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Home food availability mediates associations between mothers’ nutrition knowledge and child diet

Karen J. Campbell, Gavin Abbott, Alison C. Spence,
David A. Crawford, Sarah A. McNaughton, Kylie Ball

All authors based at:
Centre for Physical Activity and Nutrition Research,
School of Exercise and Nutrition Sciences, Deakin University,
221 Burwood Hwy, Burwood VIC 3125, Australia.
Fax: (03) 9244 6017

Author for correspondence:
Karen Campbell
Email: karen.campbell@deakin.edu.au
Ph: (03) 9244 6812; Fax: (03) 9244 6017
Centre for Physical Activity and Nutrition Research
School of Exercise and Nutrition Sciences
Deakin University
221 Burwood Hwy, Burwood VIC 3125, Australia
Home food availability mediates associations between mothers’ nutrition knowledge and child diet

Abstract

Evidence suggests that mothers’ nutrition knowledge and home food availability (HFA) are directly and independently associated with children’s food intakes. In this study we test the hypothesis that HFA mediates the association between maternal nutrition knowledge and child diet.

In this cross-sectional study of Australian women living in socioeconomically disadvantaged neighbourhoods in Melbourne, Australia, mothers with dependent children (aged 5-12 years) provided data on their child’s diet, HFA, nutrition knowledge and a range of sociodemographic characteristics.

To test our hypothesis we assessed associations between nutrition knowledge and HFA, and between HFA and child food intake (adjusting for nutrition knowledge and child age). In all instances significant associations were found. HFA was found to mediate relationships between mother’s nutrition knowledge and children’s intake of fruit, vegetables, salty foods and soft drink.

Our analyses showed that HFA was a mediator of the associations between maternal nutrition knowledge and child’s diet in this population. This supports a focus on nutrition education that expands mothers’ understanding of what foods to buy, prepare and serve. Further exploration of these associations will provide a stronger evidence base upon which to inform ‘best bets’ for parent-focussed nutrition promotion seeking to promote children’s healthy eating.

Key words: maternal, nutrition knowledge, child diet, home food availability
Introduction

Preventing child overweight and obesity remains an important public health challenge (Lobstein, Baur, & Uauy, 2004; Waters et al., 2011). The potential for overweight will be influenced by the home environment in which a child eats and plays. Home food environments are largely constructed by parents (Anzman, Rollins, & Birch, 2010), who thus provide both the genetics and the environments within which a child’s potential for overweight may be expressed. While much has been written about the ways in which parents may influence their child’s dietary intakes (Savage, Fisher, & Birch, 2007; Stang & Loth, 2011), few studies have sought to examine the pathways by which this occurs (Ventura & Birch, 2008). Consequently, our understanding of how parents influence their children’s eating remains relatively limited; as does our understanding regarding where to focus health promotion investments that seek to support parents to promote improved child nutrition and in turn, reduced obesity risk.

Two constructs commonly reported as important predictors of children’s eating are maternal nutrition knowledge and home food availability. The evidence of associations between mothers’ nutrition knowledge and child diet is equivocal, with some studies reporting positive associations (Blaylock, Variyam, & Lin, 1999) and others reporting null associations (Colavito, Guthrie, Hertzler, & Webb, 1996; Hudson, Stotts, Pruett, & Cowan, 2005) or a combination of positive and null associations (Gibson, Wardle, & Watts, 1998; Vereecken & Maes, 2010). The equivocal nature of these findings may well reflect the inconsistent ways in which nutrition knowledge is conceived and measured. For example, nutrition knowledge may include assessments of knowledge of dietary guidelines, of nutrients in food, diet and health relationships, or of ‘best’
food/meal choices (Parmenter & Wardle, 1999). Given this, conflicting findings may reflect the disparate constructs being measured rather than the strength of association.

