History

4.12.1 Association between family health history and children’s measured BMI categories

4.12.2 Association between family health history and parents’ perceptions of their child’s weight in verbal terms

4.13 Logistic Regression

4.14 Summary of the Main Results

Chapter 5
Discussion of the Findings

5.1 Introduction
5.2 Demographic Characteristics of Participants
5.3 Children’s Weight according to Region
5.4 Parents’ Recognition of their Child’s Weight Status by Words
5.5 Parents’ Recognition of their Child’s Weight Status by Sketch Selection
5.6 Parental Concern about their Child’s Weight
5.7 Factors associated with Parental Recognition and Concern about their Child’s Weight

5.7.1 Child’s BMI group
5.7.2 Child’s gender
5.7.3 Parents’ education level
5.7.4 Parental recall of doctor’s concern about their child’s weight
## APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix 1</td>
<td>IOTF international cut-off points for children’s underweight and overweight</td>
<td>150</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Regions of the Maltese Islands according to the Malta National Statistics Office (2006)</td>
<td>152</td>
</tr>
<tr>
<td>Appendix 3</td>
<td>Permission to use, modify and translate the questionnaire by Eckstein et al (2006)</td>
<td>154</td>
</tr>
<tr>
<td>Appendix 4</td>
<td>Modified version of the questionnaire by Eckstein et al (2006)</td>
<td>156</td>
</tr>
<tr>
<td>Appendix 5</td>
<td>Children’s Body Image Scale (Truby &amp; Paxton, 2002)</td>
<td>160</td>
</tr>
<tr>
<td>Appendix 6</td>
<td>Permission to use the Children’s Body Image Scale by Truby and Paxton (2002)</td>
<td>162</td>
</tr>
<tr>
<td>Appendix 7</td>
<td>Translated version of the questionnaire (into Maltese)</td>
<td>164</td>
</tr>
<tr>
<td>Appendix 8</td>
<td>Back-translated version of the questionnaire</td>
<td>169</td>
</tr>
<tr>
<td>Appendix 9</td>
<td>Calibration of the weighing balance used for children’s weight measurements</td>
<td>174</td>
</tr>
<tr>
<td>Appendix 10</td>
<td>Covering letters and consent form used in the test-retest procedure (Maltese and English versions)</td>
<td>176</td>
</tr>
<tr>
<td>Appendix 11</td>
<td>Percentage agreement for responses of test-retest procedure</td>
<td>181</td>
</tr>
<tr>
<td>Appendix 12</td>
<td>Content validity: reviews by experts in child overweight</td>
<td>183</td>
</tr>
<tr>
<td>Appendix 13</td>
<td>Evaluation form used in the pilot study (Maltese and English versions)</td>
<td>186</td>
</tr>
<tr>
<td>Appendix 14</td>
<td>Permission from the University of Malta Research Ethics Committee</td>
<td>189</td>
</tr>
<tr>
<td>Appendix 15</td>
<td>Permission from the Education Department to conduct the study in state primary schools</td>
<td>191</td>
</tr>
<tr>
<td>Appendix 16</td>
<td>Covering letter sent to parents (English and Maltese versions)</td>
<td>194</td>
</tr>
<tr>
<td>Appendix 17</td>
<td>Consent form used in the main study (English and Maltese versions)</td>
<td>197</td>
</tr>
<tr>
<td>Appendix 18</td>
<td>Booklet issued by the Health Promotion Department ‘i kel Bnin Ghat-Tfal ta’ l-Iskola’ (Healthy Food for Schoolchildren) given to every parent</td>
<td>200</td>
</tr>
</tbody>
</table>
LIST OF TABLES

(The first number indicates the chapter number)

Table 2.1 - Parents’ perceptions of their child’s weight 24
Table 3.1 - Year 1 students in state primary schools at data collection 44
Table 4.1 - Response rate for questionnaires and consent for children’s measurements 62
Table 4.2 - Response rate for every region 63
Table 4.3 - Participants – parents or guardians 63
Table 4.4 - Year 1 children who participated in the study compared to live births born to Maltese parents in 2002 64
Table 4.5 - Education level completed by parents in the study and individuals in the 20-39 age range in Census 2005 65
Table 4.6 - Parental education level by region 66
Table 4.7 - Statistics of children’s measured BMI by gender 66
Table 4.8 - Children’s measured BMI categories by parents’ education level 68
Table 4.9 - Children’s measured BMI categories according to region 69
Table 4.10 - Children’s BMI means by region 71
Table 4.11 - Parents’ perceptions of their overweight child’s weight in verbal terms by child’s gender 74
Table 4.12 - Parents’ perceptions of their child’s weight in verbal terms by parents’ education level 75
Table 4.13 - Parents’ perceptions of their overweight child’s weight in verbal terms by parents’ education level 75
Table 4.14 - Parents’ perceptions of their obese child’s weight in verbal terms by parents’ education level 76
Table 4.15 - Parental recall of doctor’s concern about their child’s weight by children’s BMI categories 79
Table 4.16 - Parental perception of the frequency of their child’s physical activity per week by children’s BMI categories 84
Table 4.17 - Parental perception of their child’s physical activity in hours/week by children’s measured BMI categories 84
LIST OF TABLES (continued)

(The first number indicates the chapter number)

Table 4.18 - Parental perception of their child’s physical ability by children’s measured BMI categories 85

Table 4.19 - Parents’ perceptions of their overweight child’s weight by their perception of their child’s physical ability in comparison to other children 87

Table 4.20 - Parents’ perceptions of their obese child’s weight by their perception of their child’s physical ability in comparison to other children 87

Table 4.21 - Parents’ level of agreement with statements on the health consequences of child overweight 93

Table 4.22 - Mean rating score for each statement about the health consequences of child overweight 94

Table 4.23 - Parents’ perceived causes of family history of illnesses related to diet, low physical activity or obesity 95

Table 4.24 - Logistic regression for parental recognition that their child was overweight by words 98

Table 4.25 - Logistic regression for parental concern about their child’s weight at data collection 98

Table 4.26 - Logistic regression for parental concern about their child’s future weight 99
LIST OF FIGURES

(The first number indicates the chapter number)

Figure 4.1 - Children’s BMI Categories 67
Figure 4.2 - Children’s BMI means according to parental education level 68
Figure 4.3 - Boxplot of children’s BMI for every region 70
Figure 4.4 - Regions’ BMI means and medians 71
Figure 4.5 - Parents’ perceptions of their child’s weight in verbal terms by children’s measured BMI categories 73
Figure 4.6 - Parents’ perceptions of their child’s weight in visual terms by children’s measured BMI categories 77
Figure 4.7 - Parents’ classification of their overweight or obese child’s weight in visual terms by child’s gender 78
Figure 4.8 - Recall of doctor’s concern by parents of obese children and their classification of their child’s weight in verbal terms 80
Figure 4.9 - Parents’ perceptions of the frequency of their child’s physical activity per week 81
Figure 4.10 - Parents’ perceptions of their child’s physical activity in comparison to other children of same age 82
Figure 4.11 - Parents’ perceptions of their child’s physical ability in comparison to other children of same age 83
Figure 4.12 - Parents of overweight/obese children and their classification of their child’s weight in verbal terms by their perception of their child’s physical ability in comparison to other children 86
Figure 4.13 - Parents’ concern about their child’s weight at data collection 89
Figure 4.14 - Parents’ concern about their child’s future weight 90
Figure 4.15 - Parents’ perceptions of their obese child’s weight and their concern about child’s weight at data collection 91
Figure 4.16 - Parents’ perceptions of their obese child’s weight and their concern about child’s future weight 92
CHAPTER 1

Introduction to the study
This chapter provides an overview of the research problem followed by a background to the study. The justification for choice of subject area, together with the purpose of the study will be outlined.

An unhealthy diet and sedentary lifestyle are the main contributors to the development of overweight and obesity. Moreover, it is widely known that obesity increases risk of morbidity and mortality. Hence, achieving higher standards of nutrition and physical activity to improve the well-being and protect the health of European citizens must be a major public health priority (International Obesity Task Force [IOTF], 2005). Rising levels of overweight and obesity among both adults and children signals the need to act immediately by adopting wide ranging and effective strategies to reverse this trend (IOTF, 2005). Adopting wide ranging and effective obesity prevention/reduction strategies may necessitate an understanding of parents’ perceptions of their child’s weight status. This will facilitate the development of such strategies that are tailor-made to the local parent/child population.

1.1 European prevalence of overweight and obesity

In parts of Europe, the combination of reported overweight and obesity in adults exceeds even the 67% prevalence found in the United States’ most recent survey, using objective means of measurement. Finland, Germany, Greece, Cyprus, Czech Republic, Slovakia and Malta all have overweight rates which surpass those of the USA (IOTF, 2005). Among children, the Mediterranean islands of Malta, Sicily, Gibraltar and Crete as well as the countries of Spain, Portugal and Italy report overweight/obesity levels exceeding 30% (IOTF, 2005). In fact, Malta has a prevalence of 36% of overweight and obese children aged 7 to 11 years, the highest prevalence among European countries (IOTF, 2005). Interestingly, the distribution of body mass index (BMI) has changed such that the heaviest children, at greater risk of complications, have become even heavier (Ebbeling, Pawlak, & Ludwig, 2002).

Historically, a fat child meant a healthy child, one who was likely to survive the rigours of undernourishment and infection (Ebbeling et al, 2002). In the past couple of decades, however, excessive fatness has become the primary childhood health problem in developed nations (IOTF, 2005; Ebbeling et al, 2002). IOTF estimates prepared for WHO show one in five children in Europe is overweight (IOTF, 2005). An additional one million children each year are becoming overweight, including at least 300000
obese (IOTF, 2005). Annual increases in prevalence of around 0.2% during the 1970s rose up to 0.6% during the 1980s and up to 0.8% in the early 1990s reaching as high as 2.0% in some cases by 2000s (Wang & Lobstein, 2006). Moreover, comparing pairs of surveys that indicate rates of change of prevalence in child overweight/obesity and using a conservative linear model estimate suggest, that unless action is taken, annual increase in prevalence of childhood overweight/obesity will rise to 2.3% by 2010 (Jackson-Leach & Lobstein, 2006).

A limitation of the extensive literature review performed by Jackson-Leach and Lobstein (2006) is the choice of criteria for defining overweight/obesity. The study included only those studies which used the IOTF criteria. Several other methods are used in the literature, but the surveys using these methods were excluded from the review (for example, European countries centile charts, United States of America centile charts). The IOTF definitions give lower estimates of overweight/obesity than some European centile charts. This highlights the need for generating standardised criteria in order to provide adequate monitoring of Europe’s childhood obesity epidemic and allow for comparison within and between countries.

1.2 Parents’ role in preventing/managing childhood obesity

The need to involve parents of young children in weight control programmes is obvious, since children often depend on their parents for the provision of their food and physical activity environment. Moreover, parents may serve as models for their children’s behaviours. The achievement of behaviour change, for both the family and child, is a key focus of interventions that address the multiple factors contributing to the development and persistence of child obesity (Barlow & Dietz, 1998). In order to accomplish family behaviour change, parents must be well engaged in the process (Eckstein, Mikhail, Ariza, Thomson, Millard, & Binns, 2006). Family-focused interventions during the preschool and early school years are particularly important (Etelson, Brand, Patrick, & Shirali, 2003) because, during this period, the course of the body mass index (BMI) curve changes from a state of progressive decline to steady increase, rendering this age a critical period in childhood for the development of obesity (Dietz, 1997). Hence, this may be the best time to maximise the child’s chances of staying on a healthy growth trajectory. It is also the period during which the
family environment plays an important role in children's health and development of their eating and physical activity behaviour (Davison & Birch, 2001).

A first step in the treatment of overweight is to help families recognise their child’s overweight status and achieve a willingness to make behaviour changes (Barlow & Dietz, 1998). This is essential as parents who do not recognise that their child is overweight or do not feel that their child’s overweight status represents a problem worthy of intervention may not be concerned enough to receive counselling or interventions related to overweight (Eckstein et al, 2006).

It will be difficult to engage parents in obesity prevention effort without first understanding how they perceive the problem of childhood overweight. Findings in the literature from the United Kingdom (UK), the United States of America (US) and Australia provide a convincingly consistent message that parents often do not accurately perceive overweight in their children and hence report low levels of concern (Campbell, Williams, Hampton, & Wake, 2006; Eckstein et al, 2006; Carnell, Edwards, Croker, Boniface, & Wardle, 2005; Jeffery, Voss, Metcalf, Alba, & Wilkin, 2005; Maynard, Galuska, Blanck, & Serdula, 2003; Wake, Salmon, Waters, Wright, & Hesketh, 2002; Baughcum, Chamberlin, Deeks, Powers, & Whitaker, 2000). However, the results of these parental perception studies may not be automatically applicable to the local parent population due to differences in culture and social norms. Despite a good number of local studies that had addressed various issues related to childhood obesity, none of these focused specifically on parents’ perceptions of their child’s weight. In view of this, it was considered useful to examine Maltese parents’ perceptions and level of concern regarding their child’s weight status since problems at this level may be partly contributing to the local high prevalence of childhood obesity.

1.3 Purpose of the Study

This study was aimed to examine Maltese parents’ perceptions and concern about their child’s weight status and compare it with their child’s true BMI. Factors possibly contributing to these perceptions were also examined. A cross-sectional survey among children in Year 1 and their parents was conducted and data collection methods included parental questionnaires and children’s measurements of weight and height. It was anticipated that the findings of the study would elicit some evidence that could contribute towards promoting parents’ appropriate judgement of their child’s true
weight. This might enable them to make the necessary behaviour changes. As layperson's definition of overweight/obesity may be different from clinical definition, the study could also provide information, which may be useful in planning health promotion programmes that target families with overweight/obese children. Additionally, it could provide baseline data for future research.
CHAPTER 2

Literature review
Chapter 2

2.1 Introduction

Childhood is considered a critical period in the development of obesity resulting in considerable morbidity and mortality. This has evoked considerable interest in research areas related to childhood obesity. Research conducted in this area includes the examination of parental influence on children’s nutrition, physical activity and weight outcome by several research activities. Other research looked into the role of parents in children’s weight reduction programmes. Recently, research focused on parents’ perceptions of and concern about their child’s weight in order to assess how well parents perceive overweight in their children and whether perception of child overweight causes parental concern. The greater part of research on childhood obesity began to prosper towards the end of the 20th century due to proliferation of childhood obesity worldwide.

This literature review aims to critically analyse a number of studies related to parental influence, roles and perceptions as described above. The Health Belief Model is presented as a conceptual framework for the study. Available literature on defining childhood obesity, childhood as a critical period in the development of obesity and morbidity in childhood and adulthood is also discussed. Finally, an overview of local research on childhood obesity is given.

A literature search was conducted through the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Pub Med and EBSCO databases and the journals’ websites on the Internet. Literature published between 1990 and 2007 was searched. Key phrases searched and cross-indexed included ‘child obesity’ and ‘parental influence’, ‘home environment’, ‘parents’ perceptions’, ‘parental concern’ and ‘parents’ involvement’, and ‘children’s weight reduction programmes’. Furthermore, a number of research articles were obtained by directly contacting the authors by electronic mail.

2.1.1 Conceptual framework – the Health Belief Model

A theory is an inter-related set of constructs formed into hypotheses or propositions that specify the relationship among variables (Creswell, 2003; Glanz, Lewis, & Rimer, 1997). It is often used as a framework for research, providing an organising model for the research questions and for the data collection procedure (Polit, Beck, & Hungler, 1997).
2001; Cormack, 2000). Some theories describe, explain and predict social phenomena, such as family behaviour. For example, social psychology offers several theoretical models that identify determinants of behaviour change (Naidoo & Wills, 2000). For the purpose of this study, the Health Belief Model (HBM) was selected to provide a conceptual framework as it was considered relevant to the study’s ultimate aim which was that of examining health behaviour issues in families (Rosenstock, Strecher, & Becker, 1988).

The HBM was developed initially by Rosenstock and Becker throughout the 1970s with the purpose of predicting preventive health behaviours. The model suggests that whether preventive action is taken or not is influenced by the perceived susceptibility to and seriousness of the disease amongst other factors. Therefore, according to this theory, parents would be expected to change their child’s behaviour related to obesity if they perceive their child as vulnerable to become obese and if they consider obesity to be a serious state. The perceived susceptibility to and seriousness of a disease may in turn be affected by factors other than knowledge of facts and statistics about the disease (Friedman, 1992). This may indicate that knowing facts about a disease may not motivate an individual to change his lifestyle. Hence, it is considered important to understand the various factors which may influence people’s perceptions and beliefs on the disease in order to be able to develop successful preventive or treatment programmes. Similarly, it is deemed necessary to understand various issues associated with parents’ perceptions of their child’s weight and childhood obesity first and foremost before attempting to educate them about behaviour change.

The Health Belief Model also proposes that individuals need to have some kind of cue to take action to change behaviour or make a health-related decision (Naidoo & Wills, 2000; Elder, Ayala, & Harris, 1999; Glanz et al, 1997). Cues to action refer to the immediate stimuli needed to trigger recognition in the person’s mind of the susceptibility and seriousness of a disease, and the need for taking action to reduce the threat (Friedman, 1992). The stimulus needs to become salient or relevant. The cue could be noticing a change in one’s internal state or appearance. For example, a mother may notice that her child is gaining weight rapidly or that the child is becoming slower in his physical activity. A trigger could also be external, such as a change in circumstance like the illness or death of someone close. For example, the child’s parent is diagnosed with obesity-related diabetes or hypertension. Another cue to take action could be a comment from a significant other or a newspaper article or information on
electronic media. Health care workers are often considered as significant others. The general practitioner’s advice is often taken seriously as he has expertise and authority, and is trustworthy, leading the client to desire to comply. A study by Eckstein et al (2006) found out that parents who recalled that their doctor was concerned about their child’s weight were more likely to perceive their child as overweight.

In spite of its contribution to understanding preventative health behaviour, the HBM has not escaped criticism. One major argument is that the HBM focuses on rational processing of information by the individual without considering the role of the social and economic environments on behaviour (Ogden, 2000). Social and economic factors may have considerable influence on an individual’s choice of behaviour. It is indicated in the literature that socioeconomic status influences mothers’ perceptions of their preschool child’s weight (Jain, Sherman, Chamberlin, Carter, Powers, & Whitaker, 2001; Baughcum et al, 2000). Further criticism of the HBM points to the fact that the interrelationship between the different core beliefs is not properly addressed (Ogden, 2000). The HBM has a static approach to health beliefs. It suggests that beliefs occur simultaneously with no room for change or development. The model indicates that once an individual perceives his susceptibility to an illness and its seriousness, all other beliefs will ensue one after the other. However, it is well known that perceiving one’s susceptibility to an illness and the seriousness of this illness may not automatically lead to the individual’s consideration of the other steps of the HBM needed to take preventive action such as the benefits and costs of the health-related behaviour.

In addition, decisions to change health-related behaviour may result from the mere perception of symptoms rather from individual variables as presented by the HBM. For example, a mother only attempts to change her obese child’s diet after respiratory problems set in even though the child was obese of a long time. It has been suggested that alternative factors may predict health behaviour, such as self-efficacy (Rosenstock et al, 1988). For example, a child is able to change eating habits depending on how confident he feels in his ability to refrain from eating chocolate and sweets.

Arguments were also brought against the HBM specifically in relation to obesity-related behaviour. Baranowski, Cullen, Nicklas, Thompson and Baranowski (2003) quoted a number of studies which showed that many of the predictions from the HBM in relation to obesity-related behaviour have not been confirmed. In order to be useful in predicting obesity-related behaviour, it was proposed that research with the HBM
needs to establish a perceived seriousness of and susceptibility to obesity, and cues to action that would help change obesity-related behaviour. Relationships between obesity-related behaviour and these factors must be assessed among both obese and non-obese individuals in a variety of populations of different gender, ethnic groups, and age groups. Other factors, such as social and economic influences, that affect these mediating variables and that result in the desired corresponding behavioural changes must also be identified. Furthermore, the usefulness of the HBM in relation to obesity may improve as perception of the susceptibility to and seriousness of obesity increases among the public in general.

Despite its weaknesses, the HBM was considered suitable in providing a theoretical background for this research. This study focuses on parents’ perceptions of their child’s weight which could directly influence parents' perceptions of and concerns about their child’s susceptibility to the health consequences of obesity. It is assumed that if parents do not perceive their overweight child as overweight, then they cannot perceive their child as being susceptible to obesity-related problems and neither can they feel concerned about this issue. According to the HBM, this may be detrimental to parental readiness to pursue weight reduction programmes for their child. Similarly, if parents are unaware of obesity-related problems, they cannot feel concerned about their child’s overweight status. Whether these factors would actually contribute to weight reduction behaviour amongst the cohort of parents under study is subject to further research. The next section presents a definition of childhood obesity.

2.2 Defining Childhood Obesity

Trends in childhood obesity ought to be closely monitored due to its public health importance. Trends are, however, difficult to quantify or to compare internationally (Ebbeling et al, 2002), as a wide variety of definitions of child overweight and obesity are in use and no commonly accepted standard has yet emerged (James, 2006; Wang & Lobstein, 2006; Cole, Bellizzi, Flegal, & Dietz, 2000; Troiano & Flegal, 1998).

Overweight is defined through establishing a level of body fat above which the individual is considered to be exceeding normal levels. Obesity is an excess level of overweight at which the likelihood of morbidity increases (Hodges, 2003). The amount of body fat is determined by measuring adiposity, generally expressed as either
absolute fat mass or percentage of total body mass (Hodges, 2003). The degree of adiposity can be used as a clinical indicator of overweight or obesity. Two ways of measuring adiposity are skinfold thickness and body mass index (BMI). Despite its lower sensitivity than skinfold thickness, BMI is widely used in adult populations (Cole et al, 2000). Normal weight and overweight are differentiated through establishing cut-off points at which BMI is considered normal or above normal.

The BMI (kg/m²) is easy to calculate and has been sufficiently correlated with direct measures of body fatness (Rosenbaum, Leibel, & Hirsch, 1997). Hence, it has been increasingly accepted as a valid indirect measure of adipose tissue in both children and adolescents for survey purposes (Wang & Lobstein, 2006). To establish BMI, height and weight can be obtained with reasonable precision in a variety of settings including field studies, clinical practice and research (Troiano & Flegal, 1998). However, a high BMI value for an individual child or adult can be due to high fat free mass (Guo, Chumlea, & Roche, 2002). A body's weight consists of fat free mass, mainly muscle and bone, and fat mass. Two persons of equal height and weight can have different percentages of fat free mass and fat, but having the same BMI. Nevertheless, comparisons among various weight-for-height indices for both adults and children have led to the selection of BMI as most desirable (Troiano & Flegal, 1998).

BMI in childhood changes substantially with age. At birth, the median is as low as 13 kg/m², increases to 17 kg/m² at age 1, decreases to 15.5 kg/m² at age 6, then increases again to 21 kg/m² at age 20. Clearly, a BMI cut-off point related to age is needed to define child obesity. In order to develop an internationally accepted definition of child underweight, overweight and obesity, Cole, Flegal, Nicholls and Jackson (2007) and Cole et al (2000) analysed data on children's BMI from six large nationally representative cross-sectional surveys on growth from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore and the United States (USA). Each survey had over 10,000 subjects with ages ranging 6-18 years and quality control measures to minimise measurement error. The analysis provided BMI cut-off points for every half year of childhood from the age of 2 to 18 years that are linked to the widely accepted adult BMI cut-off points of 18.5 for underweight, 25 for overweight and 30 kg/m² for obesity through BMI centile curve drawings (Appendix 1, p. 150). The set of BMI cut-off points given in this appendix was used to quantitatively identify underweight (Cole et al, 2007), overweight and obesity (Cole et al, 2000) amongst children involved in this study.
However, international reference sets have disadvantages (Wang & Lobstein, 2006). It was argued that population-specific references should be used for certain ethnic groups on the grounds that internationally defined thresholds for overweight and obesity may be inappropriate in terms of health outcomes for these ethnic groups (Wang & Lobstein, 2006). Additional datasets from Africa and Asia would be helpful, but the researchers’ stringent inclusion criteria of a large sample, national representativeness, minimum age range of 6-18 years and data quality control meant that no such datasets emerged from these continents. The authors concluded that it is not realistic to wait for them as there is an urgent need for international cut-off points in order to identify overweight and obese children as obesity is a multi-system disease with potentially devastating consequences.

### 2.3 Childhood – A Critical Period in the Development of Adulthood Overweight and Obesity

Childhood has been proposed as a critical period for the development of overweight and obesity in adulthood (Dietz, 1998a; Whitaker, Pepe, Wright, Seidel, & Dietz, 1998). Overweight children are more likely to become obese in adulthood than are lean children (Wang & Lobstein, 2006; Dietz, 1998a; Troiano & Flegal, 1998). For example, one study found that adiposity in infants appeared to increase the risk of subsequent obesity about two-fold (Dietz, 1998a). Another study found a strong positive correlation between excess weight in childhood and risk for adult obesity with children of normal weight being the least at risk of growing into obese adults (Freedman, Khan, Serdula, Dietz, Srinivasan, & Berenson, 2005). This study also found that if overweight began before 8 years of age, obesity in adulthood is likely to be more severe. Guo et al (2002) showed that overweight or obese adults at 35 years of age had significantly higher BMI values in childhood and adolescence (p <0.05) than did normal weight adults.

It has also been proposed that a specific age range in childhood is fundamental in the development of later obesity. During early childhood, BMI normally declines and reaches a minimum on average at age 5-6 years before beginning a gradual increase through adolescence and most of adulthood. Adiposity rebound (AR) is the rise in BMI that follows this point of maximal leanness at age 5-6 years (Cole, 2004; Whitaker et al, 1998). An early age at AR is known to be a risk factor for later obesity (Cole, 2004;
Dietz, 1998a). An increased risk for obesity later in life in individuals who had an early AR was found in different studies (Venn, Thomson, Schmidt, Cleland, Curry, Gennat, & Dwyer, 2007; Whitaker et al, 1998; Guo, Roche, Chumlea, Gardner, & Siervogel, 1994). The ability to predict adult adiposity in early childhood has led other authors to suggest that the age at AR is a critical period of growth and, thus, a possible modifiable risk factor for adult obesity (Cole, 2004).

However, the biological importance and predictive value of the association between childhood and adult obesity remains a matter of debate (Cole, 2004; Ebbeling et al, 2002). Indeed, Cole (2004) argues that the association of childhood obesity with later obesity may only be statistical without any physiological explanation to it.

2.4 An Association between Childhood Obesity and Increased Morbidity

Morbidity related to childhood obesity may well be markedly underestimated (Lobstein & Jackson-Leach, 2006). As with adults, the Bogalusa Heart Study indicated that obesity in children may cause hypertension, high cholesterol levels, and type 2 diabetes (Freedman, Dietz, Srinivasan, & Berenson, 1999), which are antecedents of adult disease (Dietz, 1998b). These risk factors may operate through association between childhood and adult obesity, but they may also act independently and cause disease at a young age (Wang & Lobstein, 2006; Cole et al, 2000; Rosenbaum et al, 1997). In fact, this clustering of cardiovascular disease (CVD) risk factors, known as the insulin resistance syndrome has been identified in children as young as five years of age (Young-Hyman, Herman, Scott, & Schlundt, 2001). Observations from autopsy studies by the Bogalusa Heart Study among 93 adolescents and young adults who died of traumatic causes revealed that the presence of CVD risk factors was correlated with asymptomatic coronary atherosclerosis, and lesions were more advanced in obese individuals (Berenson, Sirinivasan, Bao, Newman, Tracy, & Wattigney, 1998).

Additionally, the emergence of type 2 diabetes in obese children represents an ominous development and may have macrovascular (for example foot problems) as well as microvascular sequelae (such as renal and eye problems) (International Obesity Task Force [IOTF], 2005; Ebbeling et al, 2002). Moreover, common pulmonary complications of obesity include sleep-disordered breathing, asthma and exercise intolerance. The development of these complications in an obese child can limit
physical activity which in turn causes further weight gain (Ebbeling et al, 2002; Freedman et al, 1999). In addition, serious hepatic, renal, musculoskeletal and neurological complications have been increasingly recognised (Ebbeling et al, 2002).

Few studies have examined the effects of childhood or adolescent onset obesity on adult morbidity and mortality. In part, the lack of such studies reflects the difficulties in the maintenance of a cohort for the time necessary for adult disease to occur. A study by Must, Jacques, Dallal, Bajema and Dietz (1992) indicated that mortality from cardiovascular disease and colon cancer later on in life were increased in men who were obese during adolescence. Colditz et al (1990) reported increased rates of cardiovascular disease and diabetes in both men and women who were obese during adolescence.

In addition to increased physical morbidity, findings of many studies indicate substantial psychosocial consequences of childhood obesity that may persist into adulthood (Wang & Lobstein, 2006; Ebbeling et al, 2002). Indeed, they are the most widespread consequences of childhood obesity (Dietz, 1998b). Obese children are stereotyped as unhealthy, academically unsuccessful, socially inept, unhygienic and lazy (Dietz, 1998a; Dietz, 1998b). As a result of this stereotype, overweight children, as young as age five years, can develop a negative self-image (Davison & Birch, 2001a) and obese adolescents can show declining degrees of self-esteem (Strauss, 2000). Moreover, the findings of a longitudinal study showed that obesity had a variety of adverse psychosocial consequences among women who were obese during adolescence, such as completion of fewer years of education, higher rates of poverty, and lower rates of marriage (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993). However, the psychological difficulties present in obese children may reflect maternal psychopathology or socioeconomic status rather than problems that result from the child’s obesity (Dietz, 1998b). Demonstration of the causal pathways that link obesity to psychosocial difficulties requires careful prospective studies.

As childhood obesity is associated with increased risk of morbidity in childhood and adulthood, it is important to consider any external influences that may affect children’s health behaviour in relation to obesity. These external factors, such as parental influence on children’s eating behaviour and physical activity habits, may contribute to childhood overweight and obesity. Research shows that parents can influence their children’s eating and physical activity behaviour in a number of ways.
2.5 Parental Influence on Children’s Eating Behaviour, Physical Activity and Weight Outcome

Parents play a critical role in structuring children’s early eating and exercise environments, which in turn affect their children’s weight status (Hodges, 2003; Birch & Fisher, 1998). For example, parents provide food for their children and act as models in shaping their children’s eating and physical activity behaviours. Evidence also reveals that parents are influential in shaping children’s food preferences and eating behaviours and they can affect children’s regulation of energy intake (Birch, 2006). Other research indicates substantial intra-familial associations in weight status and dietary intake and to a lesser extent physical activity (Davison & Birch, 2001b). This strengthens the need for studying parents’ perceptions of and concerns about their child’s weight assuming that these would in turn influence parental readiness to engage in weight reduction related behaviour. The following sections present various ways of how parents influence their children’s eating behavior, physical activity and weight outcome.

