Abstract

Objectives: This study aimed to understand maternal perceptions of factors related to weight issues among Aboriginal and Torres Strait Islander children, including diet, physical activity, and maternal perceptions. Understanding these factors would allow Townsville Aboriginal and Islander Health Service (TAIHS) and other community controlled health organisations to provide increased support and preventative health care.

Methodology: This study included three phases: a quantitative chart audit collecting data on Indigenous children attending TAIHS (n=350), a qualitative phase interviewing mothers who had expressed concerns about their Indigenous child's weight (n=9), and a phase linking results from interviews and the chart audit. BMI values, level of physical activity, and referral to outside providers were the primary measures for the quantitative phase, and maternal opinions on cultural, social, and economic factors were the primary measures for the qualitative phase.

Results: It was found that 42 percent of 5-14 year old children who attend TAIHS were overweight, underweight, or obese classified by BMI. As per results from the chart audit and interviews, a majority of these children had poor diets and low levels of physical activity, and their mothers had experienced birth complications and/ or had health issues. The chart audit process also helped assess recording practices among health providers, and it was noted that approximately 70.8 percent of medical charts made no mention of weight issues. Maternal interviews illuminated cultural, social, and economic factors that contribute to weight issues, and a comparison of interview results and data from chart audit demonstrated a disconnect between knowledge and action for maternal caregivers.

Conclusions: TAIHS and other community health services must empower patients by creating programs focused on weight management and obesity prevention. Clinical staff must also improve data recording and provide children and their mothers with education and support related to healthy eating and exercise. An increase in referrals to external childhood weight programs would also benefit the population of children included in this study.

Implications: Findings from this study will allow TAIHS and other community health services to work with community members to reduce the rates of childhood weight issues: underweight, overweight, and obese. Likewise, suggested interventions can help decrease weight disparities between Indigenous and non-Indigenous individuals.
Ethics approval

This study received approval from the Human Research Ethics Committee at James Cook University in Townsville, Queensland. Approval number: H5847.

Acknowledgements

I would like to acknowledge the Australian Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters on which Townsville Aboriginal and Islander Health Service (TAIHS) stands and this research was completed. I would also like to thank our study participants, everyone at TAIHS, physicians, community health workers, staff, and mentors, who helped with the completion of this project.

Introduction

Weight issues, related to both underweight and overweight, negatively impact physical and mental health and increase the risk of developing chronic illnesses such as low self-esteem, depression, sleep apnea, type 2 diabetes mellitus, hypertension, atherosclerosis, and hyperlipidaemia (1,2). In 2014, 170 million children under 18 years old were overweight (2). This is problematic as nutritional behaviours and Body Mass Index (BMI) during childhood are predictive of eating behaviours and health later in life (3). Overweight children are more than four times more likely than children with normal weight to become overweight or obese in adulthood, and underweight children are at risk of diseases such as osteoporosis and weakened immunity (4).

Rates of underweight, overweight, and obesity disproportionately impact Indigenous people compared with non-Indigenous people across Australia (4). Similarly, eight percent of Aboriginal and Torres Strait Islander children 2-14 years old are overweight, and 30 percent are overweight or obese (6). This suggests the necessity of preventative efforts targeted towards Aboriginal and Torres Strait Islander children, reducing weight issues and the burden of chronic disease (7).

The purpose of this study is to understand the disproportionate rates of underweight and overweight in Indigenous children in Townsville. The setting of this study was Townsville Aboriginal and Islander Health Services (TAIHS), a community health service established in Townsville, Queensland. TAIHS provides maternal and child health care, eye and dental care, and mental health services to the local Indigenous community (8). Understanding the factors contributing to weight issues will help TAIHS provide increased support and preventative care to the greater Townsville community.

Methods

I. Overview

Three phases were conducted over a fourteen week period: a quantitative chart audit phase, a qualitative interview phase, and a correlation phase comparing results from the interviews with results from the chart audit. Each phase presented a different perspective on weight issues in the Aboriginal and Torres Strait Islander community. Ethics approval was received from James Cook University, and all participants signed consent forms. Consent covered access to child health records and confidentiality during the qualitative interview phase.