A large number of cross-sectional studies support the proposition that child (Bryant et al., 2011; Busick, Brooks, Pernecky, Dawson, & Petzoldt, 2008; Grimm, Harnack, & Story, 2004; Spurrier, Magarey, Golley, Curnow, & Sawyer, 2008) and adolescent (Campbell et al., 2007; Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005; Neumark-Sztainer, Wall, Perry, & Story, 2003) dietary intakes are associated with home food availability. In addition to cross-sectional associations, Pearson, Ball, and Crawford (2011) reported that home availability of fruits, vegetables and energy-dense snack foods were associated with longitudinal changes in adolescent (n=1850) food consumption, such that availability of energy-dense foods was inversely associated with change in fruit consumption and positively associated with change in energy-dense snack consumption over a two year period. Further, in that study, home availability of fruits and vegetables was positively associated with change in vegetable consumption.

Plausibly, maternal nutrition knowledge may be an important determinant of the types of foods purchased and made available in the home, and this may in turn influence children’s diet. However, such pathways have not previously been investigated. Mediation analysis enables investigation of the mechanisms by which maternal nutrition knowledge and home food availability might influence children’s dietary intakes. While a number of factors are likely to predict home food availability (Neumark-Sztainer, et al., 2003), including neighbourhood food availability (Inglis, Ball, & Crawford, 2005), cost (Inglis, et al., 2005; Inglis, Ball, & Crawford, 2008; Jones et al., 2010), and family food preferences (Hannon, Bowen, Moinpour, & McLerran, 2003),
this study will focus on the likely influence of the mothers’ knowledge regarding those foods that comprise a healthy diet. This focus on knowledge is important given that is a modifiable potential predictor of diet. Thus, in this study we aimed to examine if maternal nutrition knowledge was associated with child intake of food and drink items likely to increase obesity risk, and where such a relationship existed, to assess whether this association was mediated by home food availability.

Methods

Sample

Data were collected during 2007-8 as part of the Resilience for Eating and Activity Despite Inequality (READI) study, which is a cohort study of health behaviors and obesity among women and children living in socioeconomically disadvantaged neighborhoods (Cleland et al., 2010; MacFarlane, Abbott, Crawford, & Ball, 2009).

Ethical approval for the study was granted by the Deakin University Human Research Ethics Committee, the Victorian Department of Education and the Catholic Education Office. Participants were randomly selected using the electoral roll from 40 rural and 40 urban suburbs (neighborhoods). Neighborhoods were randomly selected from the most socioeconomically disadvantaged third of all suburbs within 200km of Melbourne, Australia, according to the Australian Bureau of Statistics’ (ABS) Socioeconomic Index for Areas (Australian Bureau of Statistics, 2008). Only neighborhoods with more than 1200 inhabitants were included in the sampling frame. Since voting is compulsory for Australian adults, the electoral roll provides a relatively complete record of population data on Australian residents aged 18 years and over.
A baseline survey was mailed to an initial sample of 11,940 women aged 18-46 years (150 women from each of the 80 neighborhoods, or where there were fewer than 150 women living in the neighborhood, all women within the age range within that neighborhood). A total of 4,934 returned a completed survey and a signed consent form. Excluding from the denominator those whose surveys were returned to sender unopened (n=861) or who were otherwise ineligible (e.g., were deceased, or were incorrectly denoted females on the electoral roll) (n=17), the response rate was 45%. Of these 4,934 women, 571 were excluded because they no longer lived in a READI suburb, nine were excluded because they were not within the desired age range, three were excluded because the survey was not completed by the women it was addressed to, and two subsequently requested to be withdrawn from the study. Of the remaining eligible 4,349 women, those who had a child aged between 5 and 12 years (n=1,457) were asked if they would complete an additional survey about their child (using the next birthday method), with 771 women (53%) agreeing to do so. Of these, 634 allowed their child’s height and weight to be measured, and 613 returned completed surveys about their child. Participants with missing data on any of the study variables were subsequently excluded, leaving a final sample of 536 children and mothers to be included in analyses.

**Procedure**

The self-report survey, along with a plain language statement and a consent form was distributed to women between August 2007 and January 2008. It assessed the women’s physical activity, eating behaviors and factors thought to influence these behaviors and obesity risk. Also included in the package were an invitation letter, a consent form, a $1 lottery ticket and a teabag. A reminder protocol (Dillman, 1978) was employed.
whereby letters were sent to non-responders ten days after the initial survey package was mailed. This was followed by a second reminder letter including another copy of the survey a further ten days later. The surveys were initially pilot-tested with a convenience sample of 32 women aged 18-46 years and minor modifications were made for clarity based on the feedback received. As noted, a second survey assessing child diet, physical activity and behavioural factors was sent to those women who had a child aged between 5 and 12 years.