2.5.1 Food availability and accessibility, and children’s eating behaviour

In general, children choose to eat the foods that they are served most often, and they tend to prefer to eat foods that are readily available at home (Patrick & Nicklas, 2005). For example, when fruit and vegetables are available, children are more likely to eat fruit and vegetables (Cullen, Baranowski, Rittenberry, & Olvera, 2000). Thus, the foods to which children are routinely exposed shape preferences and consumption. Since parents are responsible for making foods available to children, they can have a profound impact on preferences and hence, consumption. A study by Cullen et al (2000) showed the importance not only of availability, but also accessibility of healthier foods. They found that among school children, fruit and vegetable intake is higher when these foods are not only available, but also provided in accessible locations (for example, easy for the child to reach) and in accessible sizes (for example, apple wedges, carrot sticks).

Moreover, parents tend to have foods in the home that they like and eat (Birch & Fisher, 1998). Research established that in children as young as two years old, food
preferences are associated with their parents’ food preferences and beliefs about which foods were healthy. Such association of preferences may be due to parents’ preferred food which is made accessible to their children.

2.5.2 Parents’ modelling role and children’s eating behaviour

Children learn about eating not only through their own experiences but also by watching others (Patrick & Nicklas, 2005). In a survey carried out by Cullen, Baranowski, Rittenberry, Cosart, Herbert and de Moor (2001) amongst Grade 4-6 children in parochial schools, children’s intake of fruit and vegetables was positively related to parents’ intake of fruit and vegetables and parents’ modelling of healthful dietary behaviours was associated with low-fat eating patterns and lower dietary intake amongst children. However, the impact of parents’ modeling role may be confounded and partly related to the consequent availability of healthy food at home.

Furthermore, Oliveria, Ellison, Moore, Gillman, Garrahie and Singer (1992) reported a statistically significant but modest correlation between parents’ and their 3-5 year-old children’s intakes for most nutrients. Results confirm that parents’ eating habits have an impact on the nutrient intake of their preschool children. Similarly in a cross-sectional study, Brown and Ogden (2004) found significant correlations between parent and child for reported snack intake, eating motivations and body dissatisfaction, indicating an important role for modelling.

Children do not only imitate what parents eat but also the parents’ attitudes toward their own dietary intake and eating habits. For example, findings from an observational study including 3-5 year old children and their parents suggest that disinhibited eating in the parent may be associated with an increased risk for obesity in the child (Hood, Moore, Sundarajan-Ramamurti, Singer, Cupples, & Ellison, 2000). Disinhibition refers to uncontrolled eating behaviour (Hood et al, 2000). These effects may be mediated through parental modelling and subsequent acquisition of negative eating behaviours by the children. This argument is strengthened by the finding that those children who had two parents who exhibit high levels of disinhibition are much more likely to gain excess weight throughout early childhood than are children with one parent or none of the parents exhibiting this behaviour.
2.5.3 Feeding styles and children’s eating behaviour and weight outcome

Besides the influence from food availability and parental modelling behaviour on children’s eating, the actual child feeding patterns which parents adopt have also been found to be highly influential on children’s eating habits. Feeding styles represent the caregiver’s approach to maintain or modify children’s behaviours with respect to eating. They have been linked with both dietary intake and weight status.

Several studies have shown that children's eating behaviours are strongly influenced by parental control of the child's diet (Johannsen, Johannsen, & Specker, 2006; Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002). With regard to dietary intake, attempts to control the child’s eating with little regard for the child’s choices and preferences have been associated with lower intake of fruit, juices and vegetables (Cullen et al, 2000). In terms of the association between feeding styles and weight status, restricting and monitoring the child’s intake have been associated with higher body mass, as indicated by both BMI and total fat mass (Faith, Scanlon, Birch, Francis, & Sherry, 2004; Spruijt-Metz et al, 2002; Birch & Fisher, 2000; Fisher & Birch, 1999). In contrast, a study including 9 to 10-year-old children found that child BMI was highest in children whose parents immediately satisfied their children’s food requests (Lissau, Breum, & Sorenson, 1993). Similar findings were found in a more recent study of low income and ethnic minority groups with preschoolers by Hughes, Power, Fisher, Mueller, and Nicklas (2005). In conclusion, a positive relationship between parental control of their child’s dietary intake and child weight might be specific to affluent groups (Wardle & Carnell, 2007) or more prominent among mothers with female children (Birch & Fisher, 2000).

The association between parental control and increased children’s BMI has been attributed to the premise that reliance on parental control of unwanted behaviour through food reward or deprivation can undermine the infant and young child’s ability to attend to their internal cues of hunger and satiety (Johnson, 2000; Johnson & Birch, 1994; Birch & Fisher, 1998). Attempts to explain this association were also carried out through testing the hypothesis that parents’ attempts to restrict some foods and encourage others may ultimately determine children’s preferences to and intake of food items. Research shows that limiting the availability of foods high in fat, sugar and energy that has been used previously as a reward was associated with increased liking.
Chapter 2

Literature Review

for the limited foods (Fisher & Birch, 2002; Fisher & Birch, 1999, 1995; Birch, Zimmerman, & Hind, 1980).

In contrast to research findings mentioned earlier in the section, some studies found a negative association between parental control and children’s BMI (Faith et al, 2004; Robinson, Kiernan, Matheson, & Haydel, 2001; Faith et al, 2003). Robinson et al (2001) found no association between parental control and BMI in boys, while in girls, higher parental control was associated with lower BMI (n=792). Robinson et al (2001) attributed the inverse association between parental control over intake and overweight in girls to the fact that parents of 8-9 year olds as studied in their sample may have less influence over their children’s eating behaviours than parents of 3-5 year-olds as studied by Johnson and Birch (1994) and Birch and Fisher (2000).

Similarly, Spruijt-Metz, Li, Cohen, Birch and Goran (2006) found no associations between children’s weight and parental control. However, concern about child overweight at baseline was associated with lesser gain in fat mass in children, suggesting that concerned mothers may have successfully modified their feeding practices, but in ways that were not assessed in the study. It is possible that discrepancies between findings from studies of older children (Robinson et al, 2001; Spruijt-Metz et al, 2002) and younger children (Wardle & Carnell, 2007; Johannsen et al, 2006; Hughes et al, 2005; Birch & Fisher, 2000) are linked to child age.

As evidence in this research area has been conflicting, the evidence base could be strengthened by the use of similar and simple research tools, inclusion of both parents from a wider range of background, and by using designs that can inform conclusions about causality. Longitudinal study designs are preferable to cross-sectional studies in that the researcher can delineate whether the feeding practices are formed in response to the child’s weight or the child’s weight develops in response to the parent’s feeding practices (Birch, 2006; Faith et al, 2004). It will also allow examination of changes in the child’s weight and eating habits over time, as the consequences of parent influences imposed early on begin to be expressed.

2.5.4 Parental influence on children’s physical activity

Parents also influence the nature and amount of physical activity in which children engage (Hodges, 2003). Moore, Lombardi, White, Campbell, Oliveria and Ellison
(1991) demonstrated that parents who are more physically active are more likely to have children who are physically active. Physical activity levels in children who are still reliant on the family will likely differ according to available family resources (Golan and Crow, 2004a).

Parental encouragement may help motivate children to become more physically active (Ornelas, Perreira, & Ayala, 2007; Adkins, Sherwood, Story, & Davis, 2004; McGuire, Hannan, Neumark-Sztainer, Falkner Crossbow, & Story, 2002). McGuire et al (2002) found that parents' reported encouragement was positively related to physical activity in white and black children. Another study indicated that parents' self-efficacy for supporting daughters to be physically active was positively correlated with activity in African-American families (Adkins et al, 2004). Finally, the findings of a longitudinal study including parents of adolescents demonstrated that family cohesion, parent-child communication, and parental engagement positively predicted physical activity among adolescents (Ornelas et al, 2007).

As discussed in the previous section, parents have a unique opportunity to determine their child's food and physical activity environments (Wardle & Carnell, 2006). The rising tide of childhood obesity has been accompanied by an increased focus on the role of parents in aetiology and prevention (Golan & Crow, 2004a). Indeed, clear benefits have been shown from parental involvement in the treatment of child obesity (Golan, 2006; Golan & Crow, 2004b; Epstein et al, 1998; Epstein, Valoski, Wing, & McCurley, 1990; Coates, Killen, & Slinkard, 1982). The Expert Committee for Obesity Evaluation and Treatment recommends that treatment of childhood obesity begin early and involves the family (Barlow & Dietz, 1998). This may hint at the importance of the link between parents' perceptions of their child's weight and the accomplishment of behaviour change as identified in the Health Belief Model.

2.6 Parental Perceptions of and Concerns about their Child's Weight

Morbidity associated with childhood obesity and the influence of the home environment on children's lifestyle, which have been discussed in the previous sections, hint at the importance of understanding parents' perceptions of child body weight and health risk. Parent's perceptions and concern regarding their child's weight may shape their feeding behaviours, which in turn influences children's weight (Hodges, 2003). One frequently cited reason as to why childhood overweight is on the
rise is the failure of parents to recognise the overweight status of their children. Recognition of childhood obesity and acknowledgement of associated health risks are a critical first step in its treatment (Etelson et al, 2003; Barlow & Dietz, 1998), as suggested by the HBM. Parents who do not recognise that their child is overweight or do not feel that their child's overweight status represents a problem worthy of intervention may not be ready to receive counselling or interventions related to overweight (Eckstein et al, 2006).

2.6.1 Parents' perceptions of their child's weight

Various studies have shown that childhood overweight goes largely unrecognised by parents (Huang et al, 2007; Campbell et al, 2006; Eckstein et al, 2006; Hirschler, Gonzalez, Talgham, & Jadzinsky, 2006; Adams, Quinn, & Prince, 2005; Carnell et al, 2005; Jeffery et al, 2005; Olvera, Suminski, & Power, 2005; Boutelle, Fulkerson, Neumark-Sztainer, & Story, 2004; Etelson et al, 2003; Maynard et al, 2003; Wake et al, 2002; Jain et al, 2001; Baughcum et al, 2000; Baughcum, Burklow, Deeks, Powers, & Whitaker, 1998; Goodman, Hinder, & Khandelwal, 2000; Young-Hyman et al, 2000). Reference to methodological issues and detail of findings related to the above studies are given in Table 2.1 (p. 24). This section presents research carried out to study parents’ perceptions about their child’s weight. Various age ranges of childhood have been included such as preschoolers, schoolchildren and adolescents weight. Studies about the perceptions of parents from specific ethnic groups are also presented in this section.

Several studies looked at maternal perceptions of their preschool child’s weight. In a large sample of 1082 mothers in the UK with a response rate of 52% (n=541), Carnell et al (2005) found that 94% of mothers misclassified the weight of their overweight preschool child. Misclassification of overweight children's weight in Carnell et al's (2005) survey was markedly higher than in two large surveys in the US by Maynard et al (2003) and Baughcum et al (2000) (n=5500 and 611, respectively). In fact, 79% of mothers misclassified their overweight child’s weight in Baughcum et al (2000) and 33% of mothers of overweight children in Maynard et al (2003). One source of this discrepancy in misclassification by parents among these studies might be the use of IOTF reference data by Carnell et al (2005) to generate weight status categories. IOTF reference data may assign a greater proportion of children to the overweight group than
some other methods, thus increasing the likelihood of misclassification by parents. The low percentage of maternal misperceptions of children’s weight in Maynard et al’s study (2003) may be due to the large national sample used in this study.

Maternal perceptions of their preschool children’s weight were also recently studied in Argentina (Hirschler et al, 2006; n=321). Results reveal that 76% of 59 participants having an overweight child misperceived their child’s weight, while 45% of mothers of severely overweight children rated their child’s weight as normal. Hirschler et al (2006) recommend the development of programmes for overweight prevention in preschoolers, because once unhealthy eating and sedentary behaviour are established it is difficult to change them.

Other researchers studied parents’ perceptions of their schoolchild’s weight including children from 4 to 11 years of age (Huang et al, 2007; Jeffery et al, 2005; Etelson et al, 2003; Maynard et al, 2003). All studies used self-reported verbal responses from the parents and actual height and weight measurements of children. One study considered only maternal perceptions (Maynard et al, 2003), while the others included either parent for each child. Results ranged from 10.5% to 68% of parents of an overweight child who identified their child as overweight. The smallest percentage of correct perceptions was found in a cross-sectional study by Etelson et al (2003) using a small convenient sample (n=91), whereas the highest number of correct parental perceptions was achieved in a study by Maynard et al (2003) on 5500 participants using already available data from the Third National Health and Nutrition Examination Survey 1988-1994. Jeffery et al (2005) found that 25% of parents recognised overweight in their child, while Huang et al (2007) found that 30% of parents of overweight children identified their child’s weight status correctly.

In a cross-sectional survey, Eckstein et al (2006) used parental self-reported verbal responses and selection of a bodily image that most closely matched their child’s body image from gender and age-range specific panels of sketches in order to study the perceptions of parents about their child’s weight. Seven sketches were provided for boys and a similar panel of sketches for girls. The middle image in each series of sketches was developed to represent a child at the 50th BMI percentile. The other sketches were not tied to particular BMI percentiles, limiting accuracy of visual perception. Eligibility criteria included being a parent or a guardian accompanying a child of an age in the age range of 2-17 years old for a well-child visit in one of 7
peadiatric clinics in Chicago. No information was given on the sampling procedure of the peadiatric clinics. Test-retest reliability of the tools testing parental verbal and visual perceptions of child’s weight was assessed for 24 parents on 2 occasions separated by only 1 to 3 days. Percentage agreement between test and retest responses for word perception of child’s weight was 96% and for sketch selection was 91.7%.

Among 499 parents/guardians who accompanied a child aged 2 to 17 years old to peadiartic clinics, 396 (79%) completed the survey questionnaire, and for 261 (52%) of these, the child’s height and weight were measured at the visit. The other 153 parent/child pairs were not present for a routine check-up and so they were excluded from the study. Among the 261 parent/child pairs with a survey questionnaire and child growth measurements, 38 were excluded due to medical conditions or incomplete survey responses. Hence, findings were based on 223 parent/child pairs. Eighty-seven percent of respondents were mothers, 11% fathers and 2% other relationship. Children of more highly educated parents were less likely to be overweight, and boys were more likely to be overweight than girls. Findings demonstrated that few parents (36%) identified their overweight child as ‘overweight’ using words, but more parents (70%) selected a middle or heavier sketch.

A couple of studies looked at perceptions of parents of adolescents and have in general found higher levels of accurate perceptions than other studies looking at smaller age groups. Goodman et al (2000) and Boutelle et al (2004) assessed parents’ perceptions of their adolescent’s weight. Goodman et al (2000) used readily available weighted data from the American Longitudinal Study of Adolescent Health. Findings indicate that 60.6% of persistently obese adolescents were correctly identified by their parents. Boutelle et al (2004) evaluated the accuracy of only maternal perceptions and found similar accurate perceptions amongst 60% of her sample. However, common underestimates of adolescents’ weight status were implied (35%).

Moreover, parents’ perceptions of their child’s weight status were studied among different ethnic groups. Young-Hyman et al (2000) discovered that despite the fact that a substantial number of 5-11 year-old children were obese (69%) in their study, only 44% of African-American caregivers perceived the child’s weight to be a potential health problem. However, response rate for this study was 6% (111 out of 1750 families). In another small survey of Mexican-American mothers and their 6-12 year-old children (Olvera et al, 2005), evidence suggests that mothers were able to
accurately assess their child's weight, but they viewed their daughters' BMI as ideal despite the fact that 33% of girls studied were overweight. In their study among American tribes, Adams et al (2005) found that caregivers recognised only 15.1% of overweight children. This may indicate that parents from these ethnic groups may have a more acceptable view of childhood obesity. Moreover, studies, including either parent as a potential respondent, usually had a low response rate from fathers prohibiting comparison of findings between mothers and fathers. Adams et al (2005) recommended further studies to examine fathers' perceptions as fathers, who participated in their study, did not recognise their child's overweight problem.

Although the majority of studies used a cross-sectional survey design, two studies used a focus group approach to determine low-income mothers' perceptions of child feeding and obesity among their preschool children (Jain et al, 2001; Baughcum et al, 1998). In both studies, mothers believed that child overweight is a marker of child health and successful parenting. They also believed that overweight children often grow out of being overweight. Mothers who participated in Baughcum et al's study (1998) often relied on their mothers, that is, the child's grandmother, as their main source of information about child feeding. In the study conducted by Jain et al (2001), mothers were more likely to recognise their child's overweight status when children were teased about their weight or when they developed limitations in their physical activity. Hence, it was recommended that the best approach to preventing childhood obesity may be to focus more on improving general parenting skills and less on discussing the child's growth (Jain et al, 2001). It was also suggested that interventions aimed at altering child-feeding practices should include education of grandmothers (Baughcum et al, 2000).

In summary, evidence shows that parents are poor at identifying overweight in their children. This was found amongst studies carried out in different countries, different ethnic groups and with parents of children from different age groups. Level of parental misperception of their child's weight varied from one study to another. This may be due to different sample sizes or different criteria used for defining child overweight. Any efforts to prevent childhood obesity must consider parents' attitudes about their child's weight and childhood obesity.
<table>
<thead>
<tr>
<th>Researchers</th>
<th>Sample, Sampling method &amp; Response rate</th>
<th>Research Design/Tool</th>
<th>Major Findings</th>
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</table>
| Baughcum et al (1998) | A convenient sample of 14 low-income mothers with young children (12-36 months of age).                  | Focus groups.                                             | 1. Mothers believed it was better to have a heavy infant – best marker of child health and successful parenting.  
2. They feared their infants were not getting enough to eat – introduced solid foods before recommended ages.  
3. They used food to shape their children’s behaviours.                                                                                     |
|                      | Northern Kentucky Health District, United States of America (USA).                                        |                                                            |                                                                                                                                                                                                                |
|                      | Information on sampling frame and response rate (RR) was not included.                                    |                                                            |                                                                                                                                                                                                                |
|                      | Maternal feeding practices and childhood obesity.                                                          |                                                            |                                                                                                                                                                                                                |
| Baughcum et al (2000) | All low-income mothers with young children (23-60 months of age) in the Special Supplemental Nutrition Programme for Women, Infants and Children (WIC). | Cross-sectional survey.                                   | 1. Among mothers of 99 OW children, only 21% believed that their child was OW.  
2. Low maternal education was the only factor associated with a failure to perceive the child as OW (p=0.010).                                                                 |
<p>|                      | Northern Kentucky and Ohio Health Districts, USA.                                                         | Self-administered questionnaire (pilot tested, but no test-retest reliability assessed).               |                                                                                                                                                                                                                |
|                      | N=622; RR: 98%.                                                                                           | Direct measurement of children’s height and weight to calculate BMI.                                    |                                                                                                                                                                                                                |
|                      | Maternal self-reported height and weight.                                                                 |                                                            |                                                                                                                                                                                                                |</p>
<table>
<thead>
<tr>
<th>Researchers</th>
<th>Sample, Sampling method &amp; Response rate</th>
<th>Research Design/Tool</th>
<th>Major Findings</th>
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<tr>
<td><strong>Goodman et al (2000)</strong></td>
<td>15483 Baseline (T1) teenager and parental interviews from the National Longitudinal Study of Adolescent Health in USA. 74% Of teens re-interviewed 1 year later (T2).</td>
<td>Weighted data from the American National Longitudinal Study of Adolescent Health. BMI was calculated from both self-reported weight and height at T1 and T2 and from measured height and weight at T2.</td>
<td>1. 60.6% Of persistently OB teens were identified by parent report and 28.8% by teen report. 2. Over 1/3 were not identified by teen or parental report. 3. Using BMI based on self-reported measurements correctly classified 96% of teenagers’ weight status. 4. Low parental education and lower household income were significantly associated with misclassification.</td>
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<td><strong>Young-Hyman et al (2000)</strong></td>
<td>111 African American caregiver/child pairs (child’s age: 5-11 years). Caregivers included mothers (62%), fathers (5%), mothers and fathers (12%), grandmothers (14%) and others (7%). RR: 6% of 1750 families who were invited to participate through recruitment letters.</td>
<td>Children’s physical examinations. Family health history. Face-to-face standardised interviews.</td>
<td>1. A substantial number of children were OB (69%). 2. Only 44% of caregivers perceived the child’s weight to be a potential health problem. 3. Socioeconomic status was not related to caregiver perception of child’s weight. 4. 21% of variance in caregiver perception was predicted by child age, BMI, perception of frame size and perception of exercise habits.</td>
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25 | Table 2.1: Parents' Perceptions of their Child's Weight (in chronological sequence) | Compiled by the author |
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<tr>
<th>Researchers</th>
<th>Sample, Sampling method &amp; Response rate</th>
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<tr>
<td>Jain et al (2001)</td>
<td>18 Out of 30 mostly black low-income mothers of overweight children (mean age of 44 months) agreed to participate from a clinic of the Ohio WIC.</td>
<td>Focus groups. Direct measurements of children's height and weight to calculate BMI. Maternal self-reported height and weight.</td>
<td>1. Mothers did not define OW in their children according to standard growth charts. 2. They considered being teased about weight or developing limitations in physical activity as indicators of child OW. 3. They believed that an inherited tendency to be OW was likely to be expressed in the child regardless of environmental factors.</td>
</tr>
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<td>Wake et al (2002)</td>
<td>A stratified two-stage random cluster sample of 24 primary schools in Australia. 2863 Children aged 5-13 years and their parents participated in the study. RR: 75%</td>
<td>Cross-sectional population survey. Parental questionnaire. Parent self-reported height and weight. Children's BMI (directly measured).</td>
<td>1. 42% of parents with OB children and 81% with OW children did not report concern about their child's weight. 2. Concern was not related to child gender, parental BMI or parental education after controlling for child BMI.</td>
</tr>
<tr>
<td>Etelson et al (2003)</td>
<td>All 91 parents with children of age 4-8 years old, attending well-care visits at a private paediatric faculty practice located in New York, were invited to participate. 83 Parent/child pairs participated (RR: 91%).</td>
<td>Cross-sectional survey. Anonymous self-administered questionnaire. Direct measurements of children’s weight and height to calculate BMI.</td>
<td>1. 23% of children were overweight. 2. Only 10.5% of parents of OW children perceived their child’s weight accurately compared with 59.4% of parents of children with normal weight.</td>
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26 | Table 2.1: *Parents' Perceptions of their Child's Weight* (in chronological sequence) | Compiled by the author
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| Maynard et al (2003)         | Data from the Third National Health and Nutrition Examination Survey (1988-1994). 5500 Children (aged 2-11 years) with maternal interview data, who were residents in the USA. | Home interview. Children’s physical examination.                                        | 1. 66.7% of mothers correctly classified their OW children correctly.  
2. 32.1% of mothers of an OW child classified their child as at ‘about the right weight’.  
3. Daughters, older children, children with higher BMI and children with mothers who had lower BMI values all had greater odds that their mother would classify them as OW. |
2. Underestimates were common (35%).  
3. Mothers were more likely to overestimate their daughter’s than their son’s weight status.  
4. OW mothers were more likely to underestimate their adolescent’s weight. |
| Adams et al (2005)           | 425 Kindergarten-through-second grade children from 3 Wisconsin tribes were screened, but only 366 had corresponding caregiver surveys.  
74.1% Of caregiver information was completed by mothers, 9.7% by grandmothers, 8.6% by fathers and 7.6% by other guardians.  
Sampling method was not mentioned. | Child health screenings. Caregiver surveys. The study was field-tested and slight modifications were made subsequently. | 1. 26% of children were OW and 19% were at risk for being OW.  
2. Caregivers recognised only 15.1% of OW children.  
3. Children’s gender and age, and parental education level were not significant predictors for caregiver recognition of an OW child.  
4. No significant difference in weight perception between younger and older children, or boys and girls was found. |
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<tr>
<td>Carnell et al (2005)</td>
<td>A large population of parents and their 3-5 year old children from state-funded primary schools in outer</td>
<td>Cross-sectional survey. Parental</td>
<td>1. Although 145 children were classified as OW or OB, only 6% of their parents described them as 'overweight'.</td>
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<td></td>
<td>London.</td>
<td>questionnaire.</td>
<td>2. Odds of accurate classification were increased for heavier children, but were not associated with parental weight or other demographic factors.</td>
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<td>N=1082; RR: 52%.</td>
<td>Parent self-reported height and</td>
<td>3. 62% of parents expressed concern about their OW child becoming OW in the future.</td>
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<tr>
<td></td>
<td></td>
<td>weight.</td>
<td>4. Odds of concern were progressively higher for heavier children and for parents who were themselves OW or OB.</td>
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<td></td>
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<td>Children’s BMI (directly measured).</td>
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<td></td>
<td>Sampling method was not mentioned.</td>
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<tr>
<td>Jeffery et al (2005)</td>
<td>277 Healthy randomly recruited children (mean age 7.4 years) and their parents from the EarlyBird study</td>
<td>Cross-sectional survey. Parental</td>
<td>1. 19% of children, 52% of mothers and 72% of fathers were OW.</td>
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<td></td>
<td>performed in the UK.</td>
<td>questionnaire.</td>
<td>2. Only ¼ of parents recognised OW in their children.</td>
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<td>Parent self-reported height and</td>
<td>3. Parents were less likely to identify OW in sons than daughters.</td>
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<td></td>
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<td>weight.</td>
<td>4. More mothers than fathers correctly assessed their child’s weight.</td>
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<td></td>
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<td>Parents’ and children’s height and</td>
<td>5. No significant difference in correct perception between socioeconomic groups.</td>
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<td>weight actual measurements.</td>
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28 | Table 2.1: Parents’ Perceptions of their Child’s Weight (in chronological sequence) 

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<tr>
<td>Olvera et al (2005)</td>
<td>80 Mexican-American mothers and their 6-12-year old children, who were part of a 4-year longitudinal study. Sampling frame, sampling method and RR were not mentioned.</td>
<td>Cross-sectional survey. Pictorial instrument to assess actual and ideal body size. Maternal and child height and weight. Home interview.</td>
<td>1. 79% of the mothers were OW.  2. 32% of boys and 34% of girls were OW or at risk for OW.  3. Mothers perceived their daughters’ BMI as ideal, despite the fact that 34% of the girls studied were OW.</td>
</tr>
<tr>
<td>Campbell et al (2006)</td>
<td>402 Mother/child pairs were invited to participate who took part in an earlier longitudinal study in Australia. N=402; RR: 85%.</td>
<td>Cross-sectional survey. Parental questionnaire. Children’s BMI (directly measured).</td>
<td>1. Prevalence of child OW and OBY was 19%.  2. Only 5% of mothers reported concern that their child was currently OW.  3. Concern that a child would become OW in the future was reported by 16% of mothers.  4. OW daughters were more likely to elicit maternal concern about current weight than OW sons.</td>
</tr>
<tr>
<td>Eckstein et al (2006)</td>
<td>All 499 parents/guardians who accompanied a child (aged 2-17 years) to 7 paediatric clinics in Chicago were invited to participate. 396 parents completed the survey and for 261 of these, the child’s weight and height were measured. RR: 50%.</td>
<td>Cross-sectional survey. Parental questionnaire, including a pictorial instrument. Children’s BMI (directly measured).</td>
<td>1. 87% of respondents were the mother.  2. 19% of the children were at risk for OW and 20% were OW.  3. Children of more highly educated parents were less likely to be OW.  4. Few parents (36%) identified their OW child as OW, but 70% selected a middle or heavier sketch.  5. Parents of children older than 5 years were more likely than parents of younger children to be worried about their child’s weight.</td>
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29 | Table 2.1: Parents’ Perceptions of their Child’s Weight (in chronological sequence) | Compiled by the author
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<tr>
<td>Hirschler et al (2006)</td>
<td>321 Mother/child pairs from kindergarten schools belonging to low socioeconomic class in Argentina. Sampling frame, sampling method and RR were not mentioned.</td>
<td>Cross-sectional survey. Parental questionnaire. Children’s BMI (directly measured).</td>
<td>6. Parents of older children were more likely to be worried about their child’s weight if they perceived their child’s weight as less active than other children, recalled a doctor’s concern, or recognised their child as OW using words.</td>
</tr>
<tr>
<td>Huang et al (2007)</td>
<td>All 1098 parents of children ≤18 years of age attending paediatric clinics in California. RR was not stated.</td>
<td>Cross-sectional survey. Parental questionnaire to identify parental classification of children’s weight status. Parent and child’s measured weight and height.</td>
<td>1. A significant difference in the proportion of distorted perception of child weight between mothers of normal weight versus OW children. 2. Among mothers of 59 OW children, only 23.7% (n=14) perceived their OW child as OW. 3. Parents who were of normal weight, had children larger than 4 years of age, and had received more than high school education were more likely than comparison parents to correctly identify the weight status of their child. 4. 61% of parents correctly identified their own child’s weight status. 5. Among parents of OW children, 30% correctly identified their child’s weight status. 6. Parents who were of normal weight, had children larger than 4 years of age, and had received more than high school education were more likely than comparison parents to correctly identify the weight status of their child.</td>
</tr>
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2.6.2 Adolescents' perceptions of their own weight

In addition to parents’ perceptions of adolescents’ weight, Goodman et al (2000) also determined adolescents’ perceptions of their own weight through parent and adolescent interviews, and adolescent weight and height measurements. Before the measurements, adolescents self-reported their weight and height so as to assess accuracy of their knowledge about their weight status. Data on adolescent age were not provided in the study’s report. Findings revealed that only 28.8% of obese adolescents classified their weight correctly in comparison to 60.6% of their parents. Over 33% of obese adolescents were not identified by parent or adolescent report. Therefore, parental report is a better indicator of obesity than teen report of weight status, but parental and teen reports are both poor predictors of adolescent obesity. However, in spite of a comprehensive dataset (n=15483), it was school-based and does not include out-of-school youth or school-avoidant youth.

2.6.3 Parents’ concerns about their child’s weight

An essential step before entering a treatment programme that applies strategies to accomplish behavior change is to recognise the problem which is the focus of the treatment, in this case childhood obesity. Recognition of the problem may facilitate the development of the degree of concern that will motivate behavior change as inferred by the Health Belief Model. In Eckstein et al’s (2006) sample, few parents of overweight children felt that their child was overweight, and even fewer parents were worried about their child’s weight. However, those who recognised their child as overweight were more likely to be concerned. This predicts difficulty with recruiting families into treatment programmes for child overweight and achieving behaviour change in response to counseling on child overweight conditions.