II. Quantitative Phase

A retrospective chart audit gathered data on 350 Aboriginal and Torres Strait Islander patients meeting inclusion criteria: children 5-14 years of age who attended TAIHS from June 31, 2013 until July 1, 2014. PenCAT software extracted data for children fitting inclusion criteria. A sample size of 145 ensured a statistically significant p-value (0.05), calculated using standard z-distribution. Charts were then divided into three groups based on body mass index (BMI), the ratio of weight (kg) to height (m²), recorded in patient charts from most recent visit. Because PenCAT software is calibrated using WHO growth charts for adults, extracted heights and weight for age were compared to percentile ranges for childhood growth recognised by the Centres for Disease Control (CDC) rather than using the adult BMI in the software (9). Table 1 was compiled based on these CDC BMI percentiles and presents the correlation to the PenCAT BMI and subsequent weight classifications.

<table>
<thead>
<tr>
<th>PenCAT BMI</th>
<th>CDC BMI Percentile</th>
<th>Weight Classification</th>
</tr>
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<tbody>
<tr>
<td>&lt;18.5</td>
<td>&gt;3</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.6-24.9</td>
<td>4-75</td>
<td>Healthy</td>
</tr>
<tr>
<td>25-29.9</td>
<td>76-96</td>
<td>Overweight</td>
</tr>
<tr>
<td>&gt;30</td>
<td>&gt;97</td>
<td>Obese/Morbid</td>
</tr>
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</table>

Once patients were classified as underweight, overweight, or obese, a random sample was taken from each of the three groups. Demographic information, nutrition status, and levels of physical activity were obtained from notes previously recorded by clinical staff (Table 2). Documentation of a weight issue and referral to specialists was also noted. Diet and activity standards were based on CDC recommendations and Indigenous specific food guides, and health indicators were assessed using standardised measures, i.e. the child versions of the WAVE and REAP tools (10) (11).
Statistical analysis was performed using SPSS software, which calculated frequencies and linear regressions to determine the relationship between BMI percentiles and a number of factors. Chi-squared modelling was also used to identify characteristics contributing to weight issues in children. Correlations such as the relationship between weight status and either gender, locality, maternal diabetes, and maternal cardiovascular issues were evaluated. Additionally, one way-ANOVA tests were used to examine whether there were significant differences in CDC weight status and CDC BMI percentiles among children in each weight classification depending on their diet.

II. Qualitative Phase

Each of the nine semi-structured interviews involved a mother/grandmother of an Indigenous child, the principal investigator, and an Indigenous member of TAIHS’s clinical staff. Interviews gathered information regarding maternal perceptions of weight issues among Aboriginal and Torres Strait Islander children. Women who were 18 years or older and were a primary maternal caregiver of an Indigenous child between the ages of 5 and 14 were included in this study. Women also had to be active clients of TAIHS, receiving care within two years of the study dates, and must have expressed concern with their child/children’s weight. Maternal caregivers were recruited through letters and fliers promoting the study and by recruitment by clinicians at TAIHS. Chart audit data was used for all women who participated. Consent was obtained prior to enrolment in the study and initiation of the interview.

Interview questions were split into two sections, due to the sensitive nature of discussing weight issues. Part A included questions related to diet, physical activity, and weight issues across the community, and incorporated visuals such as meal plates and body silhouettes to enhance responses. Questions included:

- What do you think it means for someone to have a weight issue?
- What factors do you think lead to children being overweight?
- What do you think about weight issues among Aboriginal and Torres Strait Islander children?

Part B included questions related to weight issues in the participant’s own child or grandchild, and encouraged women to discuss services at TAIHS and make suggestions for improvement. This two-part setup helped transition the women from speaking about weight on a community level to discussing issues faced by children in their care.

Interviews were audio-recorded, de-identified, transcribed, and kept for long-term storage as per data storage policies at James Cook University. Responses to the questions were analysed by thematic coding using NVivo software which helped draw comparisons between responses given by maternal caregivers.