Measures

Mother’s Nutrition knowledge: Nutrition knowledge was assessed by eight questions. Participants were required to select the best choice from several foods/meals to satisfy a given criteria (adapted from Parmenter & Wardle, 1999). For example, participants were asked “In your view, which one of the following would be the best choice for a low fat, high fibre snack?” and given the options: (1) diet strawberry yoghurt, (2) raisins, (3) a muesli bar, (4) wholemeal biscuits with cheddar cheese, and (5) I don't know. Each participant’s nutrition knowledge score was calculated as the number of these items they answered correctly, so that each participant had a nutrition knowledge score between 0 and 8. The test-retest reliability of these eight items, derived from 72 women in a separately recruited sample from the sampled neighbourhoods, over a one week period was considered acceptable (percent agreement 0.69-0.85) (Portney & Watkins, 2000).

Mother’s Body Mass Index: BMI (kg m⁻²) was calculated by dividing self-reported weight (in kilograms) by self-reported height (in metres) squared, and categorized as
healthy weight (18.5–24.9 kg m$^{-2}$), overweight (25.0–29.9 kg m$^{-2}$) or obese (BMI 30.0 kg m$^{-2}$ or more).

**Mother’s Level of Education:** Level of education was assessed by asking women to indicate their highest education level, categorized as low (did not complete year 12), medium (completed year 12 or equivalent) or high (tertiary qualification).

**Home food availability:** Home food availability was assessed by asking mothers to indicate how often fruit, vegetables, potato crisps and other salty snack foods, chocolate or other confectionery, cakes/doughnuts/biscuits, soft drink, and fruit juice were usually available in their home. Response options were 1 (Never), 2 (Sometimes), 3 (Usually), and 4 (Always). The test-retest reliability of these items over a one week period, as described above, was considered acceptable (% agreement 0.73-0.93).

**Child dietary intake:** Child dietary intake was assessed using a food frequency questionnaire (FFQ) based on several previously published and validated Australian questionnaires (Marks, Webb, Rutishauser, & Riley, 2001; McLennan & Podger, 1998; Riley, Rutishauser, & Webb, 2001; Rutishauser, Webb, Abraham, & Allsopp, 2001; Sanigorski, Bell, & Swinburn, 2007). Mothers reported the usual frequency of consumption in one month of fruit, vegetables, potato crisps or salty snack foods (hereafter referred to as ‘salty snacks’), chocolate or confectionary (hereafter referred to as ‘confectionary’), cakes/doughnuts/sweet biscuits (hereafter referred to as ‘cakes’), soft drink (pop or soda), and fruit juice during the previous month. Fruit and vegetable intake was assessed using eight response options ranging from ‘My child does not eat fruit/vegetables’ to ‘my child eats 6 or more serves/day’. Consumption of salty snacks,
confectionary and cakes was assessed with nine response options ranging from ‘never or <once/month’ to ‘6 or more times/day’. Soft drink and fruit juice intake was assessed using nine response options ranging from ‘I don't drink soft drink/fruit juice’ to ‘10 or more serves/day’. Consumption frequency responses for all intake items were subsequently converted into daily equivalent frequencies (e.g., ‘Never or less than once/month’ = 0 serves/day, ‘1-3 times/month’ = 0.07 serves/day, ‘Once/week’ = 0.14 serves/day, etc).

**Child Body Mass Index:** Trained staff measured children’s height (to the nearest 0.1 cm) and weight (to the nearest 0.1 kg) were measured without shoes in light clothing using a portable stadiometer and digital scales (n = 636). These measurements were undertaken at the participant’s home with a parent present. Inter- and intra-rater reliability (intra-class correlations) were both 0.99. Based on International Obesity Taskforce cut-off points for BMI, children were classified as underweight, healthy weight, overweight or obese (Cole, Bellizzi, Flegal, & Dietz, 2000).