One ray of hope is the association between parental recognition of or concern about their child’s overweight status and parents’ recall that their child’s doctor had told them that their child is gaining weight too fast or is overweight. With heightened national concerns about obesity, parents will also receive similar messages, although not personalised, through the media. This indicates the importance of cues to action to facilitate behavior change as suggested by the Health Belief Model. Given the strong relationship between parental recognition and concern about their child’s overweight
status, ways to foster an accurate perception of their child’s weight status should be developed and tested (Eckstein et al, 2006). It was also highlighted by Eckstein et al (2006) that this link between perception and level of concern for the parent is a new finding and merits additional investigation using larger samples of parents. Ways of how health professionals can heighten parental awareness and concern need to be examined.

Participants (n=18) having an overweight child who was between 26 and 52 months old in Jain et al’s (2001) study did not feel worried about their child’s weight. In a study in Australia, findings showed that 42% of parents with obese children aged 5-13 years and 81% with overweight children did not report concern about their child’s weight (Wake et al, 2002). The observation that many parents of overweight children may neither recognise nor feel concerned about a child’s weight problems may suggest that many parents may also not perceive an impact on their child’s health and well-being. However, both these studies did not test the significance of the relationship between parental perceptions of and concerns about their child’s weight.

In a cross-sectional study concerning caregiver’s recognition of childhood overweight, participants were more concerned about their child developing diabetes or cardiovascular disease in the future than about their children’s risk of being overweight (Adams et al, 2005). Only caregivers who were diabetic themselves made a connection between child weight and future risk of obesity-related disease. This reveals lack of caregivers’ knowledge of the association between childhood obesity and morbidity, rendering childhood obesity as trivial and lowering the possibility of behaviour change. This line of thinking is supported by the Health Belief Model.

Although parents of overweight children may not feel concerned about their child’s current weight, they may express concern about their child becoming overweight in the future. This may be due to the fact that they do not perceive obesity-related disease as imminent. In Australia, a cross-sectional community-based cohort study including preschool children’s BMI and parent questionnaire (Campbell et al, 2006) revealed that the prevalence of overweight or obesity among this cohort of children was 19%. Only 5% of mothers of overweight children reported concern that their child was currently overweight. Concern that a child would become overweight in the future was reported.
by 16% of mothers, over three times more often than concern about a child’s current weight.

However, recognition of a problem does not necessarily result into concern, especially if the condition is not perceived as serious. In Hischler et al’s (2006) study, only few mothers were worried about their child’s weight even though they identified their child as overweight. Low levels of concern across studies may reflect denial, a reluctance to admit that their child is overweight particularly in the context of a parental feeding survey, or a lack of understanding of what overweight means. Parents may also fear labelling their children as overweight. Alternatively, parents may hold distorted perceptions unique to their child, while still being capable of recognising overweight in other children (Carnell et al, 2005). The increasing prevalence of child overweight may have ‘normalised’ this condition and contributed to the inability of parents to recognise when their own child is overweight. The layperson’s perception of average weight, however, now conflicts with the clinical definition of normal weight, and a detection of overweight from a health professional may be insufficient motivation for a change in lifestyle.

2.6.4 Determinants of parental perceptions

Several studies examining parents’ perception of their child’s weight and level of concern also tested for determining factors of these perceptions. Having insight into such determinants may substantiate knowledge of the means by which parental recognition of childhood overweight may be improved.

In Baughcum et al (2000), low maternal education was the only factor associated with a failure to perceive the child as overweight. Similarly, lower parental education and lower household income were significantly associated with adolescent’s weight misclassification in Goodman et al (2000). Huang et al (2007) also found that parents who had received more than high school education were more likely to correctly identify the weight status of their children. However, this finding is not consistent across studies. Adams et al (2005) showed that parental education level was not a significant predictor for caregiver recognition of an overweight child. This might result from the fact that caregivers filling out the questionnaire were not asked their specific
education level, but they were asked only the highest grade that any adult in the household completed.

Older children were more likely to have parents who would report them as overweight (Huang et al, 2007; Maynard et al, 2003). However, in Adams et al (2005), child’s age was not a significant predictor for caregiver recognition of an overweight child. This may be due to the fact that the oldest children in Adams et al’s sample were 8.5 years old which is younger than the oldest children who participated in Huang et al (2007) and Maynard et al’s (2003) study with the oldest children being 18 years and 11 years respectively. Adams et al used a smaller sample (n=366) than Huang et al (2007) (n=1098) and Maynard et al (2003) (n=5500). In addition, children with higher BMI were more likely to be identified as overweight by their parents (Adams et al, 2005; Maynard et al, 2003). Studies also found that parents who were of normal weight were more likely to correctly identify the weight status of their children (Huang et al, 2007; Maynard et al, 2003).

In addition to these determinants, Young-Hyman et al (2000) identified caregiver perception of the child’s decreasing exercise ability as a significant influencing factor. Likewise, Eckstein et al (2006) reported that parents of older children were more likely to be worried about their child’s weight if they perceived their child as less active/slower than other children. Moreover, grandmothers were significantly more likely than mothers to perceive an overweight child’s as overweight (p <0.003) (Adams et al, 2005).

Boutelle et al (2004) identified that mothers were more likely to overestimate their daughters’ weight status than their sons’ weight. This finding was reported in other studies as well (Campbell et al, 2006; Jeffery et al, 2005; Maynard et al, 2003) and seems to reflect social values. Mothers may be more sensitive to weight and body image issues for girls, while larger boys may be seen as having a physical advantage. In contrast, Adams et al (2005) and Wake et al (2002) did not find a significant correlation between parental concern and child gender. This contrast may be due to the fact that the studies that did not find a significant correlation recruited participants from one specific ethnic group, whereas the other studies included participants from a wide variety of ethnic groups.

Interestingly, Eckstein et al (2006) reported that parents of older children were more likely to be worried about their child’s weight if they recognised their child as
overweight using words or having a family history of at least one illness related to diet, low physical activity or obesity. The Health Belief Model includes framing counselling in the context of the perceived recognition of the consequences of the health behavior such as a family history of diseases related to diet, low physical activity or obesity.

2.7 Local Research

Local research, which was conducted in the arena of childhood obesity, concerns prevalence of eating and physical activity habits among children and adults, and childhood overweight. The studies include a national adult health survey, a World Health Organisation (WHO) cross-national study including Malta, a national study concerning children’s BMI, a couple of post-graduate studies and a doctorate study. These provide an insight into local statistics and prevalence regarding the health behaviours of Maltese adults and children.

Malta implemented its First National Health Interview Survey in 2002 to investigate health behaviours of the Maltese adult population aged 16 years and over (N=5500) (Department of Health Information [DHI], 2003). The sample was drawn from a population register and was stratified by age, gender and locality. Internationally accepted and validated questionnaire techniques as recommended by international bodies including the WHO and the Statistical Office of the European Communities were used after being adapted to the local situation (DHI, 2003). Findings indicate that only 18% of male and 11% of female participants engaged in regular exercise at least once weekly, while 6.68% and 8.43% never consumed vegetables or fresh fruit respectively. Lifestyle-related morbidity was quite high in Malta with 14% of respondents suffering from diabetes, 34% from hypertension and 18% having hypercholesterolaemia. This survey provides an overview of lifestyle habits and related morbidity in the Maltese Islands and may indicate the home environment in which Maltese children are growing.

Another behaviour oriented survey was the WHO collaborative cross-national study, Health Behaviour in School-Aged Children (HBSC) 2001/2 conducted in 35 countries in the WHO European Region and North America, including Malta, with the aim of examining how children’s behaviour marks their health (Currie et al, 2004). A clustered convenient sampling design from schools was used with over 162,000 young people
aged 11, 13 and 15 years filling a self-administered questionnaire. Results showed that only 34% of respondents participated in at least one hour of moderate physical activity at least five days a week in almost every country. Malta was among the top countries having a high percentage of young people who have sedentary lifestyles such as watching television, high level computer usage and spending long hours on homework. Moreover, Malta had one of the highest daily consumption of sweets and soft-drinks among countries in the survey, with a level of 40% of participants. Data presented on overweight were derived from self-reported height and weight information, not from actual measurements, and so need to be treated with some caution. The percentage of 13 to 15-year-old boys and girls who are overweight or obese ranged from 3% to 35% across countries. Malta was amongst the countries having the highest rates with 34%. However, the sample size of Malta was small compared to other countries. The survey encompassed many different schooling systems and many cultures and languages and the method of survey administration also varied within and between countries. School attendance may vary, which has the potential to introduce bias into the findings.

In a large-scale study in partial fulfillment of Doctorate in Philosophy, Piscopo (2004) used a grounded approach to explore the various influences on the food choices and behaviours of a stratified proportionate sample of 7 to 8-year-old Maltese children (N=1088) and their parents (N=932). Data collection tools included a parental questionnaire with a very high response rate (89%), follow-up focus group interviews with children (N=16 groups) and telephone interviews with parents (N=30). Findings showed that the main influences on children's food intake and choices included the mother, grandparents, type of school, the culture and cuisine, and TV food portrayal and messages. For example, children attending private schools consumed processed foods more often and also ate weekday supper with their family less frequently than other groups. Children from the rural island of Gozo seemed to place greater value on the quality and freshness of food and ate their weekday supper with their family more frequently. Moreover, grandparents emerged as having an important role in exposing children to traditional cuisine. Parents also felt that TV food portrayal was a strong influence on their children's food requests, as was to a lesser extent modelling of food behaviours by peers.

Apart from behavior-based studies, local research also includes prevalence studies of childhood obesity. The first prevalence study was carried out in 1997 by Buttigieg. This small survey focused on obesity in 3-year-old Maltese children in a randomly selected
sample of 200 children who were registered at the Malta Public Registry, excluding those born in Gozo. Parents were asked to self-report their own height and weight and to take their children to the well-baby clinic in Floriana Health Centre to have their height and weight measured. As response rate was 66%, Buttigieg recruited the remaining 34% from a replacement sample to achieve the desired 200 parent/child pairs. This might have introduced bias in the results of the study, as non-respondents might have had different features from respondents. Results showed that childhood overweight and obesity were prevalent among 3-yr-old children (26% and 12.5% respectively). In this study, child overweight was considered as more than the 75th weight-for-height percentile, and obesity as more than the 97th percentile. The high prevalence of parental obesity confirms earlier studies on adult obesity in Malta (16.5% of mothers and 21% of fathers). No associations were derived between parental and childhood obesity.

A later cross-sectional study was aimed to establish the distribution of BMI in a population of healthy Maltese children at the ages of 6 and 10 years in primary schools (Baluci, 2000). Standardised weight and height were obtained for 388 6-year-olds and 577 10-year-olds (n=965). This random sample was recruited from 12 government and 3 Church-administered schools (N=1000), which the researcher routinely visited in the course of her duties. This limits generalisability of results to the primary school population. At 6 years of age, the differences in BMI between the genders were not statistically significant. At the older age group, girls were significantly heavier than boys and had a significantly higher BMI. The study showed that 34% of children (15.3% of boys and 18.7% of girls) at the age of 6 years and 44% of children (19.9% of boys and 24.1% of girls) at the age of 10 years in this population were overweight.

The most recent prevalence study was performed by Grech and Sant’Angelo (awaiting publication). They carried out a population study to measure height and weight for all Maltese children (n=3461) entering the first year of primary schools in 2007 (mean age: 5.8 years). Children who were recently adopted or refugees or had clinical diagnoses that were likely to affect growth were excluded. Measurements were performed with portable stadiometres and digital scales during the medical examination at school entry. Based on the IOTF criteria, over 25% of Maltese school-entry children were found to be overweight or obese. Stricter Centres for Disease Control and Prevention (CDC) criteria classified 33% as overweight or obese. This prevalence was similar to that found by Baluci (2000) for 6-year-old children. Regional analysis found a higher BMI
in the less affluent southern part of Malta ($p = 0.0008$). These results were similar to the HBSC findings for Malta. Grech and Sant'Angelo (awaiting publication) attributed the regional differences to a potentially lower level of education with regard to the consequences of obesity in the less affluent southern part of the island, as well as major differences in lifestyle adopted in this area. It was estimated that obesity will eventually cost Malta 33 million Maltese Liri/70 million Euros per annum. These results emphasised the need for studying parental perceptions regarding their child’s weight as the first step in decreasing childhood obesity.

These studies give an overview of the Maltese population’s lifestyle and prevalence of childhood overweight/obesity. However, no study focused on Maltese parents’ perceptions and level of concern on their child’s weight. Hence, it is due to explore this area in order to provide appropriate data to formulate culture-sensitive childhood obesity prevention/treatment programmes. Prevention and treatment of childhood obesity will help reduce the likelihood of diseases which have long been recognised as major health problems in the Maltese Islands, namely coronary heart disease, diabetes, and hypertension (Ministry of Health, n.d.).

### 2.8 Conclusion

This literature review has critically analysed research on defining child overweight and obesity and the health consequences of childhood obesity in its first section. Another section looked at research on parental influence on their child’s eating and physical activity behaviour. The most important section of this literature review concerns research carried out to examine parents’ perceptions of their child’s weight status and also includes research on parents’ concern about their child’s weight. Determinants of parental recognition of their child’s weight were addressed as well. In addition, an overview of local research on the subject area of child overweight was presented.

#### 2.8.1 A general overview of the findings

Childhood obesity is a serious public health problem. Childhood has been proposed as a critical period for the development of overweight and obesity with subsequent morbidity and mortality in both childhood and adulthood (Whitaker et al, 1998).
Research shows that parents play a critical role in structuring children’s early eating and exercise environments, which in turn affect their weight status (Hodges, 2003; Birch & Fisher, 1998). However, evidence about parental influence on children’s eating and physical activity behaviours has been conflicting. This may be due to different researchers using different sample sizes, different age ranges of children and different methodological tools. These findings hint at the necessity of understanding parents’ perceptions regarding their child’s weight.

The international settings of parents’ perceptions studies ranging from Europe to Australia to the US, delivered evidence from a wide perspective. The size of the samples varied from 18 parent/child pairs in focus group studies to about 15500 parent/child pairs in population studies. The majority of findings reveal low parental perception of their child’s overweight status, which may be linked to a low level of concern about such an overweight status. This foretells difficulty with recruiting families into treatment programmes for child overweight and achieving behaviour changes in response to counselling on child overweight conditions. Parental visual perceptions of their child’s weight were found to be more accurate than parental verbal perceptions. Various independent variables have been found to influence parents’ perceptions of their child’s weight. Determining these variables can help health professionals understand better the process of parents’ perceptions of their child’s weight and may offer a promising way of how to help parents perceive their child’s overweight status. This may be the first step in recognising childhood obesity and may, therefore, help stimulate parents to seek advice and treatment for their child’s overweight problem.

2.8.2 Limitations of the research studies

Similar to studies on parental influence on children’s eating and physical activity habit, most studies concerning parental perceptions of their child’s weight recruited mostly mothers and preschool children as participants. The mother is considered the main contributor to children’s contextual environment and preschool children are more likely to be influenced by their parents and home environment. However, this limits generalisation of findings to fathers who nowadays may share childcare with their working female partner, and older children.
A number of studies are also limited by recruiting participants from a particular ethnic group, restricting generalisation of findings to that particular group. All studies measured children’s height and weight measurements and included parental verbal responses in a self-administered questionnaire. Only one study (Eckstein et al, 2006) used gender and age range specific sketches to determine whether parents are better at identifying their child’s correct weight using pictures rather than words. Few studies were based on random sampling, while most studies used convenient sampling from schools or paediatric offices. Some studies did not specify their sampling method, sampling frame and/or response rate. Two studies analysed readily available data from large surveys (Maynard et al, 2003; Goodman et al, 2000). Sample sizes ranged from a small number of parents in focus groups and from hundreds to thousands of parent/child pairs in surveys. Studies with small sample sizes were restricted in terms of statistical analysis of findings, such as not performing regression analysis to determine influential variables of parents’ perceptions and concern.

In addition, the majority of studies were cross-sectional in nature, reducing the ability to determine causal relationships between parents’ perceptions of children’s weight status and parents’ concerns about their child’s weight and whether changes in parental perceptions may influence a child’s weight status. Moreover, the cross-sectional approach of most studies has reduced the ability of research to determine the long-term consequences of childhood obesity. Finally, few studies adopted a qualitative design. This may hinder exploration of the rationale derived from quantitative data.

The differences between the findings of the studies on parental perceptions of their child’s weight may be attributable to variations in sampling methods, the type of indices used to define weight status, the BMI-for-age cut-off points selected to define levels of weight status, the terminology used to describe weight status, and the age range of children studied. The following chapter explains the methodology utilised for this study, which adopted a cross-sectional quantitative approach.
CHAPTER 3

Methodology
Chapter 3 Methodology

3.1 Introduction

This chapter presents the plan, design and conduction of the study which was carried out on a sample of 5 to 6-year old children, attending state primary schools, and their Maltese parents. The research design involved a quantitative cross-sectional survey using parental questionnaires to collect data on parents’ perceptions and concerns regarding their child’s weight. Data collection also included measurement of children’s body mass index (BMI).

3.2 Aim and Objectives

The aim of this study was to examine factors related to Maltese parents’ perceptions and concerns about their child’s weight.

In order to achieve the aim of this study, the following objectives were determined:

1. To identify parents’ perceptions of their child’s weight in verbal and visual terms.

2. To assess parents’ concerns about their child’s weight.

3. To calculate children’s body mass index, and compare it to their parents’ perceptions of their child’s weight.

4. To determine associations between parental perceptions/concerns about their child’s weight and the following attributes:
   a. Demographic characteristics,
   b. Parental recall of the doctor’s concern about their child’s weight,
   c. Parents’ perception of their child’s physical activity/ability compared with that of other children,
   d. Parents’ perceptions regarding childhood obesity, and
   e. Family illness related to obesity, dietary practices or low levels of physical activity.
3.3 Operational Definitions

For the purpose of this research, these terms are defined as follows:

**Maltese parent** – A schoolchild’s mother, father or legal guardian, who was a citizen of the Maltese Islands at the time of data collection.

**Perception** – An attitude or understanding based on what is observed or thought (Encarta Dictionary, 2007) as measured by the questionnaire used in this study. Verbal perception referred to participants’ selection of a statement that best described their child’s weight, while visual perception referred to participants’ choice of a sketch that best represented their child’s physical stature.

**Concern** – A feeling of worry, compassion, sympathy, or regard for somebody (Encarta Dictionary, 2007). In this study, concern referred to parents’ level of worry about their child’s weight at the time of data collection as well as about their child’s future weight.

**Child** – Schoolchildren referred to those who at the time of data collection were attending Year 1 in a state primary school.

3.4 Research Design

A quantitative cross-sectional research design was adopted for this study to identify the prevalence of Maltese parents’ correct perceptions of their child’s weight. Moreover, a quantitative cross-sectional design made it possible to gather a whole general picture of the situation at one point in time, in this case, a general overview of parents’ perceptions of and concerns about their child’s weight at the time of data collection. An exploratory survey design was utilised to address the aim and objectives of the study because surveys obtain information from populations regarding the prevalence, distribution and interrelations of variables (Polit, Beck, & Hungler, 2001).

However, a qualitative research design would have been also appropriate to examine parents’ perceptions of and concerns about their child’s weight and the actual rationale for such perceptions and concerns. Such a design would have resulted in a deeper understanding of such issues but would not have enabled the identification of the prevalence of Maltese parents’ correct perceptions of and concerns about their child’s weight.
Chapter 3 Methodology

3.5 Target Population and Sampling Technique

A population is defined as the whole set of individuals having some common defining characteristic and to which the results of the study can be generalised, while the sample is a subset of the population selected to participate in a study (Polit et al, 2001). In this study, the target population consisted of children who attended Year 1 in state primary schools in the Maltese Islands during scholastic year 2007/8 and their Maltese parents. This population of schoolchildren is presented in Table 3.1.

Table 3.1

Year 1 students in state primary schools during data collection (Department of Education, 2007)

<table>
<thead>
<tr>
<th>Locality</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gozo</td>
<td>114</td>
<td>108</td>
<td>222</td>
</tr>
<tr>
<td>Malta</td>
<td>1294</td>
<td>1137</td>
<td>2431</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1408</strong></td>
<td><strong>1245</strong></td>
<td><strong>2653</strong></td>
</tr>
</tbody>
</table>

(Figures may include some children of foreign parents)

Recruitment of the sample was based on the following eligibility criteria.

3.5.1 Inclusion criteria

a. Children attending state primary schools.
b. Children in Year 1 who were 5 to 6 years old at data collection.
c. Children who did not have a chronic medical illness affecting appetite or growth.
d. Participating parent/guardian should be of Maltese origin.
The sample was chosen from state primary schools as they represent the largest school population in the Maltese Islands and cater for all socioeconomic classes. Only Maltese parents were included in this study as the Maltese population may have different culture, lifestyle habits and perceptions regarding food, exercise and obesity than other ethnic groups living in Malta. Moreover, the number of foreign parents having 5 to 6-year-old children may be small, rendering comparisons between foreign and local participants difficult. However, this did not exclude parents who might have obtained Maltese citizenship a short while before conduction of the study. Hence, some minor 'contamination' of results could not be completely excluded. Participation was determined according to parents' nationality since literature shows that parents play a key role in shaping their children's eating and physical activity habits. Inclusion criteria (b), (c) and (d) were confirmed on collection of the questionnaires.

3.5.2 Sample size

One of the aims of this study was to identify differences between perceptions of Maltese parents. As suggested by Cohen (1992), a power of 0.80 was set as target to be achieved by statistical tests and the significance criterion (\( \alpha \)) was set at 0.05 so that differences would be detected in case a small population effect size was present. In order to detect small differences between means at power 0.80 and \( \alpha \) 0.05, a sample size of 390 parent/child pairs would be desirable.

According to the Malta National Statistics Office guidelines (2006) for Census purposes, the Maltese Archipelago consists of 6 geographic regions, including Gozo. The 6 official regions are:

- Region 1: Southern Harbour region
- Region 2: Northern Harbour region
- Region 3: South Eastern region
- Region 4: Western region
- Region 5: Northern region
- Region 6: Gozo
Hence, dividing 390 by 6 (the number of regions) resulted in 65 parent/child pairs from each region. Oppenheim (1999) warns that in questionnaire studies 80% response rate is the best one can hope to achieve under optimal circumstances. Therefore, after consulting the statistician, it was decided to increase the projected sample size from 390 to 480, that is, 80 parent/child pairs from each region to compensate for non-response. It was important to ensure that each region was represented in the study so as to increase generalisability of findings to all regions.

### 3.5.3 Sampling technique

Random sampling was vital as it enhances representation, lessens systematic bias and sampling error (Burns & Grove, 2003). It also permits statistical inferences to be made in relation to the target population, thereby augmenting the external validity of the study (Bowling, 2002). Representation was achieved by choosing parent/child pairs by stratified random sampling depending on the locality of the school.

Every region consists of a number of towns and villages (Appendix 2. p. 152). Every town and village in the Maltese Islands has a state primary school, but the size of child population of the different schools varies considerably. A paper bag for each region was devised with the name of the region on it. Hence, the final number of paper bags was 6, one for each region. Then, the name of each town or village in each region and Gozo was written down on separate slips of paper and all were placed in the paper bags according to region in which the town or village is found. Names of towns and villages were then drawn by lot from each region until a sample of 80 students from each region was reached. In 3 regions, this was reached by the first town drawn, while for the rest of regions more than one school had to be selected before reaching and at times exceeding the desired number. When the number of students in a region exceeded the desired number of participants, classes from the chosen school/s of that region, were randomly chosen by lot. Two more schools were chosen for the test-retest of the questionnaire and the pilot study.

### 3.6 Research Instruments

The nature of the survey demanded data collection by a self-administered questionnaire for parents and the measurement of children's weight and height.
3.6.1 Advantages and disadvantages of questionnaires

Advantages of questionnaires include time and cost-effectiveness of data collection and processing (Oppenheim, 1999; Talbot, 1995). This is a particular advantage if the sample is geographically dispersed (Polit et al, 2001), as in this study. Furthermore, a questionnaire is less invasive and threatening (Cormack, 2000), particularly on considering that this study examined parent’s perceptions of their child’s weight, which is a sensitive issue. In addition, questionnaires offer the possibility of complete anonymity, which may be crucial in obtaining information that is personal in nature (Polit et al, 2001; Oppenheim, 1999; Talbot, 1995). Therefore, it was more likely that parents would give honest answers in the questionnaires. Questionnaires also avoid interviewer bias which may confound findings of interviews (Polit et al, 2001; Oppenheim, 1999; Houston, 1996).

On the other hand, in self-administered questionnaires, questions can be misunderstood as a consequence of poor questionnaire design (Polit et al, 2001; Cormack, 2000; Oppenheim, 1999). In order to counteract this, a test-retest and pilot study were carried out to check for clarity of the questions. Moreover, response rate for questionnaires tends to be lower than in interviews, which can lead to bias as non-respondents are rarely a random subset of those whom the researcher intended to include in the study (Polit et al, 2001). Hence, in order to attempt to overcome a low response rate, some measures were adopted such as clear instructions for participation and a covering letter displayed on the front of the questionnaire promising confidentiality.

3.6.2 Parental questionnaire

Various tools were found in the literature which more or less contained the same main questions about parental perceptions and concern about their child’s weight (Campbell et al, 2006; Eckstein et al, 2006; Carnell et al, 2005; Jeffery et al, 2005; Maynard et al, 2003; Wake et al, 2002; Baughcum et al, 2000). However, a self-administered questionnaire constructed by Eckstein et al (2006) seemed the most appropriate as it took into consideration determinants of parental perceptions. However, an adapted version of this questionnaire was used as some of its sections did not satisfy the objectives of this study. Some questions about parental influence on children’s eating behaviour and physical activity were omitted. One question on parents’ perception on the increased likelihood of heart disease in obese children was added after
questionnaire review by an expert in childhood obesity. Permission to use, modify and translate the questionnaire into the Maltese language was obtained from the authors (Appendix 3, p. 154).

The adapted questionnaire had 5 sections (Appendix 4, p. 156). The first section gathered information on demographic characteristics, such as parents’ nationality and education. It also sought information on medical conditions perceived to limit the child’s growth or physical activity. Questions in the second section evaluated the respondents’ perceptions of their child’s weight and physical activity habits/ability. The question that indicated parents’ perceptions of their child’s weight was ‘I feel my child is (a) underweight, (b) a little underweight, (c) about the right weight, (d) a little overweight, or (e) overweight’. The third section assessed parental knowledge on the health effects of childhood overweight and parents’ level of concern about their child’s weight status in the present and the future. Five Likert-scale response choices were provided for these questions. Additionally, section 4 asked for the history of medical illnesses, such as heart attack and diabetes, for the child’s parents and grandparents. For each item, the respondent indicated whether the illness had occurred and whether they believed it was related to smoking, alcohol use, diet, low physical activity, obesity or none of these risk factors.

The last section of the adapted version of the questionnaire presented a series of sketches of children of different stature published by Truby and Paxton (2002) to determine whether parents would be better at categorising their child’s weight for height using a visual image rather than words. This series of sketches is known as the Children’s Body Image Scale (CBIS; Appendix 5, p. 160). The authors’ permission to use the CBIS was obtained (Appendix 6, p. 162). Eckstein et al (2006) published a different series of sketches of children. However, only the middle image in the series of sketches had a BMI percentile associated with it, whereas the other images were not linked to particular BMI percentiles, making it difficult to compare the respondent’s choice of image with the child’s measured BMI. On the other hand, each image in the CBIS is associated with a range of BMI values. The authors took photographs of real 7-9 year-old children of varying statures with known BMIs and then changed the children’s faces with a fictional face for boys and another one for girls, protecting the identity of the children. Although these children were older than the sample studied,
they are pre-pubescent children and hence, their image does not differ considerably from that of younger children.

3.6.3 Translation of the questionnaire from English to Maltese

Translation into Maltese was deemed essential as instruments developed in foreign countries may not apply to other countries due to language differences. It could not be assumed that all participants would be literate in the English language. Literacy is the ability to read and write to a competent level (Encarta, 2007). In the Census which was conducted in 2005, it was found that more than 7% of Maltese people are illiterate, with the higher rates being in the southern regions of Malta (NSO, 2007). The illiteracy rate was found to increase with increasing age (NSO, 2007). Maltese is the language most spoken at home in above 90% of families (NSO, 2007). Moreover, respondents did not need to write any sentences to answer questions. They just needed to tick answers. Hence, the adapted English version of the questionnaire was translated into Maltese by Ms. A, a legal adviser who was professionally specialised in the Maltese language together with the researcher (Appendix 7. p. 164). It was thought that the translated version would make the instrument applicable to all Maltese parents, enabling a higher percentage of the total population to participate in the study.

The Maltese version was back-translated into English again by Ms. B, a bilingual linguistic educator with a specialisation in the English language (Appendix 8. p. 169). Cross-checking of the English back-translation version was done against the adapted original questionnaire by Ms. B in order to check for semantic equivalence as suggested by Maneesriwongul and Dixon (2004). No changes were deemed necessary after this process. Then, the Maltese version was sent back to the researcher, ready for test-retest reliability.

Ideally, the test-retest reliability of the three versions is examined in order to make cross-cultural comparisons. However, due to time constraints, only that of the translated Maltese version was assessed. Indeed, according to Maneesriwongul and Dixon (2004), the recommended minimum standards for applying an instrument developed in another language should include at least back-translation and testing among target language participants. The Maltese version of the questionnaire was tested and retested in October and November on a cohort group of 35 parents of 6-year
old children attending a state primary school which was not used in the main study to avoid contamination of results.

3.6.4 Children's weight and height measurements

The children's weight and height were measured in order to calculate each child's BMI and compare it with his parent's classification of the child's weight in verbal and visual terms. Weight (W) was measured to the nearest 0.1 kg on a digital weighing balance with the children wearing neither jackets nor shoes. The digital weighing balance was pre-calibrated by the National Metrology Laboratory, Malta Standards Authority (Appendix 9, p. 174). Each child was asked to step on the centre of the balance and to stand straight and still with arms hanging loosely by their side. Height (H) was measured to the nearest 0.1 cm with a wall-mounted rigid ruler, which did not need any prior calibration. Children were asked to stand straight and look straight ahead. A triangle was lowered gently on the child's head at an angle of 90 degrees to the wall-mounted rigid ruler to facilitate accurate height measurements. Then, BMIs were calculated as weight in kilograms divided by height in metres squared.

\[ \text{BMI/kg/m}^2 = \frac{W}{H} \]

3.7 Reliability and Validity

Reliability and validity of the research instruments are major criteria for assessing their quality (Polit et al, 2001). Therefore, enhancing the reliability and validity of the research instruments and analysis of data gathered by such instruments might result in increased rigour of the research study (Cormack, 2000).
3.7.1 Reliability testing of the questionnaire

Polit et al (2001) define reliability as the degree of consistency with which a research instrument measures the variable under investigation. This can be assessed by performing a test-retest procedure of the research instrument.