III. Correlation Phase

Results from the interviews were linked to results from the quantitative study to provide a comprehensive view of weight issues among Aboriginal and Torres Strait Islander children. This was accomplished by comparing maternal perceptions of their child’s weight to their child’s WHO weight classification.
Results

I. Quantitative Phase

Weight Data

It was found that 42 percent (n=142) of Aboriginal and/or Torres Strait Islander children aged 5-14 who attended TAIHS in the study period had a weight issue. Of these children, 11.36 percent (n=10) were underweight, 39.77 percent (n=35) were overweight, and 48.86 percent (n=48.86) were obese (Figure 1). Chi-squared analysis demonstrated a correlation between diet and CDC weight status, where underweight, overweight, and obese children were more likely than healthy weight children to have a poor diet ($X^2$=34.83, p=0.01). In this study, poor diets were classified as those not meeting the daily-recommended servings and values for children aged 5-14, which includes 4-5 servings of vegetables and 2-3 servings of fruits each day (12). Similarly, at least fifty percent of the obese children studied had poor diets compared to less than thirty percent of healthy weight children ($X^2$=26.7, p<0.01). In reference to gender, cross tabulation findings suggest that boys were more likely to have weight issues than girls ($X^2$= 9.79, p= 0.02). There was also a correlation between gestation at delivery and weight, as children with overweight and obese BMIs were more likely to have been premature at birth, after adjusting for birth weight (13).

Figure 1: Weight classification among children with weight issues at TAIHS

Maternal Health & Demographics

Maternal health issues during gestation are risk factors for childhood weight issues and were prevalent across the population studied. Mothers with gestational diabetes and/or diabetes mellitus ($X^2$= 27.72, p= 0.01), and mothers with heart issues or pre-eclampsia ($X^2$=13.17, p=0.04), were more likely to have a child with a weight issue.

Thirty six percent of children included in the study had mothers who attended TAIHS for antenatal care, and 54 percent of children were breastfed (for any period). Cross-tabulations and chi-square analysis determined that maternal smoking, alcohol use, breastfeeding during any point of infancy, and attendance to antenatal care were not significant contributors to weight issues in this population, however, follow-up is necessary to further assess these variables. Data related to these factors were gathered from chart reviews a) at the time the child was weighed and measured and b) in child records related to their mother’s prenatal care.

Nutrition and Physical Activity

Between individuals with healthy and poor diets, there was a significant difference between group means determined by one-way ANOVA testing for CDC Weight Status (F= 4.002, p= 0.02) and CDC BMI percentile (F= 5.848, p= 0.004). Testing also determined a significant distinction in group means for CDC BMI percentile between individuals who exercised regularly and those who did not (F= 4.803, p= 0.01).

Recording and Referrals

Referral to external services such as registered dieticians, exercise specialists, and behavioural health counsellors is a cornerstone in appropriate management of childhood weight issues. The most effective strategies combine behavioural health with nutrition counselling and planning and while appropriate for all children with underweight or overweight BMIs, play a role in weight management for all children (14). In 70.8 percent of the charts reviewed, there was no documentation or written identification of weight issues by any health care provider. These included charts for 60 percent of underweight children, 74.3 percent of overweight children, and 48.8 percent of obese children. Referrals to paediatricians, dieticians, physiotherapists, and to external services were assessed during the chart audit to determine whether weight issues, when recognized, were appropriately managed. The majority of children were not directed to specialist care, as 80 percent of underweight, 97.2 percent of overweight, and 67.4 percent of obese children did not receive referrals.
II. Qualitative Phase

Semi-structured interviews of maternal caregivers demonstrated that the majority of women recognised that weight issues result from several factors.

i. Culture

Mothers attributed their child’s larger body size to Aboriginal or Torres Strait Islander customs and ancestry. “Well us Islanders, we have a lot of weights…we’re built bigger than Aboriginal and Caucasian people.” Repeated references to one’s ancestry have led to a cultural normalization of larger body size. Mothers also described that larger body size was associated with pride, because a child’s growth represented parental ability to provide for their children.

ii. Diet

A key issue that was understood to contribute to weight issues was portion size, likely a result of traditional eating practices and a lack of familiarity with healthy food portioning. One mother who named quantity as a cause of weight issues expressed frustration that she had never been taught how to cook healthy meals for her children. “It’s the quantity… you’re not really taught how much you should put on that dinner plate. When your kids are hungry, just feed ‘em. If they don’t eat it, try something else.”