**Statistical analysis**

Prior to analysis, the outcome variables (dietary intake) were assessed for normality, with all showing substantial kurtosis or skewness. Given this, inverse, log and square root transformations were performed, rendering each one adequately normal. The transformed dietary intake variables were then converted to standardised z-scores in order to maximise consistency of scale. The standardised frequencies were used as the intake outcome variables in all subsequent analyses. Child age and weight status were tested as potential covariates. Child age was associated with a number of the dietary intake measures and was included as a covariate in all models with diet as an
outcome; weight status was not associated with dietary intake and was not retained as
a covariate. Initially, associations between nutrition knowledge and the standardised
dietary intake frequencies were examined via linear regression models where dietary
intake was the outcome, nutrition knowledge was the predictor, and child age was
controlled for. Following Baron and Kenny’s (1986) recommendations for mediation
analyses, in order to determine whether home food availability was a significant
mediator of the relationship between nutrition knowledge and food intake, it was
necessary to show that (i) the predictor (nutrition knowledge) was associated with the
mediator (home food availability), and (ii) the mediator was associated with the
outcome (dietary intake) while simultaneously controlling for the predictor. Therefore,
associations were then examined between maternal nutrition knowledge and home food
availability, and between the dietary intake variables and the potential mediators (with
each home availability item only examined in relation to its matching intake variable),
controlling for the predictor and the covariate, child age. For any predictor-mediator-
outcome grouping that satisfied conditions (i) and (ii), bias-corrected bootstrap re-
sampling (using AMOS 17.0) was used to determine if the mediated effect was
statistically significant (p<0.05) (Shrout & Bolger, 2002).

Results

The average age of children and mothers was 9.4 (±2.2) and 38.7 (±5.0) years
respectively (Table 1). About half of the children were male and around 30% were
overweight or obese. Around half of all mothers were overweight or obese and around
one quarter of the mothers had achieved more than a high school education.
Maternal nutrition knowledge was significantly and directly associated with child consumption of fruits, vegetables, and cake, and inversely associated with consumption of salty snacks and soft drink (adjusted for child age) (Table 2). Maternal nutrition knowledge was directly associated with home availability of fruit and vegetables, and inversely associated with home availability of salty snacks and soft drink, however, it was not significantly related to home availability of confectionary, cakes, or fruit juice (Table 2).

For the four mediator variables associated with maternal nutrition knowledge, it was necessary to determine whether they were also associated with the outcome variables, after controlling for the predictor and child age. As can be seen in Table 3, home availability of fruit, vegetables, salty snacks, confectionary, cakes, soft drink and fruit juice were each significantly and directly associated with intake of the corresponding food/drink. As such, Baron and Kenny’s (1986) initial conditions for mediation were met for home availability being a viable mediator of the relationships between nutrition knowledge and intake of fruit, vegetables, salty snacks, and soft drink, hence these were the variables included in the final analyses.

The mediated effect of nutrition knowledge on fruit intake via home food availability was significant ($B = 0.03$ [95% CI: 0.01, 0.06], $p < .001$, see Figure 1). Likewise, home availability was a significant mediator of the relationships between nutrition knowledge and vegetable ($B = 0.02$ [0.00, 0.03], $p < .05$), salty snacks ($B = -0.02$ [-0.05, 0.00], $p < .05$), and soft drink intake ($B = -0.03$ [-0.05, -0.01], $p < .001$).

**Discussion**
This study examined associations between maternal nutrition knowledge and aspects of child diet likely to influence the development of overweight and whether these associations were mediated by the availability of these foods in the home. Moving beyond assessments of direct correlations, to assessments of mediators and explanations of associations, is important as it broadens our understanding of potential pathways by which various factors might influence nutrition and can help us to refine nutrition focussed interventions.

We found that a measure of one aspect of maternal nutrition knowledge (choosing foods consistent with a healthy diet) was significantly, albeit weakly associated with aspects of child diet and home food availability. Overall, increased maternal nutrition knowledge was associated with predicted increased availability and in turn, child consumption of fruits and vegetables. Maternal nutrition knowledge was also associated with reduced availability and child consumption of salty snacks and soft drink. Curiously, increased maternal nutrition knowledge was associated with increased child consumption of cakes. It is possible that mothers, even those with greater nutrition knowledge, view these items as healthier choices than non-core foods such as chocolate and confectionary, or potato crisps or other salty snack foods which may be offered at the same time/eating occasion.