Test-retest reliability of the original version of the questions was assessed by Eckstein et al (2006) on 24 parents on two occasions separated by 1 to 3 days. Percentage agreement between test and retest responses for word perception of child’s weight was 96%. Percentage agreement for all other questions of the questionnaire ranged from 87% to 100%. As the test and retest procedures were only separated by 1 to 3 days, this reliability measurement may be inadequate. No information was given by Truby and Paxton (2002) regarding reliability of the CBIS. Hence, due to lack of proper reliability testing and due to translation issues, it was deemed necessary to perform test-retest procedures of the whole questionnaire including the CBIS.

Test-retest reliability was assessed in a cohort of 36 parents of 5 to 6-year old children attending a state primary school which was not going to be used in the main study as discussed above. On the covering letter, it was explained to parents that they may receive a similar questionnaire after three weeks (Appendix 10. p.176). To safeguard confidentiality, an assistant researcher gave each parent-child pair a code number, unknown to the researcher. The list was kept in a sealed envelope and was shredded after the testing. Pre-values of the questionnaire responses were compared with post-values by calculating percentage agreement.

Percentage agreement was calculated for each variable by matching test and retest responses. The number of matching responses was divided by the number of participants for each variable and then multiplied by 100% to give percentage agreement (Appendix 11. p.181). For a question variable to be considered stable, percentage agreement between test and retest responses of that variable should be 80% or more (Siegle, 2007). Percentage agreement between test and retest responses for word perception of child’s weight was 92% and for sketch selection was 97%. Percentage agreement for all other questions of the questionnaire ranged from 81% to 100%. This shows that all questions of the tool were stable. Percentage agreements in this study might have been lower than those in the original study by Eckstein et al (2006) since the two runs of the test-retest procedure were only separated by 1 to 3 days, whereas in this study they were performed three weeks apart.
A limitation of stability testing is that participants' attitudes, knowledge and perceptions may change from the test to the retest irrespective of the stability of the tool (Polit et al., 2001). Memorising the contents of the questionnaire may also influence resultant scores. Caution was taken when interpreting results of this question in the main study.

Some procedures were followed to enhance reliability of children's BMI measurements. The digital weighing balance was pre-calibrated by the National Metrology Laboratory, Malta Standards Authority. The same observer took the measurements of all children who participated in the study using the same weighing balance and wall-mounted ruler. The same standard instructions were given to all children before weight and height measurements were taken using the same measurement technique throughout data collection as described in section 3.6.4.

3.7.2 Validity measures of the questionnaire

Validity refers to the ability of a tool to measure accurately what it intends to measure (Polit et al., 2001). Content validity examines the adequacy of the content area being measured (Polit et al., 2001). The adapted and translated version of the questionnaire was thoroughly examined for content clarity, format and style of the survey by a panel of three experts in childhood obesity field (Appendix 12. p.183). These were a health psychologist who was also a health promotion officer, a doctor in charge of the School Medical Services and a principal nutritionist, responsible for public health regulations. Alterations were made based on the experts' feedback, such as the inclusion of chronic heart disease as a consequence of childhood obesity. Other validity tests were not carried out as they were not applicable to the study.

3.8 Pilot Study

A pilot study, which is a small-scale version of the major study, was performed to identify weaknesses or problems in the methodology (Burns & Grove, 2003; Polit et al., 2001). Hence, its purpose was to obtain information for improving the data collection plan and to assess feasibility of this plan.
Polit et al (2001) recommend that a sample size of one tenth of the prospective sample is adequate for the pilot study in giving an indication of major problems that could arise in the research study. Oppenheim (1999) states that participants in the pilot sample should be similar to those in the population. Hence, the pilot study was conducted on 37 parent-child pairs in a state primary school which was not used in the proper study. The parents were given an evaluation sheet together with the questionnaire (Appendix 13. p. 186). They were asked to state the time it took them to fill in the questionnaire, and to comment on the clarity of the items, the presentation and design of the questionnaire and to suggest any changes that could improve the questionnaire.

The participants indicated that it took them between 5 and 10 minutes to complete the questionnaire. The majority of participants stated that the questionnaire was easy to fill and well-presented. Some commented that it increased their awareness of children’s eating and physical activity habits which they often took for granted. No modifications in question wording were required.

3.9 Ethical Considerations

A research study should abide by professional, legal and social obligations in respect to the participants involved in the study (Burns & Grove, 2003; Polit et al, 2001). In fact, it is essential that conflict between the demands of the study and the participants’ right is avoided. The dissertation title was approved by the Board of Studies, Masters of Health Science (Nursing), Institute of Health Care (IHC), University of Malta (UOM). Before conduction of any data collection, a research proposal was scrutinised by the University of Malta Research Ethics Committee (UOMREC) (Appendix 14. p.189). Institutional permission to conduct the study in state primary schools was obtained from the Assistant Director for Planning and Development, Department of Education, however, specifying that parents are not to be questioned on school premises (Appendix 15. p.191). Following permission from UOMREC and Department of Education, the head-teachers of the state primary schools randomly chosen to take part in the study were personally approached to consent for the author’s access to the research site.

The study sought to ensure informed consent and respect for autonomy, beneficence and non-maleficence, confidentiality and privacy, and justice. Participants have the right for informed consent (Burnard & Morrison, 1994). Children were verbally
informed about the purpose and nature of the study, while parents were informed in writing by sending a letter of information (Appendix 16. p.194) and consent form (Appendix 17. p. 197) with their child. In the letter of information, parents were also informed that the researcher needed to measure their children’s BMI. Appropriate covering letters were also used for the pilot study and test-retest of the research tools.

Participation in research was voluntary according to the principle of autonomy (Beauchamp & Childress, 2001). Parents and children were informed about the right to refuse to participate or to withdraw from the study at any time without any consequences of penalty, prejudice or loss of benefits as suggested by Parahoo (1997).

Another fundamental ethical principle is that of beneficence and non-maleficence (Polit et al, 2001). No bio-psycho-social risks were incurred by participating. Children did not have their height and weight measured in front of their classmates. A separate room was used for the measurements. Participation could create parental awareness on childhood obesity. This might enable them to seek professional help and make the necessary behavior changes. Moreover, results gained from the study were intended to contribute to the development of childhood obesity awareness programmes taking into consideration parents’ perceptions.

In addition, Polit et al (2001) affirm that any information obtained from the participants is privileged data and should not be disclosed under any circumstances so as not to enable identification of individuals. To safeguard confidentiality, parents were asked not to write the child’s or their name on the questionnaire and to place the questionnaire in the envelope provided and seal it before returning them to the researcher with their children. No names were used to produce codes. In fact, a code was written on the envelope of each questionnaire as the child returned it together with the signed consent form. The consent form was separated from the questionnaire to further safeguard confidentiality. Then, the child’s weight and height were measured instantly and the same code was assigned to the measurements. This allowed for the ability to compare parents’ perceptions with their children’s measurements without the need of maintaining a code list with the children’s names. However, complete anonymity was not possible as children’s weight and height were measured by the researcher.

The principle of justice was accomplished as every parent-child pair with the required eligibility criteria had an equal opportunity to participate in the study (Parahoo, 1997),
as stratified random sampling procedures were used to select the schools and the parent-child pairs.

An educational booklet ‘Ikel Brin Ghat-Tfal ta’ l-Iskola’ (Healthy Food for Schoolchildren) provided to the researcher by the Health Promotion Department was given to participants after data collection as a means of adhering to social obligation and thanking them for their participation in the study (Appendix 18. p.200). Participants were also instructed to e-mail or phone the researcher at the workplace in case they would like to receive information of the overall results on successful completion of the study.

3.10 Data Collection for the Main Study

One week before data collection, the head-teacher of every school was contacted personally. The researcher discussed with them the aim of the study and the plan of data collection. In addition, they were given a copy of the UOMREC and Education Department’s approvals of the study and of the tool. All head-teachers accepted the study being conducted in their school.

The purpose of the study was explained to the children in their classroom by the researcher. The questionnaires together with the covering letter and consent form in an envelope were disseminated to the children to be forwarded to one of their parents/guardians. Children were informed that the researcher would return to the school in five days’ time to collect the questionnaires and measure the height and weight of children whose parents’ consent was provided. The researcher made another visit to every school on the consecutive day to collect any late questionnaires. Children who were absent on the days of data collection were excluded. This was considered as a limitation in sampling and would be discussed in a later chapter of this study. To visit all the schools that were selected, data collection took about 3 weeks. Parents who participated were sent an educational booklet about healthy lifestyle for schoolchildren compiled by the Health Promotion Department.
3.11 Data Analysis

This section presents the methods used for data management, statistical analysis of questionnaires and presentation of findings.

3.11.1 Questionnaire and measurement data management

As questionnaire data were quantitative in nature, they were processed by the Statistical Package for Social Sciences (SPSS for Windows). Following consultation with the statistician, data were first coded and transformed into numerical form, for example, *What is your relationship with this child? Mother – 1, Father – 2, Other – 3.* A range of BMI values was assigned to every parent’s choice of CBIS sketch that most resembled his/her child according to the ranges developed by Truby and Paxton (2002). All data were inputted on an Excel Spreadsheet (Windows Vista). Additionally, BMI of every child was calculated from weight and height measurements and written with the other data from his/her parent’s questionnaire.

3.11.2 Statistical analysis of data

Data were analysed through descriptive and inferential statistics using SPSS. Summary statistics were used to describe the sample. Central tendency was indicated by the median or mean, including standard deviation in brackets. 95% confidence intervals were given for the main findings to indicate the possible range of values in the population.

The Z-test was used to compare proportions of ordinal data from two independent samples (Kirkwood & Sterne, 2000; Bland, 1999), such as the education level of the study respondents and that of the census participants (NSO, 2007). Two requirements of the Z-test are that both samples consist of more than 30 participants, and that both samples were chosen randomly. These criteria were satisfied both by the study and by the census. The null hypothesis (H₀) was that there is no difference between the proportion of one sample and the proportion of another sample. The alternate hypothesis (H₁) was that there is a difference between the proportion of one sample and the proportion of another sample. A z-distribution table was used to estimate the criteria value. At alpha (α) 0.05, the critical value was 1.96. Hence, if the result of the Z-test
was less than 1.96, the null hypothesis was accepted, whereas if the Z-test value exceeded 1.96, the null hypothesis was rejected.

The Chi-Square test ($\chi^2$) is a non-parametric test which was used to identify any significant associations between two categorical variables in a contingency table/cross-tabulation (Kirkwood & Sterne, 2003). The Chi-Square test was only used when the numbers in the cells are frequencies, and not percentages, proportions or measurements. It is sensitive to small counts and as a rule of thumb the expected count should be at least 5 in each cell of the contingency table. When there were less than 5 elements, the non-parametric equivalent Fisher’s exact test was used (Byrne, 2007). Some limitations with using Chi-Square test are that data should be from a random sample and the test does not prove causality. Moreover, continuous variables, such as children’s measured BMI, had to be categorised.

The null hypothesis ($H_0$) was that there is no association between two categorical variables, while the alternate hypothesis ($H_1$) was that there is a significant association between two categorical variables. The p-value is the criterion to determine whether to accept $H_0$ or $H_1$. If P-value exceeded 0.05 level of significance, $H_0$ was accepted. Otherwise $H_1$ was accepted.

One-way analysis of variance (ANOVA), which is a parametric test, was used to compare the means of three or more independent samples and to show significant differences between means (Kirkwood & Sterne, 2003). The dependent variable in ANOVA must be a ratio variable. The independent variable can be nominal or ordinal, but must be composed of mutually exclusive groups. ANOVA also allowed for comparisons to be made between subsamples with a different number of participants as it compared means of these groups (Heiman, 1996). ANOVA is based on the assumption that the data come from normal distributions within the groups and the variances of these distributions are the same (Bland, 1999). When a minimum of 20 participants in each subgroup measured is not reached, Kruskal-Wallis test should be used as the non-parametric counterpart. ANOVA measured whether there were significant differences between three or more groups, but it did not illustrate where the significance lies. There could be differences between all groups or only two. There are tests called post hoc comparisons which can be performed to determine where significance lies (Byrne, 2007). In this study, Confidence Interval (CI) calculations were used to identify where the significant difference lies.
Chapter 3

Methodology

The one-way ANOVA test was used to compare the mean rating score for several independent statements. The null hypothesis ($H_0$) was that respondents agree with the statement equally the same (the mean rating scores elicited by the parents for the statements are equal). The alternate hypothesis ($H_1$) was that respondents agree with some statements more than others (the mean rating scores elicited by the parents for some statements are higher than others). Same criterion for level of significance was used as for Chi-Square test.

Furthermore, logistic regression analysis was used to eliminate confounding variables and relate dependent categorical variables to a number of predictors (Byrne, 2007). It was assumed that the dependent variables had a normal distribution and were correlated with all the predictors. In addition, it is desirable that any predictor variable is uncorrelated with the remaining predictors (Bland, 1999).

The dependant categorical variables for logistic regression computations were parental recognition of their child’s weight by words and parental concern about their child’s weight. The independent variables were child’s gender, child’s BMI group, parental level of education, parental recall of doctor’s concern about their child’s weight, parental recognition that their child was less active or slower than other children, parental awareness of the health consequences of child overweight, and a history of an illness in a parent or grandparent related to diet, low physical activity or obesity. The $P$-value is a measure of the predictor contribution in explaining the variation in the dependant variable. The smaller the $P$-value is, the more the contribution of the predictor is.

The calculation of odds ratio (OR) for logistic regression provided an estimate with confidence interval for the relationship between two variables. Odds ratios are a way of representing probability (Bland & Altman, 2000). The odds is the ratio of the probability that the event of interest occurs to the probability that it does not. This is often estimated by the ratio of the number of times that the event of interest occurs to the number of times that it does not. If the odds of an event were greater than one, the event was more likely to happen than not, while if the odds were less than one the chances were that the event would not happen (Deeks, 1996).
3.11.3 Presentation of Findings

Findings were portrayed in frequency and percentage tables. Graphs such as clustered bar and line graphs, box plot and pie chart were also used to depict results and provide a clearer overview. The next chapter presents a detailed account of the findings of this study.
CHAPTER 4

Findings of the study
4.1 Introduction

This chapter reports the findings of the study on Maltese parents’ perceptions and concerns on their child’s weight. Influencing factors on these perceptions and concerns were also studied and analysed. Data was collected through a self-administered questionnaire disseminated to parents who had children in Year 1 at state primary schools in Malta and Gozo. Measurements of children’s weight and height which were recorded during the collection of the filled questionnaires are also reported and presented in tables and figures.

Sections in this chapter include a description of the sample of parents and children and their demographic characteristics. Results about parents’ verbal and visual perceptions of their child’s weight will be presented first, followed by findings on parental recall of doctor’s concern about their child’s weight and parents’ perceptions of their child’s physical ability and activity levels. Findings on parents’ concern about their child’s weight, parents’ opinions about the health consequences of child overweight and family health history will also be presented. Finally, results obtained from logistic regression of various variables that could potentially influence parental perceptions and concern about their child’s weight will be given.

In contingency tables, independent variables were tested against children’s measured BMI categories or parental perceptions of their child’s weight in verbal terms. Associations between the independent variables and parents’ perceptions of their child’s weight in visual terms were not computed as in this study parents’ visual perceptions were found to be less accurate than their verbal perceptions of their child’s weight. In certain computations, categories were collapsed into a smaller number of categories as number of respondents in cells was very small. For example, children’s measured BMI categories ‘overweight’ and ‘obese’ were collapsed for several computations.

4.2 Participation of Parents and Children

The study was conducted in state primary schools which were randomly selected (Chapter 3. p.45) from all regions of Malta, and Gozo (National Statistics Office [NSO], 2006; Appendix 2. p.152). An empty questionnaire, a consent form and an informative letter folded in an envelope was handed to each Year 1 student to refer
them to their parents. Parents were asked to fill the questionnaire and consent form and return it with their child at school from where the researcher collected them back and measured the children's height and weight.

As explained in the previous chapter (p.44), there were 2653 pupils attending Year 1 in state primary schools at the time of data collection. This was the target population, which might have included some children of foreign parents who were consequently excluded from the study on collection of the questionnaire. The randomly selected schools provided a sample size of 480 parents and their children, making up approximately 18% of Year 1 pupils in scholastic year 2007/2008.

4.2.1 Response rate

Four-hundred and eighty questionnaires together with consent forms were distributed amongst the randomly selected schools from the six geographical regions of Malta as discussed in the previous chapter. This denotes an average of 80 questionnaires per region. Four hundred and seventeen parents returned the questionnaire with their child at school. Five questionnaires were excluded due to foreign nationality or child having medical condition limiting his/her physical abilities as indicated by responses to questions 5, 6 and 7 in the parental questionnaire (Appendix 4. p.156). These were reduced from the number of disseminated questionnaires resulting in 475 questionnaires. Nine questionnaires were returned empty. Hence, the total of 417 returned questionnaires was reduced to 408 valid questionnaires.

<table>
<thead>
<tr>
<th>Questionnaires</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disseminated questionnaires</td>
<td>475</td>
</tr>
<tr>
<td>Total of returned questionnaires</td>
<td>417</td>
</tr>
<tr>
<td>Returned empty questionnaires</td>
<td>9</td>
</tr>
<tr>
<td>Returned filled questionnaires that were excluded</td>
<td>5</td>
</tr>
<tr>
<td>Returned filled questionnaires and consent for children's weight and height measurements</td>
<td>408</td>
</tr>
<tr>
<td><strong>Response rate (408/475)</strong></td>
<td><strong>85.9%</strong></td>
</tr>
</tbody>
</table>
All 408 valid questionnaires had consent granted for children’s weight and height measurements. This information is presented in Table 4.1. Thus, data analysis was based on 408 parental questionnaires and their corresponding 408 children’s measurement data. All parents answered all the questions in the questionnaire (n for each question = 408). This resulted in an overall response rate of 86%.

The Western Region had the highest response rate (97.5%), whereas the South Eastern Region had the lowest, but still satisfactory response rate (82.5%). Sitzia and Wood (1998) and Dillman (1991) suggest that the minimum acceptable response rate for a questionnaire survey is 60%. Table 4.2 presents information on the response rate by region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Disseminated questionnaires (n)</th>
<th>Returned and valid questionnaires (n)</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gozo</td>
<td>79</td>
<td>67</td>
<td>84.8</td>
</tr>
<tr>
<td>Northern</td>
<td>79</td>
<td>66</td>
<td>83.5</td>
</tr>
<tr>
<td>Western</td>
<td>80</td>
<td>78</td>
<td>97.5</td>
</tr>
<tr>
<td>Northern Harbour</td>
<td>79</td>
<td>66</td>
<td>83.5</td>
</tr>
<tr>
<td>Southern Harbour</td>
<td>78</td>
<td>65</td>
<td>83.3</td>
</tr>
<tr>
<td>South Eastern</td>
<td>80</td>
<td>66</td>
<td>82.5</td>
</tr>
<tr>
<td>Total</td>
<td>475</td>
<td>408</td>
<td>85.9</td>
</tr>
</tbody>
</table>

### 4.2.2 Demographic characteristics of participants

The majority of adult respondents were mothers, comprising 89.7% of adult participants. Thirty-six out of 408 respondents were fathers (8.8%), while 1.5% of adult participants were children’s guardians. Results are summarised in Table 4.3.

<table>
<thead>
<tr>
<th>Adult respondents</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>366</td>
<td>89.7</td>
</tr>
<tr>
<td>Father</td>
<td>36</td>
<td>8.8</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Since all adult respondents gave their consent for their child’s weight and height to be measured and all children accepted to have their weight and height measured, 408 children participated in the study. Of these 408 children, 177 were girls (43.4%) and 231 were boys (56.6%) resulting in a ratio of 1:1.3 (Table 4.4). This is comparable with the ratio of 1:1.1 provided by the NSO for children born in 2002 to Maltese parents who at the time of data collection were 5/6-year old girls and boys and thus eligible to participate in the study.

Table 4.4 Year 1 children who participated in the study compared to live births born to Maltese parents in 2002 (NSO, 2003)

<table>
<thead>
<tr>
<th>Child's gender</th>
<th>Year 1 children who participated in the study</th>
<th>Live birth to Maltese parents in 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Boys</td>
<td>231</td>
<td>56.6</td>
</tr>
<tr>
<td>Girls</td>
<td>177</td>
<td>43.4</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Children’s mean age was 65.45 months, approximately equivalent to 5 years and 6 months. Children’s age ranged between 60 and 72 months (mean 65.45±2.862). As the mean age of children in this study was 5 years and 6 months, IOTF criteria for children having 5 and a half years were used to define underweight, normal weight, overweight and obese weight ranges.

Table 4.5 shows the education level of parents who participated in this study. Fifty-eight percent of parents/guardians had a secondary level of education, whereas about 7% did not finish secondary school. Parents with a post-secondary education made up 24.8% of the sample, and parents with a tertiary education accounted for 10% of the sample. As the number of participants with a masters degree or doctoral degree was very small (n=1), it was collapsed into the category ‘Tertiary education’. No demographic data of non-respondents were available, making it difficult to discern whether such potential participants had any common characteristics. However, an attempt was made to compare the level of education found in the sample to that of
individuals of approximately the same age group in the general Maltese population. For this purpose, findings from the last Census (2005) were accessed.

Table 4.5 Education level completed by parents in the study and individuals in the 20-39 age range in Census 2005 (NSO, 2006)

<table>
<thead>
<tr>
<th>Education level</th>
<th>Parents in the study</th>
<th>Individuals in the 20-39 age range in Census 2005</th>
<th>Z-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Did not finish secondary school</td>
<td>28</td>
<td>6.9</td>
<td>3342</td>
</tr>
<tr>
<td>Secondary education</td>
<td>237</td>
<td>58.1</td>
<td>58792</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>101</td>
<td>24.8</td>
<td>30484</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>42</td>
<td>10.3</td>
<td>18143</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
<td>100.0</td>
<td>110761</td>
</tr>
</tbody>
</table>

In the National Census of 2005 (NSO, 2006), it was found that most individuals in the age range of 20-39 years, who in 2007/2008 might have had children attending Year 1 in state primary schools, had a secondary education (52.8%) like parents who participated in the study. However, the level of education of respondents is lower than that of individuals participating in the census as respondents were twice as likely as individuals in the census to leave school before the end of secondary level and 1.6 times less likely to have tertiary education than individuals in the census. These differences between the education level of participants in the study and of those who participated in the census were found to be significant as shown by Z-test values that exceeded the critical value of 1.96.

The categories for parents’ education level ‘did not finish secondary school’ and ‘secondary education’ were collapsed in one category and the categories ‘post-secondary education’ and ‘tertiary education’ were combined into one category as numbers for those who did not finish secondary school and those with tertiary education for every region were small. The following table (Table 4.6) illustrate that parents’ education level seems to be lower in the southern regions of Malta when compared to the education level of parents in the northern and central regions. For example, the Northern Harbour, Southern Harbour and South Eastern regions had the highest number of participants with a secondary school education and less and the
lowest number of participants who had post-secondary and tertiary education when compared to the Northern and Western regions, and Gozo ($\chi^2 = 14.52$, p-value = 0.013).

Table 4.6 Parental education level by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Parents' education level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Secondary education</td>
<td>Post-secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>or less</td>
<td>or Tertiary education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gozo</td>
<td>33</td>
<td>49.3</td>
<td>34</td>
<td>50.7</td>
<td>67</td>
</tr>
<tr>
<td>Northern</td>
<td>37</td>
<td>56.1</td>
<td>29</td>
<td>43.9</td>
<td>66</td>
</tr>
<tr>
<td>Western</td>
<td>53</td>
<td>67.9</td>
<td>25</td>
<td>32.1</td>
<td>78</td>
</tr>
<tr>
<td>Northern Harbour</td>
<td>48</td>
<td>72.7</td>
<td>18</td>
<td>27.3</td>
<td>66</td>
</tr>
<tr>
<td>Southern Harbour</td>
<td>48</td>
<td>73.8</td>
<td>17</td>
<td>26.2</td>
<td>65</td>
</tr>
<tr>
<td>South Eastern</td>
<td>46</td>
<td>69.7</td>
<td>20</td>
<td>30.3</td>
<td>66</td>
</tr>
<tr>
<td>Total</td>
<td>265</td>
<td>65.0</td>
<td>143</td>
<td>35.0</td>
<td>408</td>
</tr>
</tbody>
</table>

4.3 Children's Body Mass Index

The BMI ranged from 11.90 to 30.78 kg/m² (mean 17.30±2.81), that is, from underweight to obese for 5.5 year-old children. On considering the BMI cut-off points for overweight in 5.5-year old boys (17.45 kg/m²) and girls (17.20 kg/m²), the mean of the BMI cut-off points for overweight is 17.33 kg/m². This implies that the mean BMI for children who participated in this study is only slightly less than the mean cut-off point for 5.5-year old child overweight. The mean BMI of 17.33 kg/m² for boys was in the normal weight range for boys (14.14-17.44 kg/m²) (Table 4.7), whereas the mean BMI of 17.27 kg/m² for girls exceeded their normal weight range (13.87-17.19 kg/m²), showing that girls had a mean BMI that is classified as overweight according to IOTF 2000 criteria (Table 4.7).

Table 4.7 Statistics of children’s measured BMI by gender

<table>
<thead>
<tr>
<th>Children’s measured BMI</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Boys’ BMI</td>
<td>231</td>
</tr>
<tr>
<td>Girls’ BMI</td>
<td>177</td>
</tr>
</tbody>
</table>
Overall, it was found that 90 children (22.1%, 95% CI, 18.04-26.08%) from the sample were overweight and 65 children (15.9%, 95% CI, 12.38-19.48%) were obese according to IOTF criteria (2000) (Appendix 1. p.150), giving a total of 155 children (38.0%, 95% CI, 33.28-42.70%) being overweight. Nineteen children had their BMI classified as underweight made up (4.7%, 95% CI, 2.61-6.71%) and 234 children had a normal weight (57.4%, 95% CI, 52.55-62.15%) of the sample (Figure 4.1).

4.4 Parents’ Education Level and Children’s Weight

In order to compute significant levels for this association, the categories for ‘underweight’ and ‘normal weight’ children were amalgamated into one category and so were the categories ‘overweight’ and ‘obese’ children. This was necessary since the number of children in cells of the contingency table was small. Table 4.8 gives children’s measured BMI categories by parents’ education level. It shows that children of parents with higher educational level were less likely to be overweight than those of less educated parents ($\chi^2 = 11.33$, p-value = 0.010).
Chapter 4

Findings

Table 4.8 Children's measured BMI categories by parents' education level

<table>
<thead>
<tr>
<th>Parents' education level</th>
<th>Children's measured BMI categories</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Underweight or normal</td>
<td>Overweight or obese</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Did not finish secondary school</td>
<td>12</td>
<td>42.9</td>
</tr>
<tr>
<td>Secondary education</td>
<td>140</td>
<td>59.1</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>68</td>
<td>67.3</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>33</td>
<td>78.6</td>
</tr>
</tbody>
</table>

$\chi^2$: p-value = 0.010

This finding is supported by the line graph in Figure 4.2 which shows an inverse relationship between parental education level and children’s mean BMI, that is, as the parental level of education increased, children’s mean BMI decreased.

Figure 4.2 Children’s BMI means according to parental education level

68
4.5 Children’s Weight according to Region

By referring to the cross-tab in Table 4.9, it is evident that a higher proportion of pupils coming from the southern regions of Malta had a BMI which is categorised as either being overweight or obese. Sixty-six percent of 5/6-year old pupils from the Southern Harbour Region and 43.9% from the South Eastern Region had a BMI which is categorised as overweight (including pupils that were obese). The Western Region had the lowest prevalence of overweight Year 1 children (24.4%). This association can be generalised because the p-value is less than 0.001 ($\chi^2 = 32.64$).

<table>
<thead>
<tr>
<th>Region</th>
<th>Children’s measured BMI categories</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Underweight and normal</td>
<td>Overweight and obese</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gozo</td>
<td>47</td>
<td>70.1</td>
</tr>
<tr>
<td>Northern</td>
<td>42</td>
<td>63.6</td>
</tr>
<tr>
<td>Western</td>
<td>59</td>
<td>75.6</td>
</tr>
<tr>
<td>Northern Harbour</td>
<td>46</td>
<td>69.7</td>
</tr>
<tr>
<td>Southern Harbour</td>
<td>22</td>
<td>33.8</td>
</tr>
<tr>
<td>South Eastern</td>
<td>37</td>
<td>56.1</td>
</tr>
<tr>
<td>Total</td>
<td>253</td>
<td>62.0</td>
</tr>
</tbody>
</table>

$\chi^2$: p-value <0.001

Figure 4.3 and Figure 4.4 show the regions’ median BMI. The Southern Harbour Region had the highest median BMI of 18.26 kg/m², which lies inside the child overweight range according to IOTF 2000 criteria. The median BMI for all other regions was in the normal weight range for children with a mean age of 5.5 years old. Figure 4.10 represents boxplots of children’s BMIs for every region. It shows that the Southern Harbour and Southern Eastern Regions had the highest BMIs among 5 to 6-
year-old children. The highest BMI for the Northern Harbour Region was the lowest amongst the highest BMIs of all the regions.

The line graph in Figure 4.4 gives an overview of the BMI means for the different regions. The Northern, Southern Harbour and South Eastern Regions had a BMI mean exceeding the normal 5.5 year-old children’s BMI mean for boys and girls. There was a significant difference between the BMI means of the regions as indicated by one-way ANOVA statistical data given in Table 4.10. The association between children’s BMIs and region was tested by the non-parametric test of Chi-Square and by ANOVA, which is parametric. Parametric tests are more accurate than non-parametric ones because they assume a normal distribution and their expected cell frequency is higher than that of non-parametric tests. In fact, the number of children from each region exceeded 64.
The Southern Harbour Region had the highest BMI mean followed by the South Eastern Region, the Northern Region, Gozo, the Western Region and the Northern Harbour Region in order of decreasing BMI mean. The lower bound of the 95% confidence intervals for Southern Harbour Region exceeds the 95% confidence upper bounds for Gozo, the Western and Northern Harbour regions and almost those of the Northern and South Eastern region (Table 4.10).