Fast food was also mentioned as a contributor to unhealthy weight. Mothers explained the transition of dietary practices following the migration of Indigenous individuals from the bush into cities. “If we teach our kids and our generation the bush way, they’ll become much healthier. But when a white fellow comes and brings McDonald’s, pizza, and all that, it’s sort of making our kids fat.”

iii. Physical Activity

Women interviewed listed economic factors as a significant deterrent from healthy diets. Meals often consist of less healthy choices such as rice, tin food, and ground meat, because they cost less. Similarly, Indigenous women attribute poor diets to the cultural expectation to feed multi-generational families at a low cost. “Rather than just going to buy fruit and veggies and stuff they’re inclined to buy something that is going to feed the whole family and fill them…things that are gonna go far.”

Table 3: Correlation between maternal perception of weight status and status determined from chart audit

<table>
<thead>
<tr>
<th>Child’s Weight Classification</th>
<th>Percent Correct</th>
</tr>
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<tbody>
<tr>
<td>Underweight (2)</td>
<td>50%</td>
</tr>
<tr>
<td>Overweight (4)</td>
<td>50%</td>
</tr>
<tr>
<td>Obese (3)</td>
<td>66.7%</td>
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</table>

vi. TAIHS support

Interviews revealed issues surrounding support and weight related services provided by TAIHS. Women discussed a lack of programming centred on educating mothers’ child rearing. These programs are especially critical for young and first time mothers, and women with limited familial ties, as they may require additional support raising their children. Women also shared that while TAIHS clinical staff did not regularly provide information related to healthy eating, exercise, or external programming during visits, they were accessible and willing to provide advice when asked. “You could see a doctor and they could put you to something, but I don’t know of anything that TAIHS does just specifically for that [weight issues]…But I know that if you saw a doctor here they’d do everything they could to help you.”

III. Correlation Phase

Linking maternal perceptions from the interviews with weight related characteristics gathered from the chart audit demonstrated inconsistencies between perceptions and reality, specific to each woman’s child or grandchild. As seen in Table 3, only fifty percent of mothers or grandmothers with an underweight or overweight child were able to accurately identify their child’s weight issue. Similarly, only 66.7 percent of women with obese children recognized the issue.

Women cited participation in organized sports, running, swimming, and going to the park as healthy alternatives. However, they attributed their children’s lack of activity to the high cost of gyms and organized sports, or lack thereof.

iv. Visual Perceptions of Weight Issues

Women were asked to classify a range of standardized silhouettes of 5-14 year old children by weight status (i.e. underweight, overweight, obese) (15). All women successfully classified the silhouettes and identified key features distinguishing between smaller and larger silhouettes. However, when the participants were asked to choose a silhouette representative of their child’s appearance, all choose silhouettes smaller than their children.
Discussion

This study is innovative in that it is the first project to use a combination of methodologies to provide insight about weight issues in Aboriginal and Torres Strait Islander children. Such an approach differed from previous studies that focused solely on the prevalence of weight issues in a population or the collection of information about a specific child rather than a community. For instance, the 2005 Jackson study (16) presented a limited perspective of maternal perceptions because participants were a) asked only three questions and b) each question was related only to each woman’s child. Instead, this study provides a comprehensive view of characteristics contributing to the burden of weight issues as well as maternal perceptions of these issues.

Quantitative data collection allowed for the compilation of detailed characteristics surrounding weight issues in the TAIHS paediatric patient base, and qualitative interviews of maternal figures illuminated a wide range of perceptions concerning weight issues on both the individual and community level. Lastly, relating maternal perceptions collected from the semi-structured interviews to data gathered in the chart audit allowed for an all-encompassing view of the burden of weight issues at TAIHS and offered patient insight that has the potential to help TAIHS and other community health centres improve service provision.