Table 4.10 Children’s BMI means by region

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>95% CI for mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>Gozo</td>
<td>67</td>
<td>16.7522</td>
<td>16.2678</td>
<td>17.2367</td>
</tr>
<tr>
<td>Northern</td>
<td>66</td>
<td>17.5612</td>
<td>16.7923</td>
<td>18.3302</td>
</tr>
<tr>
<td>Western</td>
<td>78</td>
<td>16.5341</td>
<td>15.9973</td>
<td>17.0709</td>
</tr>
<tr>
<td>Northern Harbour</td>
<td>66</td>
<td>16.4606</td>
<td>15.9555</td>
<td>16.9658</td>
</tr>
<tr>
<td>South Eastern</td>
<td>66</td>
<td>17.5994</td>
<td>16.8850</td>
<td>18.3138</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
<td>17.3039</td>
<td>17.0308</td>
<td>17.5769</td>
</tr>
</tbody>
</table>

ANOVA: p-value <0.001
4.6 Parents' Perceptions of their Child's Weight in Verbal Terms

Question 8 asked parents what they thought their child's weight was and presented five response categories including 'underweight', 'a little underweight', 'about the right weight', 'overweight' and 'obese'. The response categories 'a little underweight' and 'underweight' for parents' perceptions were collapsed into a single category 'underweight' and the categories 'a little overweight' and 'overweight' were collapsed into the category 'overweight'. This resulted into 3 final categories, namely 'underweight', 'about normal weight' and 'overweight'. These verbal categories were then compared with children's measured BMI categories. When the parental verbal category matched their child's measured BMI category, verbal perception was assumed to be correct. In cases where parental verbal category and the corresponding child's measured BMI category differed from each other, verbal perception was assumed to be incorrect.

A total of 240 parents or 59% (95% CI, 54.04-63.60%) of respondents identified their child's weight correctly in verbal terms. However, 158 parents or 38.8% (95% CI, 34.00-43.46%) of respondents classified their child's weight as less than his/her actual weight whereas 10 parents or 2.5% (95% CI, 0.95-3.95%) of respondents classified their child's weight as more than his/her actual weight.

Almost half the parents of underweight children classified their children's weight correctly (52.6%). Most of the parents of normal weight children classified their children's weight correctly (84.6%), whilst few parents of overweight children perceived their child's weight correctly (3.3%). However, almost half of parents of obese children classified their child's weight correctly (44.6%). This information is summarised and illustrated in Figure 4.5. Results show that amongst parents of overweight and obese children, there was a tendency of shifting children's weight to a lighter weight than their actual weight. Differences in parents' perceptions of their child's weight in verbal terms were found to be statistically significant (Fisher's exact = 122.00, p-value <0.001).
Overweight children were more likely to be recognised as overweight if their actual weight status was categorised as obese by IOTF criteria (2000) (Fisher's exact = 41.09, p-value <0.001). It was found that only 3.3% of overweight children were classified by their parents as overweight compared to 44.6% of obese children whose parents recognised them to be overweight.

4.6.1 Parents’ perceptions of their overweight child’s weight in verbal terms by child’s gender

Table 4.11 gives the results obtained on parents’ perception of their overweight child’s weight by words against their child’s gender. Parents of overweight girls had a slightly
more accurate perception of their child’s weight than those of overweight boys (22.5% versus 19.0%). However, this difference in parental perception was insignificant as evidenced by a p-value of 0.593 ($\chi^2 = 0.286$).

Table 4.11 Parents’ perceptions of their overweight child’s weight in verbal terms by child’s gender

<table>
<thead>
<tr>
<th>Child’s gender</th>
<th>Parents’ perceptions of their overweight child’s weight in verbal terms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
</tr>
<tr>
<td>----------------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Boy</td>
<td>16</td>
<td>19.0</td>
</tr>
<tr>
<td>Girl</td>
<td>16</td>
<td>22.5</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>20.6</td>
</tr>
</tbody>
</table>

$\chi^2$: p-value = 0.593

4.6.2 Parents’ perceptions of their child’s weight in verbal terms by parents’ education level

Table 4.12 shows that parents who did not finish school had the lowest rate of correct perception of their child’s weight in verbal terms in contrast to the rate of correct verbal perception of their child’s weight by parents who completed a tertiary level of education (39.3% versus 64.3% respectively). However, parents’ perceptions of their child’s weight in verbal terms did not vary significantly by the parents’ level of education ($\chi^2 = 5.22$, p-value = 0.157). The percentage of correct perceptions of parents with a secondary level of education (60.3%) was similar to the percentage of correct perceptions of parents with a post-secondary level of education (57.4%) and of those who completed tertiary education (64.3%).
Table 4.12 Parents' perceptions of their child's weight in verbal terms by parents' education level

<table>
<thead>
<tr>
<th>Parents' education level</th>
<th>Correct</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Did not finish secondary school</td>
<td>11</td>
<td>39.3</td>
<td>17</td>
</tr>
<tr>
<td>Secondary education</td>
<td>143</td>
<td>60.3</td>
<td>94</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>58</td>
<td>57.4</td>
<td>43</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>27</td>
<td>64.3</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>239</td>
<td>58.6</td>
<td>169</td>
</tr>
</tbody>
</table>

$\chi^2$: p-value = 0.157

This computation was also carried out for parents having overweight (Table 4.13) or obese (Table 4.14) children. The majority of parents from all levels of education misclassified their child’s overweight status (Fisher’s exact = 1.22, p-value = 0.769).

Table 4.13 Parents' perceptions of their overweight child's weight in verbal terms by parents' education level

<table>
<thead>
<tr>
<th>Parents' education level</th>
<th>Correct</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Did not finish secondary school</td>
<td>0</td>
<td>0.0</td>
<td>10</td>
</tr>
<tr>
<td>Secondary education</td>
<td>3</td>
<td>5.6</td>
<td>51</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>0</td>
<td>0.0</td>
<td>19</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>3.3</td>
<td>87</td>
</tr>
</tbody>
</table>

Fisher's exact: p-value = 0.769
Parents of obese children who had a secondary level of education were more likely to correctly perceive their child’s weight in verbal terms than parents of obese children from other levels of education. However, this difference in verbal perception of their child’s weight by the level of education for parents of obese children was not found to be significant (Fisher’s exact = 6.67, p-value = 0.055).

<table>
<thead>
<tr>
<th>Parents’ education level</th>
<th>Parents’ perceptions of their obese child’s weight in verbal terms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Did not finish secondary school</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td>Secondary education</td>
<td>19</td>
<td>44.2</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>11</td>
<td>78.6</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>55.4</td>
</tr>
</tbody>
</table>

Fisher’s exact: p-value = 0.055

4.7 Parents’ Perceptions of their Child’s Weight in Visual Terms

The last section of the questionnaire contained the Children’s Body Image Scale (CBIS, Truby & Paxton, 2002) which consists of seven gender-specific figures. Each image in the CBIS is associated with a range of BMI values (Chapter 3, p.48). Parents were asked to choose the body figure that most resembled their child’s physical stature. The children’s measured BMI was compared with the range of BMI values that corresponded to their parents’ selected sketch. If the child’s BMI fitted in the range of BMI values of the sketch chosen by the parent, the parent’s visual perception was considered to be correct.

Using the CBIS, 51.5% (95% CI, 46.62-56.32%) of the respondents chose the image that corresponded to their child’s correct weight. Forty-six percent (95% CI, 40.76-
50.42% of parents chose a lighter image for their child’s weight, whereas 2.9% (95% CI, 1.30-4.58%) of parents selected a child’s image that was heavier than their child’s actual weight (Fisher’s exact test = 68.22, p-value <0.001). As can be seen from Figure 4.6, about 10% of respondents with overweight children had a correct image perception of their child’s weight compared to 24.6% of respondents with obese children who correctly perceived their child’s weight by sketch selection.

Figure 4.6 Parents’ perceptions of their child’s weight in visual terms by children’s measured BMI categories

![Graph showing parents' perceptions of their child's weight in visual terms by children's measured BMI categories]

Fisher’s exact p-value <0.001

4.7.1 Parents’ perceptions of their overweight child’s weight in visual terms by child’s gender

Categorising parents’ perceptions of their overweight child in visual terms by children’s gender, 8.3% of parents of overweight boys perceived their son’s weight
correctly compared with 25.4% of parents of overweight girls who perceived their daughter’s weight correctly. This implies that more parents having overweight sons misclassified their son’s overweight status compared to those having an overweight daughter (91.7% versus 74.6%). A significant difference in parental perception between overweight boys’ and overweight girls’ weight using sketch selection was found as indicated by a p-value of 0.004 ($\chi^2 = 8.24$). The line graphs in Figure 4.7 show parents’ perceptions of their overweight child using sketch selection. The line graphs show less overweight boys than overweight girls were perceived as overweight by their parents using sketch selection.

Figure 4.7 Parents’ classification of their overweight or obese child’s weight in visual terms by child’s gender

$\chi^2$: p-value = 0.004
The next sections involve computations between a number of variables and parents’ perceptions of their child’s weight in verbal terms since verbal perceptions were more accurate than visual perceptions both in general (58.6% versus 51.5% respectively) and for overweight children (20.6% versus 16.1% respectively).

4.8 Parental Recall of Doctor’s Concern about their Child’s Weight

Parents were asked whether they recalled their child’s doctor ever mentioning that their child was gaining weight too fast or was overweight. Children’s measured BMI categories ‘underweight’ and ‘normal’ weight were collapsed into one category due to small numbers of responses involved. Parents of obese children were 15 times as likely to recall doctor’s concern as parents of overweight children (Fisher’s exact = 34.13, p-value <0.001). This information is shown in Table 4.15.

Table 4.15 Parental recall of doctor’s concern about their child’s weight by children’s BMI categories

<table>
<thead>
<tr>
<th>Parents’ recall of doctor’s concern</th>
<th>Children’s measured BMI categories</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Underweight or normal</td>
<td>Overweight</td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I don’t know</td>
<td>6</td>
<td>2.4</td>
</tr>
<tr>
<td>No</td>
<td>246</td>
<td>97.2</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>253</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Fisher’s exact: p-value <0.001

4.8.1 Association between recall of doctor’s concern by parents of overweight and obese children and their perception of their child’s weight in verbal terms

The aim of this computation was to examine whether parents of overweight children were more likely to correctly perceive their child’s weight status if their attention about the problem had been drawn by their doctor. Parents of overweight children were excluded from this analysis as only one respondent recalled doctor’s concern and
hence, this was not representative of the sub-sample of parents having overweight children. This analysis is based on 61 parents of obese children (Figure 4.8).

Eighty-two percent of parents of obese children who correctly perceived their child’s obese status recalled doctor’s concern about their child’s weight compared to 32% of parents having an obese child and who correctly classified their child’s obese status but did not recall doctor’s concern. Eighteen percent of parents of obese children misclassified their child’s weight status although they recalled doctor’s concern and 68% of parents of obese children who misclassified their child’s weight did not recall doctor’s concern. Therefore, recall of doctor’s concern was found to be significantly associated with parents’ correct classification of their obese child’s weight (Fisher’s exact = 13.87, p-value <0.001)

Figure 4.8 Recall of doctor’s concern by parents of obese children and their classification of their child’s weight in verbal terms
4.9 Parents’ Perceptions of their Child’s Physical Ability/Activity Levels

Parents’ perceptions of their child’s physical ability/activity levels were assessed by questions 10, 11 and 12 of the questionnaire. In question 10, parents were asked about the frequency of their child’s physical activity per week. Question 11 asked parents about their perceptions of their child’s physical activity in hours/week in comparison to other children of the same age. Question 12 catered for parents’ perceptions of their child’s physical ability in comparison to other children of the same age by asking parents ‘When my child runs, he/she is usually: (a) faster than other children, (b) about as fast as other children, (c) slower than other children’.

Figure 4.9 shows that 43.4% of children were perceived by their parents to be active 1 to 2 days per week. Only 12.7% of children were perceived to be active on most days of the week (6-7 days per week).
In response to question 11, 84.8% of parents perceived their children as being physically active for about the same number of hours per week as other children as shown Figure 4.10. Seven percent of parents viewed their children as being less physically active than other children, whereas 8% of parents viewed their children as being physically active for more hours per week than other children.

Figure 4.10 Parents' perceptions of their child's physical activity in comparison to other children of same age

Figure 4.11 gives the results of the response of question 12 about parents' perceptions of their child's physical ability in comparison to other children of same age. Few parents viewed their children as being slower than other children (5.6%), whereas the majority of parents perceived their children as being as fast as other children (82.8%) and 11.5% of parents considered their child to be faster than other children.
4.9.1 Parents' perceptions of their child's physical ability/activity levels associated with children's measured BMI categories

The aim of these computations was to examine whether parents' perceptions of their child's physical activity were likely to differ by children's measured BMI categories. For this section of the findings, the children's measured BMI categories 'underweight' and 'normal' were grouped into one category because the number of underweight children was small (n=19).

Parents of obese children perceived their child as having a lower frequency of physical activity per week compared to parents of other children for the response option 6-7 days each week (Fisher's exact test = 15.18, p-value 0.016, Table 4.16).
Table 4.16 Parental perception of the frequency of their child's physical activity per week by children's BMI categories

| Parents' perceptions of the frequency of their child’s physical activity per week | Children's measured BMI categories | Total |
|---|---|---|---|
| | Underweight or normal | Overweight | Obese | n | % | n | % | n | % |
| I don’t know | 10 | 4.0 | 7 | 7.8 | 2 | 3.1 | 19 | 4.7 |
| None | 8 | 3.2 | 5 | 5.6 | 2 | 3.1 | 15 | 3.7 |
| 1-2 days each week | 116 | 45.8 | 34 | 37.8 | 27 | 41.5 | 177 | 43.4 |
| 3-5 days each week | 82 | 32.4 | 31 | 34.4 | 32 | 49.2 | 145 | 35.5 |
| 6-7 days each week | 37 | 14.6 | 13 | 14.4 | 2 | 3.1 | 52 | 12.7 |
| Total | 253 | 100.0 | 90 | 100.0 | 65 | 100.0 | 408 | 100.0 |

Fisher's exact: p-value = 0.046

Parents of overweight children did not perceive their child as less active or more physically limited than other children of the same age. On the other hand, more parents of obese children perceived their child as less active in hours per week (Table 4.17) and slower (Table 4.18) in comparison to other children of the same age than parents of other children as indicated by a p-value of 0.048 (Fisher’s exact = 9.36) and 0.006 (Fisher’s exact = 15.36) respectively.

Table 4.17 Parental perception of their child’s physical activity in hours/week by children's measured BMI categories

| Parents' perceptions of their child’s physical activity in hours/week | Children’s measured BMI categories | Total |
|---|---|---|---|
| | Underweight or normal | Overweight | Obese | n | % | n | % | n | % |
| Fewer hours/week than other children | 15 | 5.9 | 4 | 4.4 | 11 | 16.9 | 30 | 7.4 |
| About the same number of hours/week | 219 | 86.6 | 77 | 85.6 | 50 | 76.9 | 346 | 84.8 |
| More hours/week than other children | 19 | 7.5 | 9 | 10.0 | 4 | 6.2 | 32 | 7.8 |
| Total | 253 | 100.0 | 90 | 100.0 | 65 | 100.0 | 408 | 100.0 |

Fisher's exact: p-value = 0.048
### Table 4.18 Parental perception of their child’s physical ability by children’s measured BMI categories

<table>
<thead>
<tr>
<th>Parents’ perceptions of their child’s physical ability</th>
<th>Underweight or normal</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Slower than other children</td>
<td>10</td>
<td>4.0</td>
<td>5</td>
<td>5.6</td>
</tr>
<tr>
<td>About as fast as other children</td>
<td>218</td>
<td>86.2</td>
<td>67</td>
<td>74.4</td>
</tr>
<tr>
<td>Faster than other children</td>
<td>25</td>
<td>9.9</td>
<td>18</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>253</td>
<td>100.0</td>
<td>90</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Fisher’s exact: p-value = 0.006

#### 4.9.2 Association between parents’ perceptions of their child’s weight and their perceptions of their child’s physical ability/activity levels

The aim of these computations was to examine whether parents’ perceptions of their child’s physical activity were likely to influence parents’ perceptions of their child’s weight. This section concerns parents of overweight or obese children according to their measured BMI (n=155). Parents’ perceptions of these children’s weight were categorised into correct and incorrect perception.

A significant difference was found in parents’ perceptions of their child’s physical ability in comparison to other children of same age between parents who classified their overweight child’s weight correctly and parents who viewed their child as not overweight (Fisher’s exact = 10.95, p-value = 0.003). Figure 4.12 illustrates that 4.5% of parents who perceived their overweight/obese child as faster than other children classified their child’s weight correctly. This contrasts well with 56.8% of parents who perceived their overweight/obese child as slower than other children and correctly identified their child as being overweight.
No significant difference was found between parents’ perceptions of their overweight/obese child and their perceptions of their child’s physical activity levels in hours per day (Fisher’s exact = 3.92, p-value >0.05 = 0.143) or their perceptions of the frequency of their child’s physical activity per week (Fisher’s exact = 6.04, p-value >0.05 = 0.105).

The association between parents’ perceptions of their child’s fastness compared to other children and their perception of their child’s weight was tested for parents of overweight children and those of obese children separately.
Table 4.19 Parents’ perceptions of their overweight child’s weight by their perception of their child’s physical ability in comparison to other children

<table>
<thead>
<tr>
<th>Parents’ perceptions of their overweight child’s physical ability</th>
<th>Parents’ perceptions of their overweight child’s weight in verbal terms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Slower than other children</td>
<td>4</td>
<td>80.0</td>
</tr>
<tr>
<td>About as fast as other children</td>
<td>66</td>
<td>98.5</td>
</tr>
<tr>
<td>Faster than other children</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>96.7</td>
</tr>
</tbody>
</table>

Fisher’s exact: p-value = 0.072

Results show that parents perceptions of their overweight child’s weight was not influenced by their perception of their child’s physical fastness (Table 4.19, Fisher’s exact = 4.93, p-value = 0.072). On the other hand, 75% of parents of obese children who perceived their child to be slower than other children correctly classified their child’s weight (Table 4.20, Fisher’s exact = 5.79, p-value = 0.043).

Table 4.20 Parents’ perceptions of their obese child’s weight by their perception of their child’s physical ability in comparison to other children

<table>
<thead>
<tr>
<th>Parents’ perceptions of their overweight child’s physical ability</th>
<th>Parents perceptions of their obese child’s weight in verbal terms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Slower than other children</td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>About as fast as other children</td>
<td>30</td>
<td>56.6</td>
</tr>
<tr>
<td>Faster than other children</td>
<td>4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>55.4</td>
</tr>
</tbody>
</table>

Fisher’s exact: p-value = 0.043
4.10 Parents' Concern about their Child's Weight at Data Collection and their Child's Future Weight

Statements 13(a) and 13(b) in the questionnaire assessed parents’ concern about their child’s weight at data collection and in the future by using a Likert Scale format with 5 response categories from strongly agree to strongly disagree. The categories ‘strongly agree’ and ‘agree’ were collapsed into one category and parents who chose this category were considered as being concerned about their child’s weight. The categories ‘strongly disagree’ and ‘disagree’ were also amalgamated into one category. Parents who selected this category were considered as being unconcerned about their child’s weight. Another category was developed for respondents who were neutral about this issue.

4.10.1 Parents’ concern about their child’s weight at data collection and their child’s future weight associated with children’s measured BMI categories

Parents of underweight children may be concerned about their child’s weight because their child is underweight and not because their child is overweight. Therefore, parents of underweight children were excluded from this part of the analysis. Levels of concern were compared between parents of normal weight children and parents of overweight children (n=389).

Among parents of overweight children, 10.0% were worried about their child’s weight at the time of data collection and among parents of obese children, 23.1% were concerned about their child’s weight at the time of data collection. Among the same parents, 14.4% and 47.7% respectively were concerned about their child’s future weight. Parents of obese children were twice more likely to be concerned about their child’s future weight than their child’s weight at the time of the study. Figures 4.13 and 4.14 summarise the findings on parents’ concerns about their child’s weight during data collection and about the child’s future weight.
Fewer parents of normal weight children were concerned about their child’s weight than parents of overweight and obese children at both data collection (7.7% versus 10.0% and 23.1% respectively) and in the future (11.1% versus 14.4% and 47.7% respectively). These differences in concern among parents of children of different weight categories were found to be significant at the time of data collection ($\chi^2 = 27.68$, p-value <0.001) and in the future ($\chi^2 = 51.22$, p-value <0.001).
4.10.2 Association between parents’ concern about their child’s weight at data collection and their child’s future weight and parents’ perceptions of their child’s weight in verbal terms

The aim of the following computations was to examine whether parents’ correct classification of their overweight or obese child’s weight was likely to influence their concern about their child’s weight at the time of data collection and in the future. No statistical differences were found in parents’ concern about their child’s weight at data collection (Fisher’s exact = 2.82, \( p = 0.257 \)) or in the future (Fisher’s exact = 1.59, \( p = 0.550 \)) between parents of overweight children who correctly classified their child’s weight and those who misclassified their overweight child’s weight.

\( \chi^2 \): p-value < 0.001
On the other hand, parents of obese children who recognised their child as overweight were more likely to be concerned about their child’s weight status both at data collection and in the future than parents who did not correctly perceive their child’s obese status. Forty-eight percent of parents of obese children who recognised their child’s overweight status agreed that they were worried about their child’s weight during the study compared to 2.8% of parents of obese children who misclassified their child’s weight and were worried about their child’s weight (Fisher’s exact = 22.17, p-value <0.001). This finding is illustrated in Figure 4.15.

Figure 4.15 Parents’ perceptions of their obese child’s weight and their concern about child’s weight at data collection
Seventy-two percent of parents of obese children who recognised their child's overweight status were worried about their child's future weight in comparison to 27.8% of parents of obese children who underestimated their child's weight status (Fisher's exact = 12.66, p = 0.002) (Figure 4.16). Therefore, parents who perceived their obese child as overweight were more likely than those who did not to be worried about their child's weight at data collection and in the future.

Figure 4.16 Parents' perceptions of their obese child's weight and their concern about child's future weight

Fisher's exact: p = 0.002
4.11 Parents' Opinions Regarding the Health Consequences of Child Overweight

Parents were asked about their opinions on the health effects of child overweight. Four statements [13(c) to 13(f)] about the health consequences of child overweight were presented in the questionnaire with response options in the format of a Likert scale from strongly agree to strongly disagree. No response categories were combined as a rating score was worked out for further analysis.

Table 4.21 Parents' level of agreement with statements on the health consequences of child overweight

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>13c. Overweight children are likely to be overweight as adults.</td>
<td>5</td>
<td>28</td>
<td>41</td>
<td>198</td>
<td>136</td>
<td>408</td>
</tr>
<tr>
<td>13d. Overweight children are more likely to develop diabetes than children who are not overweight.</td>
<td>2</td>
<td>19</td>
<td>33</td>
<td>178</td>
<td>176</td>
<td>408</td>
</tr>
<tr>
<td>13e. Overweight children are more likely to develop chronic heart disease than children who are not overweight.</td>
<td>3</td>
<td>9</td>
<td>35</td>
<td>175</td>
<td>186</td>
<td>408</td>
</tr>
<tr>
<td>13f. Overweight children are more likely to have problems in their social relationships with other children than children who are not overweight.</td>
<td>10</td>
<td>2.5</td>
<td>13.2</td>
<td>65</td>
<td>119</td>
<td>408</td>
</tr>
</tbody>
</table>

The majority of parents were aware of the effects of childhood overweight. For example, 81.8% of participants agreed or strongly agreed with the statement 'Overweight children are likely to be overweight as adults' and 86.7% agreed or strongly agreed with 'Overweight children are more likely to develop diabetes than children who are not overweight'. About 90% of parents knew that overweight children...
were more at risk of developing chronic heart disease. However, less parents (68%) agreed or strongly agreed with the statement 'Overweight children are more likely to have problems in their social relationships with other children than children who are not overweight' than with the other 3 statements (Table 4.21). No significant differences were found in perceptions of the effects of child overweight amongst parents of children from different BMI categories (p-values for statements 13(c), 13(d), 13(e) and 13(f) are 0.183, 0.152, 0.441, 0.399 respectively).

The following rating scores in Table 4.22 were assigned to the Likert scale: Strongly disagree=1, Disagree=2, Neutral=3, Agree=4, and Strongly agree=5. After calculating a mean rating score for each statement, it is evident from the descriptive table that the majority of parents agreed with all statements as all mean rating scores were above 3. However, they agreed most with statement 13(e) followed by statement 13(d), statement 13(c) and statement 13(f). This result can be generalised to the target population of Maltese parents because it is not attributed to chance (ANOVA: F = 26.16, p-value <0.001).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating Score</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13c. Overweight children are likely to be overweight as adults</td>
<td>408</td>
<td>4.06</td>
<td>0.904</td>
</tr>
<tr>
<td>13d. Overweight children are more likely to develop diabetes than children who are not overweight</td>
<td>408</td>
<td>4.24</td>
<td>0.828</td>
</tr>
<tr>
<td>13e. Overweight children are more likely to develop chronic heart disease than children who are not overweight</td>
<td>408</td>
<td>4.30</td>
<td>0.778</td>
</tr>
<tr>
<td>13f. Overweight children are more likely to have problems in their social relationships with other children than children who are not overweight</td>
<td>408</td>
<td>3.79</td>
<td>1.078</td>
</tr>
</tbody>
</table>

ANOVA: p-value <0.001

The influence of parental awareness of the health consequences of child overweight on parents' perceptions of their child's weight in verbal terms and its influence on parents' concern about their child's weight were examined in the logistic regression.
4.12 Health History

Family health history was assessed by asking respondents about the incidence of heart attack, stroke, diabetes and hypertension among the child's parents and grandparents. All these illnesses are related to diet, low physical activity and obesity. Those respondents who reported a family history of one or more of these illnesses were further asked to choose a number of risk factors they perceived as contributing to the occurrence of every illness from a provided list of risk factors. Participants had to tick one or more options which included smoking, alcohol, diet, low physical activity, obesity or none of these factors.

Findings show that 79.2% of participants reported a parent or grandparent with a history of an illness related to diet, low physical activity or obesity (heart attack: 29.7%, stroke: 10.8%, diabetes: 44.9%, and hypertension: 60.3%).

Table 4.23 demonstrates respondents' perceived causes of a family history of heart attack, stroke, diabetes and hypertension. Only 5% of respondents with a positive family history of heart attack and stroke attributed these 2 illnesses to obesity. A larger number of respondents chose obesity as a related cause of diabetes and hypertension with 9.3% and 10.9% choosing obesity respectively. Another 36% of participants related heart attack and stroke with diet or low physical activity. About 50% of respondents attributed diabetes and hypertension to diet or low physical activity. A considerable percentage of respondents perceived smoking as a cause of heart attack (26.7%) and stroke (21.3%). A mean of 27.8% of respondents attributed a family history of these illnesses to none of the above risk factors.

Table 4.23 Parents' perceived causes of family history of illnesses related to diet, low physical activity or obesity

<table>
<thead>
<tr>
<th>Perceived causes of family history of illnesses</th>
<th>Heart attack</th>
<th>Stroke</th>
<th>Diabetes</th>
<th>High blood pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Smoking</td>
<td>48</td>
<td>26.7</td>
<td>16</td>
<td>21.3</td>
</tr>
<tr>
<td>Alcohol</td>
<td>12</td>
<td>6.7</td>
<td>9</td>
<td>12.0</td>
</tr>
<tr>
<td>Diet</td>
<td>40</td>
<td>22.2</td>
<td>16</td>
<td>21.3</td>
</tr>
<tr>
<td>Low physical activity</td>
<td>25</td>
<td>13.9</td>
<td>11</td>
<td>14.7</td>
</tr>
<tr>
<td>Obesity</td>
<td>9</td>
<td>5.0</td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td>None of these</td>
<td>46</td>
<td>25.6</td>
<td>19</td>
<td>25.3</td>
</tr>
</tbody>
</table>
4.12.1 Association between family health history and children’s measured BMI categories

The purpose of these computations was to assess whether frequency of illness related to diet, low physical activity or obesity varied by children’s measured BMI categories. Another computation tested the association between the perceived causes of family health history by parents and their children’s measured BMI categories. The frequency of individual types of illness related to diet, low physical activity or obesity did not significantly vary by child BMI group (p-values for frequency of heart attack, stroke, diabetes and hypertension are 0.422, 0.395, 0.086 and 0.513 respectively). The perceived causes of a history of an illness related to diet, low physical activity or obesity did not significantly vary by child BMI category (p-values for the perceived causes of heart attack, stroke, diabetes and hypertension are 0.316, 0.137, 0.865 and 0.566 respectively).

4.12.2 Association between family health history and parents’ perceptions of their child’s weight in verbal terms

The aim of the following computation was to assess whether family history of illnesses related to diet, low physical activity or obesity was likely to influence parents’ perceptions of their child’s weight in verbal terms. Correct or incorrect verbal perception of overweight children’s weight and of obese children’s weight by their parents did not vary significantly by family history of illnesses related to diet, low physical activity or obesity (Fisher’s exact = 0.133, p-value = 0.716 and Fisher’s exact = 0.365, p-value = 0.546, respectively).

4.13 Logistic Regression

Among parents of overweight and obese children, the influences of various factors on two dependant variables were examined using logistic regression. Logistic regression also eliminates independent variables that act as confounders. Parents of normal weight children were used as baseline for comparison. Responses of parents of underweight children were excluded as the number of these parents was small and parental
perception of and concern about underweight children may be influenced by different factors than perception of and concern about overweight and obese children.

The dependent variables were parental recognition that their child was overweight by words and level of worry about their child’s weight. Parental concern about their child’s weight was further categorised into 2 variables, namely parental concern about their child’s weight at data collection and parental concern about their child’s future weight. Factors that were expected to influence the above dependent variables were examined, and included: child’s gender, child’s measured BMI (inputted as a ratio variable), parental level of education, recall of a doctor telling the respondent that their child was overweight or gaining weight too fast, perception that their child was less active or slower than other children, parental awareness of the health consequences of child overweight, and illness in a parent or grandparent related to diet, low physical activity or obesity. Parental recognition of the child’s overweight status by words and sketch selection were also considered as potentially influential variables in relation to parental concern about their child’s weight. Tables 4.24, 4.25 and 4.26 give the logistic regression data for the independent factors against the dependent variables after a backward method was used to examine the potential influence of these independent factors on the dependent variables.

The most contributing variables for parental recognition of their overweight child’s weight by words were parental recall of doctor’s concern about their child’s weight, parental perception that their child was slower than other children and the child’s measured BMI (Table 4.24). Recall of doctor’s concern increased parental recognition of their overweight child by words (OR: 5.9; 95% CI: 1.1-30.9). Parents who perceived their child as slower than other children were 3.3 times more likely to recognise their child as overweight by words than parents who perceived their child as fast as or faster than other children (95% CI: 1.1-10.0). However, the significance of the influence of parental recall of doctor’s concern and perception that their child was slower than other children decreased from previous individual computations, showing the effect of confounders. Parents were 1.4 times more likely to perceive their child’s weight correctly with every increasing BMI unit (OR: 1.4; 95% CI: 1.27-1.61).
Table 4.24 Logistic regression for parental recognition that their child was overweight by words

<table>
<thead>
<tr>
<th>Influencing variables</th>
<th>p-value</th>
<th>Odds ratio (OR)</th>
<th>95% CI for odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental recall of doctor’s concern</td>
<td>0.037</td>
<td>5.861</td>
<td>1.112</td>
</tr>
<tr>
<td>Parental perception that their child was slower than other children</td>
<td>0.034</td>
<td>3.316</td>
<td>1.096</td>
</tr>
<tr>
<td>Child’s measured BMI</td>
<td>&lt;0.001</td>
<td>1.431</td>
<td>1.271</td>
</tr>
</tbody>
</table>

Parental concern about their child’s weight at data collection was influenced by parental recall of doctor’s concern about their child’s weight, parental perception that their child was slower than other children and the child’s measured BMI (Table 4.25). Parents who recalled doctor’s concern were 12 times more likely to be concerned about their child’s weight than parents who did not recall doctor’s concern (OR: 12.3; 95% CI: 3.9-38.9). Parents who perceived their children to be slower than other children were 4.7 times as likely as parents who perceived their children to be as fast as or faster than other children to be concerned about their child’s weight at data collection (OR: 4.7; 95% CI: 1.7-12.4).

Table 4.25 Logistic regression for parental concern about their child’s weight at data collection

<table>
<thead>
<tr>
<th>Influencing variables</th>
<th>p-value</th>
<th>Odds ratio (OR)</th>
<th>95% CI for odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental recall of doctor’s concern</td>
<td>&lt;0.001</td>
<td>12.338</td>
<td>3.917</td>
</tr>
<tr>
<td>Parental perception that their child was slower than other children</td>
<td>0.003</td>
<td>4.726</td>
<td>1.709</td>
</tr>
<tr>
<td>Children’s measured BMI</td>
<td>&lt;0.001</td>
<td>1.211</td>
<td>1.096</td>
</tr>
</tbody>
</table>

The variables that mostly influenced parents’ concern about their child’s future weight were parental perception that their child was less active than other children and the child’s measured BMI (Table 4.26). Parents who perceived their children as less active than other children were more likely to be concerned about their child’s future weight than parents who perceived their children as active as or more active than other children (OR: 2.9; 95% CI: 1.20-7.16). Moreover, parents were 1.3 times more likely to be
concerned about their child’s future correctly with every increasing BMI unit (OR: 1.3; 95% CI: 1.22-1.49).

Table 4.26 Logistic regression for parental concern about their child’s future weight

<table>
<thead>
<tr>
<th>Influencing variables</th>
<th>p-value</th>
<th>Odds ratio</th>
<th>95% CI for odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental perception that their child was less active than other children</td>
<td>0.018</td>
<td>2.930</td>
<td>1.199</td>
</tr>
<tr>
<td></td>
<td>&lt;0.001</td>
<td>1.348</td>
<td>1.218</td>
</tr>
</tbody>
</table>

Family history of an illness related to diet, physical activity or obesity, child’s gender, parental education level and parental awareness of the health consequences of child overweight were not found to have significant influence on any of the dependant variables examined. Parental perception of their child’s weight in verbal or visual terms did not influence significantly parental concern about their child’s weight at data collection or in the future.

4.14 Summary of the Main Results

A high prevalence of child overweight was found in the sample of 5 to 6 year-old children attending state primary school. Overall, 22.1% of children from the sample were overweight and 15.9% were obese according to IOTF criteria (2000) giving a total of 38.0% of children being overweight (n=155). Children who had their BMI classified as underweight made up 4.7% of the sample and children of normal weight accounted for 57.4% of the sample. Southern regions of Malta had a higher prevalence of child overweight than northern regions and Gozo.

Maltese parents’ perceptions of their child’s weight were studied in verbal and visual terms. Almost half the parents of underweight children classified their children’s weight correctly (52.6%) in verbal terms. Most of the parents of normal weight children classified their children’s weight correctly (84.6%), whilst few parents of overweight children perceived their child’s weight correctly (3.3%). However, almost half of parents of obese children classified their child’s weight correctly (44.6%). Parents of overweight children had a more correct visual than verbal perception of their child’s weight in contrast to parents of obese children who had a more correct verbal
perception of their child’s weight. Ten percent of respondents with overweight children had a correct image perception of their child’s weight compared to 24.6% of respondents with obese children who correctly perceived their child’s weight by sketch selection.

Another variable that was considered in the study was Maltese parents’ concern about their child’s weight at the time of data collection and in the child’s future. Among parents of overweight children, 10.0% were worried about their child’s weight at the time of data collection and among parents of obese children, 23.1% were concerned about their child’s weight at the time of data collection. Among the same parents, 14.4% and 47.7% respectively were concerned about their child’s future weight. Parents of obese children were twice more likely to be concerned about their child’s future weight than their child’s weight at the time of the study.

The last section of this chapter analysed the influence of various independent variables on two dependent variables among parents of overweight and obese children. The dependent variables included parents’ perception of their child’s weight in verbal terms, and parental concern about their child’s weight at data collection and their child’s future weight. Parental perception that their child was slower or less active than other children, child’s measured BMI and parental recall of doctor’s concern about their child’s weight were found to influence one or more of the dependant variables.

These results will be discussed in the following chapter, with reference to literature and to the limitations of the study.
CHAPTER 5

Discussion of the findings
5.1 Introduction

Research evidence indicates that parents can help prevent obesity in their own children only if they feel motivated because they appreciate the health risks of obesity, know what to do because they understand healthy eating and exercise habits, and comprehend that their child is at risk because they recognise obesity when they see it (Etelson et al, 2003). This is well supported by the Health Belief Model (HBM) which highlights the importance of the perceived susceptibility to and seriousness of a condition in order to induce health behaviour change (Rosenstock et al, 1988). These perceptions are modified by cues to action among other factors (Elder et al, 1999; Glanz et al, 1997).

This chapter presents a discussion of the findings of a study on Maltese parents' perception and concern about their child's weight within the context of the local situation and in relation to existing literature. It will also endeavour to discuss these findings in view of the aims and objectives of the study. In addition, limitations of the study will be considered in the last section.

5.2 Demographic Characteristics of Participants

The response rate of this study was 86%, consisting of 408 valid questionnaires out of 475 questionnaires that were disseminated (Table 4.1. p.62). All parents who returned a valid questionnaire gave consent for their child’s weight and height measurements to be taken. Response rate was very good despite the fact that the researcher had to rely on young children to take the questionnaire to their parents and return the filled in questionnaires to the researcher at their school. Many authors of research information (Oppenheim, 1999; Sitzia & Wood, 1998; Dillman, 1991) consider such a response rate as high. Piscopo (2000) obtained a similarly good response rate in their local studies by using a similar method of disseminating to and collecting from parents questionnaires through primary schoolchildren. However using the same method with 9 to 10-year-old children, Sharples (2006) had a parental response rate of 59%.

In this study on parents of 5 to 6-year-old children, most teachers were cooperative and asked the children to put the study material in a folder specifically designed to deliver any school communication or other material to the parents. Parents were supposed to check this folder on a regular basis. However, nine questionnaires were returned to the
researcher empty. There may be various reasons why these parents decided not to participate and it may not be easy to deduce any conclusions. First of all, parents may have been illiterate. Another reason may be that parents viewed the questionnaire as judgemental of their parenting skills. Moreover, parents may have not liked to give information about their children’s weight status. It is also possible that children might have forgotten to give the envelope to their parents or lost it till they arrived home.

It was noted that some parents of overweight children did not participate in the study (n=4). There may have been more than these which the researcher might have not observed. These parents left a message with the child’s teacher that they refused to participate. Every potential participant had the right to refuse, which was made clear in the information letter sent to the parents with the questionnaire. A slightly lower level of participation amongst parents of overweight children might have introduced bias in the research findings. It is possible that these parents were privately aware of their child’s weight problem, but reluctant to acknowledge it, particularly within the context of a parental perceptions survey. They might also dislike other people to interact with their child on health issues. For example, one teacher commented that these children did not attend school when their parents knew that the school doctor or nurse would be visiting the school for routine check-ups. This is inconsistent with Wake et al (2002) who commented that field researchers did not observe any apparent lack of willingness among parents of heavier children to participate. Other studies did not give information about this issue.

The majority of adult respondents were mothers (n=366 out of 408), comprising 89.7% of adult participants (Table 4.3. p.63). This denotes an under-representation of fathers. Generally, this prohibited comparison of findings between mothers and fathers. It may be interesting to specifically include fathers in further research to gain insight in their perceptions and how they differ from those of mothers. In some studies, it was found that fathers influence children’s physical activity habits (Moore et al, 1991), even though they seem to be less dominant in child-caring than mothers.

Most participants had a secondary school education or did not finish high school (Table 4.5. p.65). Parents’ education level seemed to be lower in the southern regions of Malta when compared to the education level of parents in the northern regions and Gozo (Table 4.6. p.66). In addition, the education level of parents in this study was lower than that of individuals in the age range of 20-39 years of age who participated in the
Chapter 5 Discussion

Census of 2005 and who might have had 5 to 6-year-old children at the time of this study. While this may be seen to limit generalisation of findings to the whole population of Maltese parents, another issue regarding this comparison needs to be considered. Census data does not differentiate education level in each age group by gender, and the majority of adults who participated in the study were females. Hence, it would have been more appropriate to compare the education level of study participants with the education level of females in the 20-39 years age group of the Census. Indeed, the Census shows that males tend to have a higher level of education than females. For example, more females did not finish secondary school than males (32.3% versus 24.3%) and fewer females completed a tertiary level of education than males (8.6% versus 10.6%). Thus, the education level of the participants could be close to that of the female population in Malta, though this could not be statistically confirmed.

Four-hundred and eight children participated in the study as all parents who filled in the questionnaire gave their consent for their child’s height and weight to be measured. All children who had their parents consent agreed to participate. Of these 408 children, 177 were girls (43.4%) and 231 were boys (56.6%) resulting in a ratio of 1:1.3 (Table 4.4. p.64). This is comparable with the ratio of 1:1.1 provided by the NSO for children born in 2002 to Maltese parents who at the time of data collection were 5 to 6-year old girls and boys and thus eligible to participate in the study. Hence, the ratio of boys and girls in the study sample can be said to be representative of the population of 5 to 6-year-old children born to Maltese parents.

5.3 Children’s Weight according to Region

Child overweight prevalence according to IOTF criteria (2000) was 22.1% and childhood obesity prevalence was 15.9%, giving an overall prevalence of 38% of 5-6 year-old children being overweight (n=155) (Figure 4.1. p.67). This is comparable to the child overweight prevalence in two earlier studies conducted in Malta. Baluci (2000) found a child overweight prevalence of 34% among 6-year-old school children (n=388) and Grech and Sant’Angelo (awaiting publication) found 33% prevalence among children of similar age in a recent study. The differences in prevalence might be due to the earlier studies recruiting participants from more types of primary schools than Government schools only. For example, Grech and Sant’Angelo reported that the
type of school the child was attending did not influence the BMIs of girls, while boys showed statistically significant differences, with lowest BMIs being found in private schools, followed by church schools and then by state schools. This was a population study which took BMI measurements of all children attending Year 1 (n=3461).

This cross-sectional study found that the southern regions of Malta had a higher proportion of overweight and obese 5 to 6-year-old children than central and northern regions (Table 4.9, p.69). This finding confirms Grech and Sant’Angelo’s population study (awaiting publication). A higher prevalence of child overweight in the southern regions could be attributed to a lower parental level of education. In this study it was found that the Northern Harbour, Southern Harbour and South Eastern regions had the highest number of participants with a secondary school education and less and the lowest number of participants who had post-secondary and tertiary education when compared to the Northern and Western regions, and Gozo. This low parental education level was significantly associated with higher rates of overweight children (Table 4.8, p.68).

Major differences in lifestyle may be adopted in the southern regions. The quality and quantity of food offered to children in this area may play an important role in the results obtained. There is a well established inverse relation between education and other markers of socioeconomic status, and morbidity (Kirlander, Berglund, Boberg, Vessby, & Lithell, 2001). Research carried out in several countries often times explained this relation by the adoption of unhealthy lifestyles by individuals with a low level of education (Chroiniere, Lafontaine, & Edwards, 2000; Davey-Smith, Neaton, Wentworth, Stamler, & Stamler, 1998; Lantz, House, Lepkowski, Williams, Mero, & Chen, 1998; Brunner et al, 1997; Hoeymans, Smit, Verkleij, & Kromhout, 1996; Dietz-Roux, Nieto, Tyroler, Crum, & Szklo, 1995; Pekkanen, Toumilehto, Uutela, Vartiainen, & Nissinen, 1995; Kaplan & Keil, 1993; Jacobson & Thelle, 1988). Further research is necessary to elucidate any possible differences in nutrition and physical activity habits among children from the different regions of the Maltese Islands.

5.4 Parents’ Recognition of their Child’s Weight Status by Words

Formulating effective community interventions for child overweight depends, in part, on local parental recognition of childhood weight problems and related future health
risks. It is likely that parents are the chief initiators of clinical consultation for primary school-aged children. If parents do not perceive a problem, then it is unlikely that they will seek help for their child’s weight as suggested by the Health Belief Model (Rosenstock et al, 1988).

In this study, it was found that only 20.6% of parents with an overweight child recognised that their child was overweight (Figure 4.5, p.73). Overall, parents had a tendency to perceive their child’s weight as normal weight even if their child was overweight or obese. It was found that 92.2% of parents of overweight children and 52.3% of parents of obese children perceived their child’s weight as normal. Some parents of overweight and obese children viewed their children as underweight (4.4% and 3.1% respectively). Parental identification of child obesity may be an indicator that the child’s family is concerned about weight status and may be more amenable to intervention than families who do not acknowledge their children’s weight problems.

This percentage of parental recognition can be compared with as low an incidence of parental recognition of 6% in Carnell et al’s study (2005) and as high as 68% in Maynard et al’s study (2003). The majority of studies had a percentage of less than 25% of parents of overweight children who correctly identified their child’s weight status.

The two studies with the highest incidence of parental perception of their overweight child as overweight were Maynard and Baughcum. Maynard et al (2003) found 67% correct child’s weight perception among mothers of overweight children and Baughcum et al (2000) found 29% correct perception. This may be due to differences in samples. Maynard et al assessed mothers with children of a much wider age range (2-11 years). Research indicates that parents of older children may be more likely to correctly perceive their child’s weight status than parents of young children (Huang et al, 2007; Maynard et al, 2003). Baughcum et al recruited over half of their families from paediatric clinics participating in a Special Supplemental Nutrition Programme for Women, Infants and Children (WIC), a programme that supplies supplemental food and nutrition counselling to low-income women and their children. Each of these samples might be expected to display higher awareness than parents of 5 to 6-year-old children drawn from community primary schools.

The finding that essentially four-fifths (80%) of parents failed to classify correctly their overweight child as ‘overweight’ may reflect a failure of parents to recognise the
overweight status of their child possibly because they may use a high weight threshold for defining child overweight. Other reasons for such high parental misperception of their child’s overweight status may be a reluctance to admit that their child is overweight or to label their own child as overweight as there might be fear of stigmatisation or blame. While this study demonstrated that parents of overweight children systematically underestimate their children’s weight, the study did not assess the reasons for parental misperceptions of their child’s weight. Qualitative studies are necessary to explore the reasons for the lack of Maltese parents’ recognition of their child’s overweight status.

In small focus group discussions, Jain et al (2001) and Baughcum et al (1998) provided qualitative evidence of the reluctance of low-income mothers to describe their preschool children as overweight. These mothers expressed distrust of medical height-weight charts, felt that children could not overcome their genetic predisposition to obesity, believed that having bigger children signifies good health and parental competence, or grew concerned about their child’s weight only when it impaired their activity and social functioning. They also tended to believe that their child will outgrow being overweight once the child becomes older, taller and more active. In fact in other studies, parents were more likely to classify older children as overweight as compared with younger children in studies including children from a wide age range (Maynard et al, 2003).

In a qualitative study about the perceptions of health care professionals providing nutritional counselling to low-income mothers with overweight pre-school children, participants reported that mothers lacked knowledge about normal child development and eating behaviour (Chamberlin, Sherman, Jain, Powers, & Whitaker, 2002). Parents of young children often express anxiety about thinness and ‘picky eating’, when this is developmentally normal (Birch & Fisher, 1998). Ironically, overweight children may appear better nourished and be perceived as ‘better eaters’.

The tendencies of the mothers, in the above mentioned study, to perceive their child’s weight incorrectly and minimise issues related to overweight might also be seen in mothers with other sociocultural and economic backgrounds, but at this point, this study did not reveal whether this is the case. Clearly, additional research is necessary to gain a more thorough understanding of how parents perceive their child’s weight status.
Moreover, the increasing prevalence of child overweight may have ‘normalised’ this condition and contributed to the inability of parent to recognise when their own child is overweight. Stereotypes of overweight children portrayed in the media tend to be at the severe end of the overweight spectrum. In fact, most overweight young children in the community do not stand out from the crowd.

While the extent of parents’ failure to categorise their children’s weight according to medically established definitions of child overweight is noteworthy, it may be unreasonable to expect lay definitions to coincide with those of health professionals. This lack of parental awareness of their child’s overweight status may affect parents’ engagement with weight control for their children. Health professionals, especially nurses who work in close contact with children can help improve recognition of childhood overweight. The charting of child BMI could be encouraged as a part of normal practice, not only to provide an objective measure of weight status, but also to reassure parents who are anxious about underweight and may coerce their children to overeat. This can also help trigger discussion between health professionals and parents of overweight children, paving the way to look for treatment of the problem and may consequently result in family behaviour change.

Some parents overestimated (2.5%) their child’s weight with the majority of these being parents of underweight children. In fact, 47.4% of parents of underweight children classified their child’s weight status as ‘normal’. This finding is important because health care professionals may be hesitant to raise weight concerns with children and their parents for fear of putting too much pressure on children to lose weight or of initiating an eating disorder. It has been argued that even well-meaning health promotion campaigns can have adverse side effects (Social Issues Research Centre, 2006). Over-zealous promotion of healthy eating and constant warnings about the dangers of being overweight are also now widely recognised as contributing factors in the development of eating disorders such as anorexia nervosa especially among young girls. Although weight concerns should always be discussed in a sensitive manner, findings of the study suggest that parents who overestimate their children’s weight status are a minority.
5.5 Parents’ Recognition of their Child’s Weight Status by Sketch Selection

In this study, child sketches assessed the child’s BMI group less sensitively than did parental report by words. Indeed, 59% of respondents identified their child’s weight correctly in verbal terms compared to 51.5% of respondents who classified their child’s weight correctly in visual terms (Figure 4.6, p.77). In addition, fewer parents classified their child’s overweight or obese status correctly by sketch selection than by words. Findings indicate that 16% of respondents with overweight and obese children had a correct image perception of their child’s physical stature in contrast to 21% of parents who correctly classified their overweight or obese child’s weight status in verbal terms. This is not similar to the findings of the study by Eckstein et al (2006), whose findings demonstrated that few parents (36%) identified their overweight child as ‘overweight’ using words, but more parents (70%) selected a middle or heavier sketch.

These authors allowed for a wider margin of error since if a parent of an overweight child selected the middle or a heavier sketch, it was considered to indicate good perception of the child’s weight. They used figure sketches without exact correlation to actual BMI-for-age and sex ranges to represent body types for selection by survey participants. In contrast, this study used the CBIS which provided actual representations of children with known BMI-for-age and sex ranges for selection. Thus, the researcher was able to compare and interpret demonstrated differences in perceived and actual weight status more accurately. No published studies were found that had used the CBIS and this limited comparison of findings with those of other studies. Another reason for this high visual misperception among parents in the local study may be that respondents might have found it difficult to associate their child’s physical stature with a sketch in the scale, for example, the overall body shape of their child could have been different from that of the child figure corresponding to the same BMI, making comparisons difficult.

Parents of overweight children were more likely to correctly identify their child’s weight in visual terms than in verbal terms (10% versus 3.4% respectively). This may indicate that the CBIS may consist of too small a number of sketches representing overweight children for parents to be able to distinguish between normal weight children and overweight children. Indeed, 90% of overweight children were misclassified in visual terms by their parents. In contrast, parents of obese children were less likely to classify correctly their child’s weight in visual terms than in verbal
terms (24.6% versus 44.6% respectively). Hence overall, 48.0% of parents having an overweight or an obese child classified their child’s weight status correctly in verbal terms, whereas 34.6% of parents of overweight and obese children classified their child’s weight status correctly in visual terms. Research is necessary to examine the influence of the order of the sketches on sketch selection.

5.6 Parental Concern about their Child’s Weight

Research that tests the relationship between recognition of a health problem and concern is limited. Hopwood, Shenton, Laloo, Evans, and Howell (2001) reported higher levels of concern among women who perceived the possibility of having breast cancer because of a family history. However, the researcher commented that the cause/effect of this relationship was uncertain. In another study on women, Mosca, Jones, King, Ouyang, Redberg, and Hill (2000) found that most participants did not perceive that heart disease is a substantial health concern as they were not well informed about their risk. Results also showed that lack of awareness of the risk of heart disease impeded the development of concern about the condition, the uptake of preventive efforts as well as the adoption of positive lifestyle changes.

This study also sought to identify whether parental recognition of child overweight as a health problem may be related to parents’ concern. In this study, parents of obese children who recognised their child as overweight were more likely to be concerned about their child’s weight status both at data collection (48.3%; Figure 4.15. p.91) and in the future (72.4%; Figure 4.16. p.92) than parents who did not correctly perceive their child’s overweight status (3.4% and 34.5% respectively). Parental concern may, in turn, motivate behaviour change along the lines of the Health Belief Model. This model states that individual awareness of his susceptibility to and seriousness of the disease or health condition under consideration may motivate the individual to consider changing his behaviour (Rosenstock et al, 1988). However, awareness of a problem does not necessarily translate into concern on an individual level. Parents of overweight children who correctly classified their child’s weight (3 out of 90 parents) were not concerned about their child’s weight at data collection nor in the future. In the logistic regression, other explanatory variables of parental concern were identified, which were of more significant value than parental correct identification of their child’s weight.
Despite the high rate of overweight and obesity in 5 to 6-year-old children in Malta and the high rate of misclassification of overweight and obese children by their parents, overall few parents were worried about their child’s weight. For instance, only 9% of 155 parents of overweight and obese children were worried about their child’s weight at data collection (Figure 4.13, p.89) and 13.5% of these 155 parents were worried about their child’s future weight (Figure 4.14, p.90). A low level of parent-reported concern about their child’s weight is consistent with a number of recent published studies in different countries across a range of populations of varying age groups (Carnell et al, 2005; Wake et al, 2002; Baughcum et al, 2000; Goodman et al, 2000; Young-Hyman et al, 2000).

This lack of parental concern may foretell difficulty with recruiting families into treatment programmes for child overweight and with achieving behaviour changes in response to counselling on child overweight conditions. This is supported by the Health Belief Model, which implies that individuals should view their health condition as worthy of intervention in order for them to seek help.

While acknowledging that misconceptions about weight status could be an important reason for low levels of concern, other explanations are possible. For example, parents may not be aware of the health risks linked with child overweight. Indeed, one of the prerequisites for behaviour change in the Health Belief Model is the individual’s perception of the seriousness of the condition. If parents are unaware of the health consequences of overweight in their child, they may not view behaviour change as necessary. However, participants’ knowledge on the health consequences of child overweight was found to be high. This study has also assessed the association between parental awareness of the adverse effects of child overweight on health and parental concern, which will be discussed later on in this chapter. Additional research is necessary to assess the relation between parental knowledge of the health consequences of child overweight, parental concern about their child’s weight and the uptake of child overweight treatment.

Moreover, their children’s health in the present may have reduced parental concern about the children’s weight. This shows the need for a cue for action. The HBM proposes that in addition to an individual’s perception of the susceptibility to and seriousness of a health condition, an important factor that may motivate an individual to change behaviour is the cue for action (Elder et al, 1999; Glanz et al, 1997). Cues to
action refer to immediate and relevant stimuli that are needed to trigger recognition in
the person's mind of the susceptibility and seriousness of a disease, and the need for
taking action to reduce the threat (Friedman, 1992). This study looked into a number of
factors that could act as cues to action and their influence on parental concern. Such
results and their impact on parental concern will be discussed in later sections of this
chapter. Research is deemed necessary to identify and test the effectiveness of further
possible cues to action that can help motivate parents of overweight and obese children
to seek professional help for their child's weight problem. Health professionals can use
these cues to action to motivate parents to change family health behaviour and maintain
a healthy lifestyle once it is established.

Many more parents reported concern that their child would become overweight in the
future than at present. Parents may not view their child's weight as a health problem
that requires immediate treatment. Instead, they may perceive their child's weight as a
predisposition for future overweight. Betz, Hunsberger, and Wright (1994) discussed
that parents may have a low level of perceived vulnerability to illnesses about their
children at present, which implies that they think that their child's health will not be
affected now. Moreover, parents may perceive obesity as causing problems in the
future, resulting in a low level of concern about their child's weight at data collection.
Indeed, parents who recognised limitations at data collection, for example, that their
child was slower than other children, were more likely to be concerned about their
child's weight. Interestingly, the only immediate problem of childhood obesity, which
is its psychosocial consequences, was the one identified least by parents as an adverse
effect of childhood obesity. This may suggest that reframing discussions of children's
weight in terms of preventing future overweight rather than tackling current overweight
might be a way to engage parents while avoiding the stigma of parental blame.
Alternatively, greater use of school and community-wide interventions would eliminate
the need to raise the potentially sensitive issue of a particular child's weight. This
would have the added advantage of promoting healthy eating and exercise patterns in
currently normal weight children who may go on to become overweight.

Low level of parent-reported concern about their child's overweight status may have
both negative and positive implications on children's health. On the one hand, many
overweight/obese children do not seem to suffer general adverse health effects that are
serious enough to cause their parents concern. Therefore, a low level of parent-reported
concern can be seen positively, since ideally all children with chronic conditions, including obesity, would enjoy the same quality of life as their healthy peers. On the other hand, at a population level overweight/obese children are experiencing limitations to their general health, physical functioning, psychosocial well-being and family relationships (Dietz, 1998b). Effective interventions to help these children are urgently needed. Hence, if parents do not perceive the health impact of child overweight and feel concerned, it seems unlikely that they would seek health care for their child’s weight. Given the indication of a possible relationship between parental recognition and concern about their child’s overweight status, ways to foster an accurate parental perception of their child’s weight status should be developed and tested.

5.7 Factors associated with Parental Recognition and Concern about their Child’s Weight

Several computations were carried out to assess associations between a number of explanatory variables and dependent variables. Logistic regression was performed to eliminate confounders and confirm or refute the associations resulting from the other computations. It may be possible that certain factors were not found to significantly influence the dependent variables due to a low variance among different response categories.

Factors that were found to significantly increase parental recognition of their child’s overweight status were the child’s measured BMI, parental perception that their child was slower than other children and parental recall of doctor’s concern about their child’s weight. Parental recognition of their child’s overweight status by sketch selection was found to be also associated with child’s gender. Influencing variables for parental concern included parental perception that their child was slower or less active than other children, parental recall of doctor’s concern about their child’s weight, and the child’s measured BMI.

5.7.1 Child’s BMI group

Overweight children were more likely to be recognised as overweight if their BMI was classified as obese by IOTF cut-off points (2000). In fact, only 3.3% of overweight children were classified by their parents as overweight compared to 44.6% of obese
children whose parents recognised them to be overweight in verbal terms (Figure 4.5. p.73). Moreover, parents were 1.4 times more likely to perceive their child’s weight correctly with every increasing BMI unit (Table 4.24. p.98). This finding compares well with Adams et al (2005). Other studies did not differentiate between overweight and obese children, but included them into one weight category. This result may imply that the increasing prevalence of child overweight may have ‘normalised’ this condition and contributed to the inability of parents to recognise when their own child is overweight. It may also entail that Maltese parents are more accepting of their children’s weight increases.

The children’s measured BMI categories were also found to influence parental concern about their child’s weight. Parents of obese children were twice as likely to be concerned about their child’s weight at data collection as parents of overweight children and 3 times as likely as parents of normal weight children. In addition, parents of obese children were 3 times as likely to be concerned about their child’s future weight as parents of overweight children and 4 times as likely as parents who had normal weight children.

As the child’s BMI group was related to both independent and dependent variables, it was considered as an important confounder in the associations between these variables. For example, doctors were found to be more likely to show concern if the child was obese than if the child was overweight. Likewise, parents were more likely to perceive their child as overweight if the child was obese than if the child was overweight. Hence, the relationship between parental recall of doctor’s concern about their child’s weight and parental correct perception of their overweight child’s status might have been confounded by the child’s BMI. For this reason, logistic regression was performed in order to control for such confounding effect.

5.7.2 Child’s gender

A number of studies found child gender to influence parent’s correct recognition of a child’s overweight status with mothers of overweight daughters being more likely to perceive them as overweight than mothers of overweight sons (Jeffery et al, 2005; Olvera et al, 2005; Boutelle et al, 2004; Maynard et al, 2003). Other studies did not find a significant influence of child gender on parental recognition of their child’s
overweight status (Adams et al, 2005; Wake et al, 2002; Baughcum et al, 2000). This may be due to studying preschoolers, and these differences may not surface until school-age and adolescence.

In this study, parental perception of their child’s overweight by words was not significantly influenced by child’s gender. However, a significant association was found between parental recognition of their child as overweight by sketch selection and the child’s gender (Figure 4.7. p.78). Sorting parents’ perceptions of their overweight child in visual terms by children’s gender, 8.3% of parents of overweight boys perceived their son’s weight correctly compared with 25.4% of parents of overweight girls who perceived their daughter’s weight correctly (p-value = 0.004). This association was not tested for confounders by logistic regression. While this significant relationship between parents’ perceptions of their overweight child’s weight status in visual terms and child’s gender may be related to gender differences in body composition (Sopher, Thornton, Wang, Pierson, Heymsfield, & Horlick, 2004), it seems more likely to reflect social values. Parents may be more sensitive to weight and body image issues for girls, while larger boys may be seen as having a physical advantage. Whether or not these inaccuracies in the perceptions of parents having overweight boys serve as an impediment to parental support for healthy weight management or, conversely, shade boys from unhelpful pressures to lose weight warrants further exploration.

5.7.3 Parents’ education level

Findings demonstrated that parents’ education level was lower in the southern regions of Malta when compared to the education level of parents in the northern and central regions (p-value = 0.013; Table 4.6. p.66). Moreover, children of parents with a higher educational level were less likely to be overweight (p-value = 0.010; Table 4.8. p.68). This may shed light on the higher rates of child overweight in the southern regions. Parents with a higher educational level may be more aware of healthy dietary and physical activity patterns and they may influence their children to adopt such healthy habits.