Suggestions

Three study phases presented the high prevalence of weight issues among children receiving care at TAIHS, lack of proper weight classification and referrals, and a need for increased support. There are a number of ways to address this failure to identify, prevent, and/or treat weight issues within the TAIHS community.

First, it is critical for clinical staff to standardize recording practices, both in frequency and quality, to improve the timely identification of risk factors for weight issues. Once risk factors for weight issues or an already existent weight issue are identified, health providers will be better able to provide education to families related to weight status and can adjust goals of care according to patient and family needs. Staff training and simulation sessions would be an appropriate method to accomplish this.

Second, workshops should be created to eliminate the disconnect between maternal knowledge and action. Both mothers and TAIHS staff suggested that having scheduled yet informal education sessions would be beneficial for families and children to learn about weight issues. Regular workshops run with children and their parents that incorporate effective learning techniques for Aboriginal and Torres Strait Islander people will ensure self-efficacy—in this way, skills taught will more likely be put into practice. Including women and children in the planning and management of programming will also help empower community members by allowing them to focus on issues they need the most help with. Women can share their opinions and suggestions through surveys, focus groups, or one-on-one discussions such as those in this study. To involve children, TAIHS staff can visit local schools and work directly with children to gauge their understanding and determine their learning preferences. Because school based health promotion initiatives have been shown to reduce health risks and prevent causes of premature death and disability that originate during youth, it is critical that TAIHS focus on the youth population in the communities it serves (17). TAIHS currently offers health promotion workshops so there is ample opportunity, capacity, and support from community to expand into schools.

Next, an increase in referrals to external weight loss programs would also benefit the population of children included in this study. These programs would ideally be integrated with local services to increase participation and improve cultural acceptability. They also ought to be low cost or free of charge to accommodate the affected communities’ socio-economic status. Increased referrals to specialists and external weight loss programs allow more efficient weight status assessment and monitoring of BMI, physical activity, and diet. Accessing services outside of the primary care setting allows patients to focus on their weight issues on a regular basis with providers devoted specifically to weight issues and has been proven to improve behaviour change.

Limitations

i. Quantitative chart audit

The scarcity of diet and physical activity data as well as the lack of in-chart notation of weight issues made characterization of risk factors related to weight issues difficult. Rather than uniformly specifying what each child ate for each meal (e.g. dinner: ½ chicken leg, 2 servings of vegetables, 1 serving of fruit), diet was most often recorded as “healthy” or “poor” or “yes veggies” when recorded at all. Similarly, the amount of time each child spent active was not recorded; general activity was instead listed “plays outside with mum” “runs in backyard”). In terms of recording for weight issues, whereas there were approximately 145 children suffering from weight issues (i.e. underweight, overweight, or obese), only 112 were included in data analysis due to data accuracy and completion. A follow up study must therefore be performed once recording of weight related information improves to expand the scope of results from this study. There are however no concerns related to the accuracy of the height, weight, diet, physical
activity, and other data reviewed in this study; only complete data was included in the analysis. Limitations regarding limited diet, physical activity, and weight classification were included to explain why the study population was decreased from 145 to 112 and to stress the importance of improving data recording amongst health providers.

ii. Qualitative interviews

Interview results may be influenced by sampling bias as participants who responded to the recruitment letter or posters in the clinic were attending TAIHS regularly, suggesting they had more of a stake in their health. In turn, data collected may not be representative of the greater population, especially those individuals who are not attending TAIHS for services.

Further, if women avoided sharing opinions they believed were against social norms or the doctor’s wishes, social desirability bias may have been present (18). Such bias is difficult to overcome because it is inherent in natural conversation and daily interactions, although attempting to spot inconsistencies in answers and drawing connections to hard data may help standardize information.

Conclusion

All in all, improving staff training and the creation of health promotion programming related to weight issues will allow TAIHS to work with community members to reduce the rates of weight issues in present and future generations. Likewise, interventions will help to decrease weight disparities between Indigenous and non-Indigenous individuals.
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