Unlike the results of some studies (Huang et al, 2007; Baughcum et al, 2000; Goodman et al, 2000), parents’ recognition of child’s overweight did not differ according to
parents’ education level (p-value = 0.157), even though there were sufficient numbers of responses from families with both lower and higher education levels. These discordant findings might reflect true variation between distinct populations or may simply be a result of differences in the respective research designs.

Similarly, parents’ education level was not found to influence parents’ concern about their child’s weight (Table 4.25, p.98; Table 4.26; p.99). This might be due the fact that few parents of overweight and obese children had a higher educational level. Only 9 out of 155 parents of overweight and obese children had a tertiary level of education (5.8%) and 7 (out of 9, 77.8%) of these parents had an overweight child rather than an obese child. The influence of parental education on parents’ perceptions and concern about their child’s weight needs further exploration.

5.7.4 Parental recall of doctor’s concern about their child’s weight

Few parents of overweight children recalled that their child’s doctor ever told them that their child was overweight or was gaining weight too fast. Results show that 16.9% of the parents of obese children and 1.1% of the parents of overweight children that recalled such doctors’ comments (Table 4.15, p.79). Those parents who recalled such advice were more likely to acknowledge their child’s overweight status in the study than those who did not recall doctor’s concern about their child’s weight (Figure 4.8. p.80). This supports Eckstein et al’s (2006) findings. Such parents were also more likely to be concerned about their child’s weight. In this study, however, it was not determined whether these parents would be more likely to seek help for their child’s weight problem once they acknowledged the problem and were concerned about it. This area necessitates further enquiry. Advice from health professionals can be considered as a cue to action by parents of overweight children. In fact, the Health Belief Model suggests that advice and concern by significant others could result in behaviour change (Glanz et al, 1997). Health professionals are often viewed and respected as significant others by clients (Naidoo & Wills, 2000).

This association of parental recognition and concern about their child’s weight with recall of doctor’s concern about this weight can be utilised to increase parental concern about a child’s current weight status. Doctors are more likely to show their concern about the weight status of overweight and obese children as the guidelines for the
prevention of pediatric overweight and obesity becomes more widespread (Barlow & Dietz, 1998). In this sample, physician advice on the child’s overweight status was infrequently recalled, even by the parents of obese children. It was found that 1.1% (n=1 out of 90) of parents of overweight children and 16.9% (n=11 out of 65) of obese children recalled their doctor ever mentioning that their child was overweight or gaining weight rapidly. Concern about a child’s weight can also be shown by nurses who work in close contact with children either in schools, hospitals and the community. However, young children may have more contact with their family doctor for early life ailments than with nurses.

5.7.5 Parents’ perceptions of their child’s physical ability/activity levels

According to the findings, many parents perceived their children as being relatively active. Parents of both overweight and obese children did not perceive their child as more physically inactive in terms of the frequency of days per week the child engaged in physical activity (Table 4.16. p.84). Campbell et al (2006) had similar findings in a community-based sample of 324 preschool-aged children and their parents. Perceiving children as being relatively active may hinder parents from viewing child overweight as a health problem that would need professional assistance. As long as parents do not perceive child overweight to be adversely affecting their child health, they may not be concerned about their child overweight status to an extent that they consider family behaviour change as essential. Logistic regression showed that parental concern about their child’s weight at data collection was significantly influenced by parents’ perception of their child being slower than other children (p-value = 0.003; Table 4.25. p.98). Moreover, parental concern about their child’s future weight was influenced by their perception that their child was less physically active than other children (p-value = 0.007; Table 4.26. p.99).

Among parents of overweight children, the perception that their child’s activity habits and abilities were more limited in comparison with other children of the same age was associated with recognition of their child as overweight (Table 4.20. p.87; Table 4.24. p.98) similar to Eckstein et al’s (2006) and Young-Hyman et al’s (2000) findings. According to the Health Belief Model, this perception of children’s limited physical activity and ability may serve as a cue to action for recognition of child overweight. This supports the qualitative research findings of Jain et al (2001) and Baughcum et al
Both studies found that mothers were more likely to recognise their child's overweight status when children developed limitations in their physical activity. It is suggested that the use of fitness measures that are user-friendly in primary health care, for example a step-test, may be one way to increase parental recognition of a child's overweight status.

5.7.6 Parents' knowledge on the health risks of child overweight

Acceptance of the diagnosis and understanding of child obesity as a serious health risk may be necessary before actual child weight loss intervention can be effective. The majority of parents seemed to be aware of the health consequences of child overweight with all mean rating scores being above 3 (Table 4.22, p.94). Awareness of the health risks of child overweight can also serve as a cue to make behaviour changes as suggested by the Health Belief Model (Elder et al, 1999; Glanz et al, 1997). In addition, knowledge of these health risks can also help parents acknowledge that child overweight is a serious condition that calls for the seeking of professional treatment and behaviour change. This is also supported by the Health Belief Model which implies that an individual needs to understand the seriousness of a health condition before considering behaviour change.

Although obesity is clearly an objective, measurable phenomenon (for example, BMI), it is also socially constructed and has inherent psychosocial implications and psychological meaning for the individual (Goodman et al, 2000; Strauss, 2000). Although greatly increased risks for health-related problems often accompany obesity, perhaps the most devastating consequences of children being overweight are psychosocial (Lynn-Garbe & Hoot, 2004; Dietz, 1998b). Children develop negative attitudes about overweight peers at early ages. Unchecked, such attitudes often lead to intentional weight-related teasing.

From an early age, research suggests that many cultures stigmatise overweight children as lazy, stupid, slow, and self-indulgent (Dietz, 1998b). One study, for example, found that children as young as age 6 associated being overweight with an assortment of negative characteristics, including laziness and sloppiness (Dietz, 1998b). Moreover, overweight children are perceived as being less likable. As a result, they often are excluded from social development opportunities such as play. Richardson, Goodman,
Hastorf, and Dornbusch (1961) and Latner and Stunkard (2003) found that 10 and 11-year-old boys and girls ranked drawings of children with a wide variety of handicaps as more likeable than children who were overweight. As a result of the negative perceptions of being overweight, obese children are likely to experience depression and low self-esteem and to become socially withdrawn (Dietz, 1998b). A study of children as young as age 5, for instance, found that overweight girls reported lower self-concept and lower perceived cognitive ability than girls of lower weight (Davison & Birch, 2001a). The social construction of childhood obesity and its impact on parents’ willingness to seek treatment for their child’s weight problem is an important area of future inquiry.

Despite the various psychosocial consequences of child overweight, parents disagreed mostly with the statement that overweight children may have problems in their social relationships. This phenomenon of problems in the social relationships of overweight children might have been too sensitive for parents to admit it. No significant difference was found between the perceptions of parents of normal weight children and those of parents of overweight children with regards to parents’ perceptions of the psychosocial consequences of child overweight ($p = 0.381$). Parents of overweight children may be unwilling to acknowledge that their child is having problems in his/her social relationship with other children, whereas parents of normal weight children may be unaware of this consequence of child overweight. However, this question was found weak when testing for test-retest reliability (Percentage agreement = 80.6%).

Parental knowledge of the health risks of child overweight was not found to be significantly related to parental perceptions and concerns about their child’s weight using logistic regression. This shows that knowledge of the adverse health effects of child overweight does not necessarily lead to better parental perception of their child’s weight status or to increased parental concern about their child’s weight. Therefore, increasing parental awareness of the health consequences of child overweight may not be effective on its own to improve parental perception and concern about their child’s weight. Increased efforts are necessary to help parents perceive overweight in their children and view child overweight as a serious health problem that requires professional treatment.
Chapter 5 Discussion

5.7.7 Family history of illness related to diet, low physical activity or obesity

Many parents reported illnesses among the child’s parents or grandparents that are related to diet, low physical activity or obesity. Findings show that 79.2% of participants reported a parent or grandparent with a history of an illness related to diet, low physical activity or obesity. Few parents perceived these illnesses to be related to obesity (Table 4.23. p.95). The majority of respondents related these illnesses to diet and/or low physical activity or none of these factors. This may indicate that most respondents did not perceive obesity as a health risk and a contributor to their family history of such illnesses as myocardial infarction, stroke, diabetes and hypertension.

Although the majority of parents (86.8%) were aware that overweight children have an increased risk of developing diabetes than children of normal weight (Table 4.21. p.93), only 5.9% of participants related a family history of diabetes to obesity. A minority of those participants (14.6%) who had a family history of diabetes and knew of the increased risk of developing diabetes for overweight children related a family history of diabetes to obesity. This inconsistency might be due to participants being reluctant to admit having obese family members when questions required a response on their own family. On the other hand, they might not find it difficult to relate diabetes to overweight when the question was addressed in general as a knowledge question.

Family history of such illnesses was not found to be an influential factor on parental perception of their child’s weight and on parental concern about their child’s weight. A reason for this lack of association may be due to the fact that few respondents related family history of these illnesses to obesity. If parents do not perceive obesity as a risk factor for such family illnesses, obesity will not be considered as having serious consequences. Therefore, family history of such illnesses may not stimulate better perception of child overweight or parental concern about their child’s weight. This hints at the need for additional evaluations of the impact of family history of illnesses related to diet, low physical activity or obesity on parents’ perceptions of their child’s weight and parents’ concern about their child’s weight in larger samples. The general population, including parents of overweight and obese children, would benefit from increased awareness on the association of a family history of myocardial infarction, stroke, diabetes and hypertension with obesity.
The Health Belief Model includes framing counselling in the context of the perceived recognition of the consequences of the health behaviour. The effects of counselling the parent on the consequences for the child of unhealthy dietary and physical activity habits are unknown (Eckstein et al., 2006). Betz et al. (1994) argued that educational strategies to increase family health behaviours have not demonstrated consistent effectiveness.

Ariza, Greenberg, LeBailly and Binns (2005) applied a practice systems intervention and cross-sectional evaluations at pre-intervention and post-intervention periods. The intervention focused on the education of clinicians and staff regarding assessment of the nutritional status of children and implementation of the routine use of educational material on healthy dietary and physical activity habits. Focus groups were used to assess parents' reactions to the intervention. Findings indicated that parents would welcome a greater emphasis on the consequence of unhealthy behaviours to motivate them to change family health practices (Ariza et al., 2005). This emphasis may be helpful as the adverse effects of unhealthy behaviours can serve as a cue to action for the parent of an overweight child, which in turn may lead to family behaviour change as proposed by the Health Belief Model.

5.8 Limitations of the Study

This section presents limitations of the sample and methodology of the study.

5.8.1 Limitations of the sample

To the researcher's knowledge, this was the first local study to identify Maltese parents' perceptions and concern about their child's weight. A strength of this study was the fact that state primary schools were randomly selected according to their location from each region of Malta, including Gozo. Then, 80 students were randomly selected from each state primary school. However, a few limitations of this study should be considered.

Children who were absent on the days of data collection were excluded. This was considered as a limitation in sampling, as it might have decreased the randomness of
the sample. Due to time and resource constraints, it was not feasible to lengthen the 
time span of data collection to possibly include a few more potential respondents. 

Although sample size was relatively large (n = 408 out of 475), dividing participants’ responses into various categories resulted in small numbers in some response categories at times. This necessitated the amalgamation of response categories in some instances. In addition, poor variance in some response categories probably influenced the ability of statistical calculations, including logistic regression, to identify significant levels of differences.

The prevalence of overweight children according to regions should be viewed as exploratory because of the limited sample size from each region. However, an encouraging issue is that the proportions of child overweight with a higher prevalence in the southern regions of Malta and the differences in child overweight among the regions are similar to the population study carried out by Grech and Sant’Angelo (awaiting publication). Thus, this may hint at the generalisability of findings to the target population consisting of 5 to 6-year-old children attending state primary schools.

Research shows that parental education level influences child overweight and parental perception of their child’s weight (Huang et al, 2007; Baughcum et al, 2000; Goodman et al, 2000). The study sample was taken from state primary schools. These cater for the largest number of primary schoolchildren, and hence, there was a higher probability that parents from a multitude of socioeconomic strata and with differing educational background would be included in the study. However, families from the lower strata of society may not afford to send their children to private schools. Therefore, parents of a higher socio-economic level may have been under-represented. Hence, the inclusion of state primary schools only in this study might have adversely affected the prevalence rate of child overweight and obesity in Malta. A similar study including parents of children from state schools, church and private schools as eligible to participate may allow for comparisons amongst the perceptions of parents having children attending these different types of schools.

Although the researcher had to rely on young children to give the envelope containing the questionnaire and consent form to their parents and to return them to school, response rate was very good (86%). However, the few non-respondents could be atypical of the rest of the sample, introducing a small element of bias.
As the majority of respondents were the child’s mother, the results cannot be generalised to fathers. A higher participation by mothers than fathers may show that the mother still plays a crucial role in taking care of young children including school matters, in spite of the fact that many mothers nowadays work outside the home. Findings from a large-scale study showed that the main influence on children’s food intake and choices was the mother (Piscopo, 2004). Only 8.8% of participants were the fathers. This is similar to the participation rate of fathers in other studies about parents’ perceptions of their child’s weight that included either parent as a potential respondent (Eckstein et al, 2006; Adams et al, 2005). Further research including a large sample of fathers is essential as in a number of families, the mother and the father share childcare as both of them work outside the home. It is important to understand fathers’ perceptions and concern about their child’s weight especially if they are responsible for shaping their children’s eating and exercise patterns.

5.8.2 Limitations of the methodology

This study represents a cross-sectional evaluation of Maltese parents’ perception and concern about their child’s weight. This should be considered when interpreting the results. A limitation of a cross-sectional study is its inability to establish cause-and-effect relationships conclusively (Polit et al, 2001). Caution was taken when interpreting results on the explanatory variables that were found to influence parental perception and concern about their child’s weight. In addition, due to the cross-sectional nature of the study, one cannot comment on whether current parent ability to recognise the weight status of their children at a given age adequately reflects their ability to recognise the weight status of their children in the past or future. Cohort studies would be needed to address these remaining concerns.

Translation and back-translation procedures were performed for a modified version of the questionnaire by Eckstein et al (2006). The questionnaire and children’s measurements were pilot-tested to improve the questionnaire’s readability and applicability and to check feasibility of taking children’s measurements in schools. Test-retest reliability of the questionnaire was also assessed in order to determine stability of the questionnaire.
Chapter 5 Discussion

The study adopted a cross-sectional quantitative research approach. Further insight might have been gained by allowing space for open-ended responses as to why parents did or did not perceive their child to be overweight. It was intended that the questionnaire be filled by parents from all classes of society and therefore, response categories were provided for each question to overcome writing problems. Another limitation is that psychological issues, such as parental concern about their child’s weight, were measured only by one question. Focus groups or interviews would be ideal to gather qualitative data on the rationale behind parents’ perceptions and concern about their child’s weight as they do not require participants to write down their responses.

Question 9 required parents to remember if their doctor ever mentioned that their child was overweight or gaining weight too rapidly. Some parents may have forgotten such doctor’s concern and so results for this question may be slightly inaccurate. Although recall bias can be minimised, it is inevitable in studies requiring participants to recall information (Hasan, 2006).

Data analysis could also have some limitations. Efforts were made to ensure that selection of statistical tests would be appropriate for the variable being measured, in the light of sample size limitations. Problems were particularly related to the small numbers in certain response categories and the strong association between variables. As a consequence, non-parametric tests had to be used in most of the computations. These problems also contributed to limitations with using logistic regression.

The objective assessment of children’s stature is one of the strengths of this study. Weight and height measurements of all children were obtained by the researcher herself, preventing inter-observer bias. Various precautions were taken to standardise these measurements. Children were asked to remove their shoes and jackets prior to measuring their weight and height. Weight measurements were taken with a digital weighing balance that was pre-calibrated by the National Metrology Laboratory, Malta Standards Authority. Height measurements were obtained using a wall-mounted ruler as portable stadiometres are expensive. Minor inaccuracies may have led to BMI group misclassification. Nonetheless, findings would not have changed by misclassification of a few individuals.
Despite the various limitations of the study, an overall rational approach was used to investigate Maltese parents’ perceptions and concern about their child’s weight. To this extent, the findings, considered in the light of its limitations and against the framework of existing theory and literature, may be considered as useful evidence. The next chapter concludes the study as well as presents a number of recommendations for practice, nursing education and further research.
CHAPTER 6

Conclusion and Recommendations
6.1 Conclusion

Parental involvement is important for weight reduction and healthy weight maintenance in children. Research shows that parents have a strong influence on children’s dietary intake and level of activity, and parental encouragement has been shown to be important for adoption of healthy eating and physical activity behaviours by their children (Heitzler, Martin, Duke, & Huhman, 2006; Benedikt, Wertheim, & Love, 1998).

Crucial to parental involvement in weight maintenance efforts among children is parental recognition of overweight in their children and a heightened level of health concern for their overweight children. Studies demonstrate that parental recognition of the overweight status of their children and of health risk associated with overweight is associated with parental readiness for action with regard to their child’s weight (Rhee, De Lago, Arscott-Mills, Mehta, & Davis, 2005). Interventions targeting parental recognition of their child’s weight status may, thus, be important for healthy weight maintenance in children.

This chapter incorporates a summary of the research study, and a number of recommendations for nursing education, further research, and practice.

6.1.1 Summary of the research study

The purpose of this study was to assess Maltese parents’ perceptions and concern about their child’s weight and associated factors. The study adopted a cross-sectional survey design and recruited a random sample of 5 to 6-year-old children and their parents from randomly selected state primary schools from all regions of Malta. Data collection methods included a parental self-administered questionnaire and children’s weight and height measurements. The research questionnaire was an adapted version of the questionnaire developed by Eckstein et al (2006) which was used to study parents’ perceptions and concern about their child’s weight in an American sample. The questionnaire was translated into Maltese to increase response rate amongst potentially English illiterate participants. Children’s weight and height measurements were used to
calculate BMI and compare parents’ perceptions of their child’s weight with the child’s actual BMI. Data collection took place in state primary schools.

Findings show that a considerable number of children who participated in the study were overweight or obese (n = 155 out of 408, 38%). Notwithstanding the limitations, the results indicate a notable lack of awareness in Maltese parents of overweight 5 to 6-year-olds, of their children’s weight status. Indeed, only 20.6% of parents of overweight children classified their child’s weight as overweight by words and 16.1% by sketch selection. This lack of awareness appears to be equally evident across all levels of parental education, and for both male and female children. However, parents were more likely to identify correctly overweight girls than overweight boys when using sketch selection (25.4% versus 8.3% respectively). Findings also show lack of parental concern about their child’s weight. Participants could be considered as aware of the physical health risks of child overweight but they were least aware about the psychosocial consequences of child overweight.

Some independent variables, such as child’s measured BMI, parental recall of doctor’s concern about their child’s weight and parental perception that their child is slower than other children, were found to contribute significantly to parent’s perceptions and concern about their child’s weight. Parents of obese children who recognised their child as overweight were more likely to be concerned about their child’s weight status both at data collection and in the future than parents who did not correctly perceive their child’s obese status. However, this relationship was not found to be significant in logistic regression. This pattern of association could not be identified for parents of overweight children possibly due to poor variance in this subgroup regarding perceptions of children’s weight.

The findings imply the need for decreasing the prevalence of children who are overweight or obese. In order to facilitate this effort, the need for improving parental awareness of and concern about their child’s weight should be realised first and foremost. Hence, public health efforts need to concentrate on improving parental perception of their child’s overweight status. This may trigger parents to seek help for their child’s overweight problem and start considering behaviour change. In light of this, recommendations for further research and health promotion practice are presented.
6.2 Recommendations

6.2.1 Recommendations for practice

Recognition and acknowledgement of child overweight are a critical first step, but effective treatment requires behavioural modification involving diet and physical activity. Achieving these goals will depend on ongoing support and reinforcement from health care professionals and families, as well as school and community policies that support healthier lifestyles. These measures, along with efforts to help parents recognise obesity, will help control this growing epidemic among Maltese children.

Having a high prevalence of child overweight in young children highlights the importance of early identification of overweight children and emphasises the need for increased parental recognition of overweight in their children. Programmes for overweight prevention in young children should be developed, as once unhealthy eating habits and weight are established, it is difficult to change them. As health care professionals try to increase parental awareness about preventing child overweight, they must also help parents meet an additional challenge. That challenge is to encourage healthy, lifelong diet and exercise habits in children without producing a preoccupation with thinness or a poor self-concept related to body weight.

As parents were more likely to recognise their child’s overweight status when children developed limitations in their physical ability, it is suggested that the use of fitness measures that are user-friendly in primary health care, for example a step-test, may be one way to increase parental recognition of a child’s overweight status during routine child check-ups.

As parental recall of doctor’s concern about their child’s weight was found to influence both parental recognition of and concerns about their child’s weight, it may be valuable that doctors and nurses do not hesitate to show their sensitive concern in cases of child overweight and obesity. They are also in a position to refer these children and their parents to and liaise with other health professionals, such as nutritionists and
psychologists. Counselling can occur on a one-to-one basis and adjusted to the particular needs of the family.

Reframing discussions of children’s weight in terms of preventing future overweight rather than tackling current overweight might be a way to engage parents while avoiding the stigma of parental blame. Another potential approach to preventing obesity may be to focus more on improving general parenting skills and less on discussing the child’s growth.

Population-based, public health initiatives are also necessary to reach the target population and may be the first cue to action that encourages parents to seek help for their child’s weight problem. Health education and promotion messages on the media as well as the dissemination of good information on the prevention of childhood obesity are fundamental.

Developing collaboration with primary health care providers and community agencies that are related to childhood obesity may also be beneficial. Obesity prevention programmes designed for Maltese parents should provide information about what is the appropriate and healthy weight status for their children. In addition, getting parents interested in taking steps to prevent obesity or obesity-related chronic diseases in their children will involve educating them about the health risks associated with childhood obesity and making the connection between childhood obesity and early onset diabetes. However, it is not only essential to help parents become aware of child overweight and its consequences, but also to help them realise that child overweight is an issue of concern and so they need to seek help for their child’s overweight status. To reach Maltese parents, these messages will need to be made culturally sensitive and address cultural differences.

6.2.2 Recommendations for nursing education

Malta has the highest prevalence of child overweight in 7 to 11-year-old children in the World Health Organisation European Region and local studies indicate that this problem is also common among younger children (Grech & Sant’Angelo, awaiting publication; Baluci, 2000). This study supported such findings. Nurses work in a wide
variety of settings and most of them meet children either for routine check-ups in the community or in schools, as patients in general practitioners’ clinics or hospitals or as visitors in various health care facilities. Opportunities for child contact imply the importance of the role of nurses as health promoters.

Health promotion forms an integral part of the nurse’s role (Whitehead, 2001). In order for the nurse to achieve a degree of success in her behavioural-change interventions, the nurse needs to be well-informed on child overweight and how to effectively pass a message to parents of overweight children in a sensitive manner using a non-judgemental approach (Whitehead, 2001). Therefore, it is vital that special training is provided to nurses who work with children in schools and GP or child clinics. This training might include information on child nutrition and physical activity, and basic skills in counselling for behaviour change. Other areas that could be considered for staff training are the education of parents on child development and child-rearing while taking into consideration the client’s social context and personal goals.

School nurses play a key role in promoting better nutrition and the uptake of physical activity among children. This will encourage nurses to help parents of overweight children perceive their children’s weight problem and lead them to seek appropriate help and make the necessary behavioural changes. In this way, most overweight children and their families would be reached and helped. In addition, the availability of nutrition counsellors is important so that special cases can be referred to for their advice and help.

6.2.3 Recommendations for further research

In order to better understand the full impact of child overweight in the community, research aimed specifically at clarifying children’s perspectives about their own weight and the impact of overweight on children’s short and long-term health is needed. This might illuminate aspects of child overweight which might lead to new intervention strategies. Furthermore, qualitative research with the aim of gaining insight into the reasons why parents do or do not perceive their child to be overweight would help in finding ways to challenge these reasons and in working with parents to get more aware of their children’s weight problems.
Improved efforts to discern parents' concerns and needs regarding their child's overweight status, and factors that motivate or inhibit them from taking action are a first step in beginning to address the child obesity epidemic, whether in clinical or public health settings. Further qualitative studies in a variety of social settings are needed to fill these gaps.

Fathers accounted for a very small proportion of the respondents. It may be interesting to conduct a study on paternal perceptions of and concern about their child's weight, knowing that nowadays, couples often share child-caring as both of them may be working outside the home.

Additional research is needed to understand how best to implement early screening practices for overweight among children and encourage discussions with families regarding what is an appropriate and healthy weight for their child. The social construction of childhood obesity and its impact on parents' willingness to seek treatment for their child's weight problem is an important area of future inquiry.

This study has sought to examine perceptions and concerns among parents of their child's overweight status. It was assumed that these may in turn influence parental perceptions of their child's susceptibility or risk for developing complications related to overweight. According to the Health Belief Model, such perceived susceptibility would in turn motivate parents to implement weight-related behaviour modifications. Such a link between parental perception of their child's overweight status and parental intentions to implement behaviour change was not tested in this study. It is thought that examining this association would be ideal for future investigation.
Reference List
References


Grech, V., & Farrugia Sant'Angelo, V. Body mass index estimation in a school-entry aged cohort in Malta. Unpublished article.


APPENDIX 1

IOTF International Cut-Off Points for Child Underweight and Overweight
Appendix 1  

International cut-off points for BMI for underweight, overweight and obesity by gender between 2 and 18 years, defined to pass through BMI of 18.5, 25 and 30 kg/m² at age 18, obtained by averaging data from several international surveys.

<table>
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(The cut-off points at 5.5 years of age were used in the local study as children had a mean age of 5.5 years.)
APPENDIX

Regions of the Maltese Islands according to the Malta National Statistics Office (2006)
### Regions of the Maltese Islands according to the Malta National Statistics Office (2006)

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APPENDIX 3

Permission to use, modify and translate the questionnaire by Eckstein et al (2006)
From: Helen Binns [mailto:hbinns@northwestern.edu]
Sent: Friday, March 23, 2007 9:29 AM
To: 'Rose Marie Muscat'
Subject: RE: research

Rose Marie,
The survey and sketches are available at www.childrensmrc.org/pprg/resources

Follow the link to our obesity-related postings and you will get to the sketches. Let me know if you need anything else. Feel free to use whatever you need. These are freely available questions. There is no copyright attached to them. You can alter them, translate them or revise as you wish.

Helen Binns

e-mail: hbinns@northwestern.edu
APPENDIX 4

Modified Version of the Questionnaire by Eckstein et al (2006)
Appendix 4

Modified version of the questionnaire by Eckstein et al (2006)

PERCEPTIONS REGARDING CHILDREN'S WEIGHT

This questionnaire is for parents and guardians of children in Year 1.

This questionnaire should be filled in by ONE of the parents/guardians.

Please answer ALL questions.

1. Child’s sex: a. [ ] Male   b. [ ] Female

2. Child’s age: _______ years _______ months

3. What is your relationship with child?
   a. [ ] Mother   b. [ ] Father   c. [ ] Other
   (If other, describe____________________)

4. What is your highest grade completed? (Check one)
   a. [ ] Did not finish secondary school
   b. [ ] Secondary education
   c. [ ] Post-secondary education
   d. [ ] Tertiary education
   e. [ ] Post-graduate degree

5. Parents’ country of origin:
   a. Mother________________________
   b. Father________________________

6. Does your child have any medical condition that limits his/her growth?
   a. [ ] No
   b. [ ] Yes (describe____________________)

7. Does your child have any medical condition that limits his/her physical activity?
   a. [ ] No
   b. [ ] Yes (describe____________________)

8. I feel my child is
   a. [ ] Underweight
   b. [ ] A little underweight
   c. [ ] About the right weight
   d. [ ] A little overweight
   e. [ ] Overweight

9. Did your child’s doctor ever tell you that your child is gaining weight too fast or is overweight?
   a. [ ] Yes   b. [ ] No   c. [ ] I don’t know

10. About how many days per week does your child participate in physical exercise for at least 20-30 minutes (such as running, biking, sports or active playing)?
    a. [ ] 6-7 days each week
    b. [ ] 3-5 days each week
    c. [ ] 1-2 days each week or less
    d. [ ] No exercise at all
    e. [ ] I don’t know
For the next two questions (11 & 12), compare your child with other children of the same age.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer Options</th>
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</thead>
</table>
| 11. My child participates in active physical exercise | a. More hours/week than other children  
   b. About the same number of hours/week as other children  
   c. Fewer hours/week than other children |
| 12. When my child runs, he/she is usually | a. Faster than other children  
   b. About as fast as other children  
   c. Slower than other children |

13. How strongly do you agree or disagree with each of the following statements? (Check one box for each statement.)

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<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
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<th>Neutral</th>
<th>Disagree</th>
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<td>a. I am worried about my child’s weight right now.</td>
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<td>b. I am worried about my child’s future weight.</td>
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<td>c. Overweight children are likely to be overweight as adults.</td>
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<tr>
<td>d. Overweight children are more likely to develop diabetes (high blood sugar) than children who are not overweight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Overweight children are more likely to develop chronic heart disease than children who are not overweight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Overweight children are more likely to have problems in their social relationships with other children than children who are not overweight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4  Modified version of the questionnaire by Eckstein et al (2006)

14. Has the child’s parent or grandparent had a heart attack?
   a. □ No  b. □ I don’t know  c. □ Yes → If yes, do you believe the heart attack was related to:  
      | Check all that apply, or ‘None of these’. |
      | a. Smoking                             |
      | b. Alcohol use                         |
      | c. Diet                                |
      | d. Low physical activity               |
      | e. Obesity                             |
      | f. None of these                       |

15. Has the child’s parent or grandparent had a stroke?
   a. □ No  b. □ I don’t know  c. □ Yes → If yes, do you believe the stroke was related to:  
      | Check all that apply, or ‘None of these’. |
      | a. Smoking                             |
      | b. Alcohol use                         |
      | c. Diet                                |
      | d. Low physical activity               |
      | e. Obesity                             |
      | f. None of these                       |

16. Does/did the child’s parent or grandparent have diabetes (high sugar)?
   a. □ No  b. □ I don’t know  c. □ Yes → If yes, do you believe the diabetes was related to:  
      | Check all that apply, or ‘None of these’. |
      | a. Smoking                             |
      | b. Alcohol use                         |
      | c. Diet                                |
      | d. Low physical activity               |
      | e. Obesity                             |
      | f. None of these                       |

17. Does/did the child’s parent or grandparent have high blood pressure?
   a. □ No  b. □ I don’t know  c. □ Yes → If yes, do you believe the high blood pressure was related to:  
      | Check all that apply, or ‘None of these’. |
      | a. Smoking                             |
      | b. Alcohol use                         |
      | c. Diet                                |
      | d. Low physical activity               |
      | e. Obesity                             |
      | f. None of these                       |
Children's Body Image Scale (Truby & Paxton, 2002)

BOYS

A  B  C  D

E  F  G

GIRLS

A  B  C  D

E  F  G
APPENDIX

Permission to use
the Children’s Body
Image Scale by
Truby and Paxton
(2002)
Dear Rose Marie,

I give you consent to use the CBIS in your research project and have forwarded to you files that contain the relevant images so you can print the figures yourself. Please do not alter the figures in any way or use them for any other purpose other than for the specified project.

Best wishes,

Helen Truby
APPENDIX

Translated Version of the Questionnaire by Eckstein et al (2006)
(Maltese)
**OPINJONIJET DWAR IL-PIŻ TAT-TFAL**

Dan il-kwestjonarju huwa ghall-ġenituri jew gwardjani tat-tfal li qeghdin Year 1.

*Ghandu jimtela minn ġenitur/gwardjan WIEHED.*

*Jekk foğghbok, irrispondi l-mistoqsijiet KOLLHA.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Sess: a. tifel  b. tifla</td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong> Eta’ tat-tifel/tifla: _____snin u _____xhur</td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong> X’tiġi minn dan/din it-tifel/tifla?</td>
<td>a. Omm  b. Missier  c. Ohra ('Ohra’ spjega_________)</td>
</tr>
<tr>
<td><strong>4.</strong> X’inhu l-ogħla l-livell ta’ edukazzjoni tiegħek? (għażel waħda)</td>
<td>a. Ma spicċajtx is-sekondarja  b. Sekondarju  c. Post-sekondarju  d. Terzjarju (universita’)  e. Livell ta’ Masters/Dottorat</td>
</tr>
<tr>
<td><strong>5.</strong> Pajjiż fejn twieldu l-ġenituri:</td>
<td>a. Omm_________________________  b. Missier_________________________</td>
</tr>
<tr>
<td><strong>6.</strong> Iben/kintek għandu/ha xi kundizzjoni medika li tisa’ taffetwa l-attivita’ fiżika tiegħu/tagħha?</td>
<td>a. Le  b. Iva (iddeskrivi______________)  c. Ma nafx</td>
</tr>
<tr>
<td><strong>7.</strong> Iben/kintek għandu/ha xi kundizzjoni medika li tista’ taffetwa l-attivita’ fiżika tiegħu/tagħha?</td>
<td>a. Le  b. Iva (iddeskrivi______________)  c. Ma nafx</td>
</tr>
<tr>
<td><strong>9.</strong> Ġieli t-tabib tal-familja qallek li ibnekk/jintek qieghed/qegħda żżid fil-piż wisq malajr jew li għandu/ha piż żejjed?</td>
<td>a. Iva  b. Le  c. Ma nafx</td>
</tr>
<tr>
<td><strong>10.</strong> Kemm-il ġurnata f’ġimgħa ibnek/jintek jiehu/tieihu sehem feżercizzju fiżiku għal 20-30 minuta jew aktar (bhal ċiri, użu tar-rota, sports jew logħob attiv)?</td>
<td>a. 6-7 jiem f’ġimgħa  b. 3-5 jiem f’ġimgħa  c. Darba-darbtejn f’ġimgħa  d. Xejn  e. Ma nafx</td>
</tr>
</tbody>
</table>
### Appendix 7

**Translated version of the questionnaire (Maltese version)**

<table>
<thead>
<tr>
<th>Question</th>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Ibni/binti jieħu/tieħu sehem f’ezercizzju fiżiku attiv:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Iktar sigħat fil-ġimgħa minn tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Bejn wieħed u ieħor l-istess ammont ta’ sigħat fil-ġimgħa bħal tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Inqas sigħat fil-ġimgħa minn tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Meta ibni/binti jiġri/tiġri, generalment:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Jiġri/tiġri iktar minn tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Bejn wieħed u ieħor jiġri/tiġri daqs tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Jiġri/tiġri inqas minn tfal ohra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Kemm taqbel jew ma taqbilx ma’ kull waħda minn dawn id-dikjarazzjonijiet? (Immarka kaxxa waħda għall kull dikjarazzjoni.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inħossni inkwetat/a dwar il-piz ta’ibni/binti bħalissa.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Inħossni inkwetat/a dwar il-piz ta’ ibni/binti fil-futur.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Tfal li għandhom piz żejjed għandhom ċans akbar li meta jikbru jibqgħu b’piz żejjed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Tfal b’piz żejjed għandhom riskju akbar li jiżviluppaw id-dijabete (livell għoli ta’ zokkor fid-demm) minn tfal ta’ piz tażjeb.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Tfal b’piz żejjed għandhom riskju akbar li jiżviluppaw mard tal-qalb minn tfal ta’ piz tażjeb.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Tfal b’piz żejjed għandhom riskju akbar ta’ problemi fir-relazzjonijiet ma’ shabhom minn tfal ta’ piz tażjeb.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 14. Il-ġenituri jew in-nanniet tat-tifel/tifla kellhom attakk ta’ qalb xi darba?

- □ Le
- □ Ma nafx
- □ Iva → Jekk Iva, taħseb li l-attakk ta' qalb ġara minhabba:

<table>
<thead>
<tr>
<th>Tista’ timmarka iktar minn waħda.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Tipjip</td>
</tr>
<tr>
<td>b. Xorb alkoholiku</td>
</tr>
<tr>
<td>c. Dieta hażina</td>
</tr>
<tr>
<td>d. Nuqqas ta' eżercizzju fisiku</td>
</tr>
<tr>
<td>e. Obezita'</td>
</tr>
<tr>
<td>f. Xejn minn dawn</td>
</tr>
</tbody>
</table>

### 15. Il-ġenituri jew in-nanniet tat-tifel/tifla kellhom puplesija xi darba?

- □ Le
- □ Ma nafx
- □ Iva → Jekk Iva, taħseb li l-puplesija ġrat minhabba:

<table>
<thead>
<tr>
<th>Tista’ timmarka iktar minn waħda.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Tipjip</td>
</tr>
<tr>
<td>b. Xorb alkoholiku</td>
</tr>
<tr>
<td>c. Dieta hażina</td>
</tr>
<tr>
<td>d. Nuqqas ta' eżercizzju fisiku</td>
</tr>
<tr>
<td>e. Obezita'</td>
</tr>
<tr>
<td>f. Xejn minn dawn</td>
</tr>
</tbody>
</table>

### 16. Il-ġenituri jew in-nanniet tat-tifel/tifla għandhom/kellhom id-dijabete (zokkor għoli)?

- □ Le
- □ Ma nafx
- □ Iva → Jekk Iva, taħseb li d-dijabete hi minhabba:

<table>
<thead>
<tr>
<th>Tista’ timmarka iktar minn waħda.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Tipjip</td>
</tr>
<tr>
<td>b. Xorb alkoholiku</td>
</tr>
<tr>
<td>c. Dieta hażina</td>
</tr>
<tr>
<td>d. Nuqqas ta' eżercizzju fisiku</td>
</tr>
<tr>
<td>e. Obezita'</td>
</tr>
<tr>
<td>f. Xejn minn dawn</td>
</tr>
</tbody>
</table>

### 17. Il-ġenituri jew in-nanniet tat-tifel/tifla għandhom/kellhom pressjoni għolja?

- □ Le
- □ Ma nafx
- □ Iva → Jekk Iva, taħseb li pressjoni għolja hi minhabba:

<table>
<thead>
<tr>
<th>Tista’ timmarka iktar minn waħda.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Tipjip</td>
</tr>
<tr>
<td>b. Xorb alkoholiku</td>
</tr>
<tr>
<td>c. Dieta hażina</td>
</tr>
<tr>
<td>d. Nuqqas ta' eżercizzju fisiku</td>
</tr>
<tr>
<td>e. Obezita'</td>
</tr>
<tr>
<td>f. Xejn minn dawn</td>
</tr>
</tbody>
</table>

Jekk joqghbok, eqleb il-paġna

Subien

A   B   C   D

E   F   G

Bniet

A   B   C   D

E   F   G

Nirringrazzjajak tal-partecipazzjoni tiegħek.
APPENDIX 8

Back-Translation of the Questionnaire
(from Maltese to English)
### Perceptions regarding children’s weight

This questionnaire is aimed at parents and educators of children attending Year 1.

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sex: □ boy □ girl</td>
<td></td>
</tr>
<tr>
<td>2. Child’s age: ___ years ___ months</td>
<td></td>
</tr>
<tr>
<td>3. What is your relationship with this child?</td>
<td>□ Mother □ Father □ Other ('Other' explain____________________________)</td>
</tr>
<tr>
<td>4. What is your level of education? (choose one)</td>
<td>□ Did not complete secondary school □ Secondary □ Post-secondary □ Tertiary (university) □ Masters/Doctorate</td>
</tr>
<tr>
<td>5. Parents’ country of origin:</td>
<td></td>
</tr>
<tr>
<td>a. Mother</td>
<td></td>
</tr>
<tr>
<td>b. Father</td>
<td></td>
</tr>
<tr>
<td>6. Does your son/daughter have a medical condition that hinders his/her development?</td>
<td>□ No □ Yes (describe_______________________________ )</td>
</tr>
<tr>
<td>7. Does your son/daughter have a medical condition that limits his/her physical activities?</td>
<td>□ No □ Yes (describe_______________________________ )</td>
</tr>
<tr>
<td>8. I feel that my son/daughter is</td>
<td>□ underweight □ slightly underweight □ of average weight □ slightly overweight □ overweight</td>
</tr>
<tr>
<td>9. Has your general practitioner ever said that your son/daughter is putting on weight rapidly/is overweight?</td>
<td>□ Yes □ No □ Don’t know</td>
</tr>
<tr>
<td>10. How many days a week does your son/daughter take part in physical activity for 20-30 minutes or more (running, cycling, sports or active play?)</td>
<td>□ 6-7 days a week □ 3-5 days a week □ Once-twice a week or less □ Don’t know</td>
</tr>
</tbody>
</table>
For the next two questions (11 and 12), compare your son/daughter to other children of the same age.

<table>
<thead>
<tr>
<th>11. Per week, my son/daughter spends</th>
<th>12. When my son/daughter runs, he/she generally</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ more hours doing physical activity compared to other children.</td>
<td>□ runs faster than other children</td>
</tr>
<tr>
<td>□ more or less, the same amount of time in physical activity as other children.</td>
<td>□ more or less, runs as fast as other children</td>
</tr>
<tr>
<td>□ less hours doing physical activity compared to other children.</td>
<td>□ runs slower than other children</td>
</tr>
</tbody>
</table>

13. How strongly do you agree or disagree with the following statements? (Tick only one box per statement.)

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel worried about my son/daughter’s present weight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will be worried about my son/daughter’s weight in future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight children have a bigger chance of being overweight in adult life.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight children have more risk of developing diabetes (a high level of sugar in the bloodstream) than children of normal weight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight children have more risk of social problems than children of normal weight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. Have the child’s parents or grandparents ever suffered from a heart attack?
   - [ ] No
   - [ ] Don’t know
   - [ ] Yes
   If ‘yes’, do you think the heart attack was caused by:
   - [ ] Smoking
   - [ ] Alcohol
   - [ ] Inadequate diet
   - [ ] Lack of physical activity
   - [ ] Obesity
   - [ ] None of the above

15. Have the child’s parents or grandparents ever suffered from stroke?
   - [ ] No
   - [ ] Don’t know
   - [ ] Yes
   If ‘yes’, do you think the stroke was caused by:
   - [ ] Smoking
   - [ ] Alcohol
   - [ ] Inadequate diet
   - [ ] Lack of physical activity
   - [ ] Obesity
   - [ ] None of the above

16. Do the child’s parents or grandparents suffer from diabetes (high levels of sugar in the bloodstream)?
   - [ ] No
   - [ ] Don’t know
   - [ ] Yes
   If ‘yes’, do you think the diabetes is caused by:
   - [ ] Smoking
   - [ ] Alcohol
   - [ ] Inadequate diet
   - [ ] Lack of physical activity
   - [ ] Obesity
   - [ ] None of the above

17. Do the child’s parents or grandparents suffer from high blood pressure?
   - [ ] No
   - [ ] Don’t know
   - [ ] Yes
   If yes, do you think the high blood pressure is caused by:
   - [ ] Smoking
   - [ ] Alcohol
   - [ ] Inadequate diet
   - [ ] Lack of physical activity
   - [ ] Obesity
   - [ ] None of the above
18. Draw a circle around the drawing that best resembles your a) son or b) daughter’s physical stature.

A) Boys

B) Girls
APPENDIX

Calibration of the Weighing Balance used for Children’s Weight Measurements
<table>
<thead>
<tr>
<th>Applied weight</th>
<th>Actual weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kg</td>
<td>10.1 kg</td>
</tr>
<tr>
<td>15 kg</td>
<td>15.1 kg</td>
</tr>
<tr>
<td>20 kg</td>
<td>20.2 kg</td>
</tr>
<tr>
<td>30 kg</td>
<td>30.0 kg</td>
</tr>
<tr>
<td>40 kg</td>
<td>40.5 kg</td>
</tr>
<tr>
<td>50 kg</td>
<td>50.4 kg</td>
</tr>
<tr>
<td>60 kg</td>
<td>60.3 kg</td>
</tr>
<tr>
<td>70 kg</td>
<td>70.3 kg</td>
</tr>
</tbody>
</table>
APPENDIX

Covering Letter and Consent Form used for the Test-Retest Procedure (Maltese and English versions)
Data

Għażiż Genitur/Gwardjan,


Dan l-istudju hu importanti minhabba li Malta għandha l-akbar prevelenza ta’ tfal b’piż żejjed fir-Reġjun Ewropjej kif muri mill-Ghaqda Dinjija tas-Saħħa. Dan jista’ johloq problemi fiżiċi, soċjali u emożjonali fit-tfal. L-ewwel pass biex neghelbu din il-problema hu li l-ġenitur jindunaw meta jkun hemm piż żejjed fit-tfal taghhom u jkunu lesti li jieħdu passi dwar dan.

Biex naghmel dan l-istudju għandi bżonn il-kunsens tieghek. Il-partiċipazzjoni tieghek hi voluntarja u m’għandek l-ebda dmir li tiehu sehem f’dan l-istudju kemm-il darba int ma tixtieqx tipartecipa. Madankollu, il-partiċipazzjoni tieghek hi importanti u tkun ta’ ġhajnuna kbira. L-identita’ tieghek u l-informazzjoni li taghti jibqgħu strettament kunfidenzjali. Wara 3 gimghat, se jinghatalek kwestjonarju ieħor simili li inti se tiġi mitlub/a timla.

Nirringrazzjak bil-quddiem tal-koooperazzjoni, l-ġhajnuna u l-hin tieghek.

Dejjem tieghek,

Rose Marie Cutajar
(Numru tal-karta ta’ l-identita’: 21082G)
Dear Parent/Guardian,

I am Rose Marie Cutajar, Staff Nurse presently working at the local general acute hospital. I am currently reading for Masters of Health Science in Nursing. As part of the requirements for obtaining this degree, I am undertaking a research study. The aim of this research is to study parental perceptions of their child’s weight. You are therefore being sent the attached questionnaire which was designed to gather relevant data. The questionnaire should be filled by one of the parents, that is, either the mother or the father, or a guardian.

This study is important as Malta has the highest prevalence of children being overweight and obese in the World Health Organisation European Region. This might have physical, social and emotional consequences in children. A first step in the treatment of overweight is to help families recognise their child’s weight status and achieve a willingness to make behavior changes should these be necessary.

To conduct this research, I require your consent. Your participation is voluntary and you are free not to participate should you not want to. However, your participation is important and will be of great help. Strict confidentiality of the information provided is ensured. Your identity will not be included in any part of the questionnaire. You will be kindly asked to fill another questionnaire after 3 weeks’ time.

I thank you in advance for your cooperation, help and time.

Yours truly,

Rose Marie Cutajar

(ID No 21082G)
Data

Dear Parent/Guardian,

This is the second questionnaire that needs to be filled by the same parent or guardian who filled the first one. It is essential that you fill this questionnaire as well. The main study will not be possible without your cooperation.

I thank you in advance for your help.

Yours truly,

Rose Marie Cutajar

(ID No: 21082G)
Appendix 10

Consent form used in the test-retest procedure (Maltese and English versions)

Formula tal-Kunsens

Jiena, hawn taht iffirmat/a, niddikkjara li ghandi 'I fuq minn tmintax-il sena (18). Jiena naqbel li nimla dan il-kwestjonarju u iehor li se jinghatali iktar tard.

Firma tal-ġenitur/gwardjan ______________________________

Firma tal-persuna responsabbli ghal din ir-ričerka____________________________

Isem tal-persuna responsabbli ghal din ir-ričerka (b'ittri kbar) ROSE MARIE CUTAJAR

Jekk joğghbok, iffirma din il-formula ta' kunsens u aghtiha lir-ričerkatur mal-kwestjonarju li nghatalek ma' din il-fomula.

Grazzi hafna.

______________________________

Consent Form

I, the undersigned, declare that I am above eighteen years old (18). I agree to fill in this questionnaire and another one that will be given to me later.

Parent’s/guardian’s signature ______________________________

Researcher’s signature ______________________________

Researcher’s name (in block letters) ROSE MARIE CUTAJAR

Kindly sign this consent form and hand it to the researcher together with the questionnaire attached to it.

Thank You.

180
APPENDIX

Percentage Agreement for Responses of Test-Retest Procedure
### Percentage agreement for test-retest variables

<table>
<thead>
<tr>
<th>Test variable</th>
<th>Retest variable</th>
<th>Name of variable</th>
<th>Percentage agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>a1</td>
<td>b1</td>
<td>Child’s gender</td>
<td>100%</td>
</tr>
<tr>
<td>a2</td>
<td>b2</td>
<td>Parent respondent</td>
<td>100%</td>
</tr>
<tr>
<td>a3</td>
<td>b3</td>
<td>Parental level of education</td>
<td>100%</td>
</tr>
<tr>
<td>a4</td>
<td>b4</td>
<td>Parents’ country of origin</td>
<td>100%</td>
</tr>
<tr>
<td>a5</td>
<td>b5</td>
<td>Child’s condition that limits growth</td>
<td>100%</td>
</tr>
<tr>
<td>a6</td>
<td>b6</td>
<td>Child’s condition that limits physical activity</td>
<td>100%</td>
</tr>
<tr>
<td>a7</td>
<td>b7</td>
<td>Word Perception of child’s weight</td>
<td>91.7%</td>
</tr>
<tr>
<td>a8</td>
<td>b8</td>
<td>Recall of GP’s concern</td>
<td>100.0%</td>
</tr>
<tr>
<td>a9</td>
<td>b9</td>
<td>Physical exercise in days per week</td>
<td>86.1%</td>
</tr>
<tr>
<td>a10</td>
<td>b10</td>
<td>Perceived child’s physical activity</td>
<td>88.9%</td>
</tr>
<tr>
<td>a11</td>
<td>b11</td>
<td>Perceived child’s physical ability</td>
<td>91.7%</td>
</tr>
<tr>
<td>a12</td>
<td>b12</td>
<td>Concern about child’s weight at data collection</td>
<td>91.7%</td>
</tr>
<tr>
<td>a13</td>
<td>b13</td>
<td>Concern about child’s future weight</td>
<td>91.7%</td>
</tr>
<tr>
<td>a14</td>
<td>b14</td>
<td>Overweight in adulthood</td>
<td>94.4%</td>
</tr>
<tr>
<td>a15</td>
<td>b15</td>
<td>Diabetes</td>
<td>97.2%</td>
</tr>
<tr>
<td>a16</td>
<td>b16</td>
<td>Chronic heart disease</td>
<td>97.2%</td>
</tr>
<tr>
<td>a17</td>
<td>b17</td>
<td>Psychosocial effects of child overweight</td>
<td>80.6%</td>
</tr>
<tr>
<td>a18</td>
<td>b18</td>
<td>Family history of heart attack</td>
<td>97.2%</td>
</tr>
<tr>
<td>a19</td>
<td>b19</td>
<td>Perceived risk factors for heart attack</td>
<td>94.4%</td>
</tr>
<tr>
<td>a20</td>
<td>b20</td>
<td>Family history of stroke</td>
<td>100.0%</td>
</tr>
<tr>
<td>a21</td>
<td>b21</td>
<td>Perceived risk factors for stroke</td>
<td>97.2%</td>
</tr>
<tr>
<td>a22</td>
<td>b22</td>
<td>Family history of diabetes</td>
<td>94.4%</td>
</tr>
<tr>
<td>a23</td>
<td>b23</td>
<td>Perceived risk factors for diabetes</td>
<td>86.1%</td>
</tr>
<tr>
<td>a24</td>
<td>b24</td>
<td>Family history of hypertension</td>
<td>91.7%</td>
</tr>
<tr>
<td>a25</td>
<td>b25</td>
<td>Perceived risk factors for hypertension</td>
<td>83.3%</td>
</tr>
<tr>
<td>a26</td>
<td>b26</td>
<td>Sketch selection</td>
<td>97.2%</td>
</tr>
</tbody>
</table>

The variable child’s age was not considered for test-retest due to possible variations between the first and second run of the procedure.
APPENDIX 12

Content Validity

- Reviews by Experts in Child Overweight
Dr Victoria Farrugia Sant'Angelo MD, MA  
Honorary Lecturer University of Malta  
Co-ordinator School Health Services

12th September 2007

Re: Study on Parents' Perception of Child's Weight  
Questionnaire Review

The questionnaire is comprehensive yet simple to complete and the format is attractive.

There are only two minor changes which I may suggest as follows:

In Q.12 a box should be added with the wording Overweight children are more likely to develop chronic heart disease than children who are not overweight.

There is a syntax error in Q. 17. The wording should read "most resembles" and not "resembles most".

I wish you every success in your studies.

7, Harper Lane Floriana. Tel: 25576304
From: Dutton Elaine at MHEC [elaine.dutton@gov.mt]
Sent: 26 September 2007 14:21
To: Rose Marie Muscat

Dear Rose Marie,

I thought the survey was ok - I think I had mentioned though some spelling mistakes in the Maltese version. In terms of methodology I think it's fine.

Regards & good luck,
Elaine Dutton B.Psy (Hons.), M.Sc (Health Psy)
Health Psychologist & Health Promotion Officer
Health Promotion Department
5A, The Emporium,
C. De. Brocktorff
Msida MSD 1421
Email: elaine.dutton@gov.mt

Ms. Maria Ellul, B.Pharm. (Hons.), M.Sc. (Aberdeen), RPH Nutr., Dip. Pol. Stels.,
Principal Scientific Officer (Nutrition), D.G. (Public Health Legislation), Health Division,
reviewed the questionnaire as well and gave comments to the researcher in verbatim.
She commented that the questionnaire was simple and interesting, thus suitable for the general public. No modifications of the questions or any additions were required.
APPENDIX

Evaluation Form used in the Pilot Study (Maltese and English Versions)
### Formula ta' Valutazzjoni tal-Kwestjonarju 'Opinjonijiet dwar il-Piż tat-Tfal'.

1. Kemm domt biex imiejt dan il-kwestjonarju?
   
   _____ Minuti

   
   Numru tal-mistoqsija: ____________
   Numru tal-mistoqsija: ____________
   Numru tal-mistoqsija: ____________

   
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

   
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

_Grazzi Hafna._
Evaluation form of the questionnaire 'Parents' perceptions of their child's weight'.

1. How much time did you take to fill in this questionnaire?
   
   Minutes

2. Please specify any questions that are ambiguous, unclear or difficult to understand?

   Question number: __________
   Question number: __________
   Question number: __________

3. Please write down your comments about the layout of the questionnaire.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. Kindly forward any other comments/suggestions about the questionnaire.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   Thank You.
Permission from the University of Malta Research Ethics Committee
ATTACHMENTS:
* Recruitment letter, poster * Other institutional approval * Subject instructions
* Tests or questionnaires * Information sheets or debriefing materials
* Written consent form (or script) * Other

Return the completed application to your faculty Research Ethics Committee

To be completed by Faculty Research Ethics Committee

We have examined the above proposal and advise

Acceptance

Refusal

Conditional acceptance

√

For the following reason/s:

Signature

Date 12/06/07

To be completed by University Research Ethics Committee

We have examined the above proposal and grant

Acceptance

Refusal

Conditional acceptance

√

For the following reason/s:

Signature

Date 6/7/07
APPENDIX

Permission from the Education Department to Conduct the Study in State Primary Schools
Request for Research in State Schools

A. (Please use BLOCK LETTERS)

Surname: CUTAJAR .................... Name: ROSE MARIE ............

I.D. Card Number: 210251 ..................... Telephone: 21553052 .............

Address: GALA TA' GESU', FLAT 5, GHAJN TUTA STREET, .......... Fontana, GOZO, ................ Post Code: FNT.1120

Faculty: INSTITUTE OF HEALTH, Course: MASTERS OF HEALTH SCIENCE, Year: 2006-2008, CARE, IN NURSING

Area/s of research: PARENTS' PERCEPTIONS OF THEIR CHILD'S WEIGHT

Aims of research: (Underline as appropriate) Long Essay, Dissertation, Thesis, Publication

Estimated duration of research: ONE YEAR ........ Language used: ENGLISH, MALTESE

Description of method to be used: (i) QUESTIONNAIRES TO PARENTS, (ii) WEIGHT AND HEIGHT MEASUREMENTS OF CHILDREN

School/s where research is to be carried out: KALKARA, ŻEITUN, RABAT (MALTA), PAOLA, MGARR, NAKKAR, .. BIRKIR KARA, NELLIKA, .. HSIDA, LIJA, .. GOZO: VICTORIA, XAGHRA, NADUR, ..

Years/Forms: YEAR 1, .. Age range of students: 5-6 YEARS

I accept to abide by the rules and regulations re Research in State Schools and to comply with the Data Protection Act 2001.

Warning to applicants – Any false statement, misrepresentation of concealment of material fact on this form or any document presented in support of this application may be grounds for criminal prosecution.

Signature of applicant: RH CUTAJAR ..................... Date: 11/05/2004
B. Tutor's Approval (where applicable)

The above research work is being carried out under my supervision.

Tutor's Name: [Signature]

UNIVERSITY OF MALTA
Institute of Health Care

C. Education Division – Official Approval

The above request for permission to carry out research in State Schools is hereby approved according to the official rules and regulations.

Raymond Camilleri
Assistant Director Research & Planning

Conditions for the approval of a request by a student to carry out research work in State Schools

Permission for research in State Schools is subject to the following conditions:

1. The official request form is to be accompanied by a copy of the questionnaire and/or any relevant material intended for use in schools during research work.

2. The original request form, showing the relevant signatures and approval, must be presented to the Head of School.

3. All research work is carried out at the discretion of the relative Head of School and subject to their conditions.

4. Researchers are to observe strict confidentiality at all times.

5. The Education Division reserves the right to withdraw permission to carry out research in State Schools at any time and without prior notice.

6. Students are expected to restrict their research to a minimum of students/teachers/administrators/schools, and to avoid any waste of time during their visits to schools.

7. As soon as the research in question is completed, the Education Division assumes the right to a full copy (in print/on C.D.) of the research work carried out in State Schools. Researchers are to forward the copies to the Assistant Director Research and Planning, Education Division.

8. Researchers are to hand a copy of their Research in print or on C.D. to the relative School/s.

9. In the case of video recordings, researchers have to obtain prior permission from the Head of School and the teacher of the class concerned. Any adults recognisable in the video are to give their explicit consent. Parents of students recognisable in the video are also to be requested to approve that their siblings may be video-recorded. Two copies of the consent forms are necessary, one copy is to be deposited with the Head of school, and the other copy is to accompany the Request Form for Research in State Schools. Once the video recording is completed, one copy of the videotape is to be forwarded to the Head of school. The Education Division reserves the right to request another copy.
Covering Letter used in the Main Study (Maltese and English Versions)
Ghaziz Ġenitur/Gwardjan,


Jekk int interessat dwar ir-riżultati ġenerali fl-aħħar ta’ l-istudju, jekk joğghbok ikkuntatja lili fuq rmmuscq@malta.net (e-mail) jew 25457296 (xoghol).

Nirringrazzjakom bil-quddiem tal-kontribuzzjoni utli taghhom.

Dejjem tieghek,

Rose Marie Cutajar
ID No: 21082G
Dear Parent/Guardian,

I am Rose Marie Cutajar, Staff Nurse presently working at the local general acute hospital. I am currently reading for Masters of Health Science in Nursing. As part of the requirements for obtaining this degree, I am undertaking a research study. The aim of this research is to study parental perceptions of their child’s weight. You and your child have been chosen to participate in this study. You are therefore being sent the attached questionnaire which was designed to provide relevant data. I may need to measure your child’s weight and height and I will take the measurements myself. Children will not have their weight and height measured in front of their classmates.

This study is important as Malta has the highest prevalence of children being overweight and obese in the World Health Organisation European Region. This might have physical, social and emotional consequences in children. A first step in the treatment of overweight is to help families recognise their child’s weight status and achieve a willingness to make behavior changes should these be necessary.

To conduct this research, I require your consent. Parent and child’s participation is voluntary and you are free not to participate should you not want to. However, your participation is important and will be of great help. Strict confidentiality of the information provided is ensured. Your identity will not be included in any part of the questionnaire. Questionnaires and child measurements will be coded.

If you are interested in the results on completion of this study, kindly contact me on rmmuscat@maltanet.net (e-mail) or 25457296 (work). I thank you in advance for your kind and useful contribution.

Regards,

Rose Marie Cutajar

(ID No: 21082G)
APPENDIX

Consent Form

used in the

Main Study

(Maltese and

English Versions)
Appendix 17  

Consent form used in the main study (Maltese version)

Formula tal-Kunsens


Firma tal-ġenitur/gwardjan __________________________________________

Isem it-tifel/tifla (b'ittri kbar) ______________________________________

Firma tal-persuna responsabbli ghal din ir-ricerka ______________________

Isem tal-persuna responsabbli ghal din ir-ricerka (b'ittri kbar):

ROSE MARIE CUTAJAR

Jekk joġghbok irritorna din il-formula flimkien mal-kwestjonarju ma' ibnek/bintek.

Grazzi hafna.
Appendix 17

Consent form used in the main study (English version)

Consent Form

I, hereby declare, that I am over eighteen (18) years of age. I agree to participate in this study and give my consent to the researcher to measure the weight and height of my child, providing that the principles explained in the covering letter are maintained.

Signature of parent/guardian ____________________________

Name of child (in block letters) ____________________________

Signature of researcher _________________________________

Name of researcher (in block letters) _______________________

Please return this form to the school with your child.

Thank you.
APPENDIX

Booklet issued by the Health Promotion Department ‘Ikel Bnin Ghat-Tfal ta’ I-Iskola’ (Healthy Food for Schoolchildren) given to Every Parent who Participated