Several associations between the availability of foods in the home and child consumption of these foods were statistically significant and medium to strong in magnitude. Home availability of fruit, vegetables, salty snacks, confectionary, cakes, soft drink and fruit juice were each significantly and directly associated with children’s intake of the corresponding food/drink. These findings are consistent with those
previously reported in the literature (Bryant, et al., 2011; Busick, et al., 2008; Grimm, et al., 2004; Spurrier, et al., 2008).

The unique aspect of this work relates to the finding that home food availability mediated the associations between maternal nutrition knowledge and some aspects of child intake (fruits, vegetables, salty snacks and soft-drinks). Thus, when home availability was included in the models, associations between knowledge and intake were significantly attenuated. To the authors’ knowledge these finding have not previously been reported.

This examination is both timely and important, confirming that, at least for selected foods (in this study fruits, vegetables, salty snacks and soft drinks), maternal knowledge regarding those foods which comprise a healthy diet was related to foods made available in the home. This in turn was associated with child intake of these foods. These findings are important given evidence that child diets often do not meet recommendations for good health (Cameron et al., 2012; Commonwealth Scientific Industrial Research Organisation & University of South Australia, 2008; Golley, Hendrie, & McNaughton, 2011) and that these food items are likely to influence total energy intakes and in turn risk of overweight (Biro & Wien, 2010). Further, these findings are timely, as there is a renewed focus in a number of developed countries on families as a key target group for the design and implementation of healthy eating and obesity prevention strategies (Campbell et al., 2008; Daniels et al., 2009; Hesketh & Campbell, 2010; Wen et al., 2007).
This study provides support for a focus on improving mother’s nutrition knowledge, specifically their knowledge regarding which foods/beverages comprise a healthy diet. This study suggests that, among mothers living in socioeconomically disadvantaged neighborhoods, investment in knowledge of healthy food choices may be likely to impact child consumption through the foods/beverages they subsequently buy and make available in the home.

One example of the influence of knowledge as a facilitator of promoting healthy dietary behaviours is provided by our own work with first-time mothers of new infants in the Melbourne Infant Feeding Activity and Nutrition Trial (InFANT) Program (Campbell et al., 2012). In that randomised controlled trial, the intervention sought to improve mother’s knowledge, skills and social support to improve mother and child obesity-risk behaviours. When compared to controls, intervention group mothers had significantly greater nutrition knowledge post intervention, and knowledge was found to mediate the intervention effect on child dietary quality (child aged 18 months) (Spence, Campbell, McNaughton, Crawford, & Hesketh, 2012).

Further support for a focus on individual level nutrition knowledge is provided by the first multilevel study to examine intrapersonal, social and environmental factors explaining socioeconomic variations in women’s fruit and vegetable intakes (Ball, Crawford, & Mishra, 2006). Ball et al. (2006) reported that lower intakes of fruits and vegetables amongst women (n=1347) were not attributable to poorer access to fruits and vegetables in the local neighbourhood, but rather to intrapersonal factors, particularly poorer nutrition knowledge and less consideration of health issues when purchasing foods.
The high representation of non-university educated women (74.3%) is an important strength of this study given that diet quality and associated co-morbidities are socioeconomically patterned (Ball & Crawford, 2005; McNaughton, Ball, Crawford, & Mishra, 2008). Further, the measures of diet and of nutrition knowledge were adapted from validated tools, and the measures of nutrition knowledge and home food availability showed good reliability (test-retest). It is important to acknowledge that the measure of home food availability, a four point scale (never, sometimes, usually, always), may have limited the opportunity to find differences given many people reported ‘always’ (for example regarding vegetable availability). We suggest a more refined scale allowing for greater differentiation may be appropriate in future studies. We also acknowledge that the response rate (53%) may limit the generalizability of our findings.

Conclusions

This study provides renewed support for a focus on the individual (mothers) as an agent for improving child diet. Improving mother’s nutrition knowledge is likely to be an important facilitator of improved child eating and health and as such needs to be considered in the design of interventions. These data support the design of studies which can assess whether improved nutrition knowledge in mothers living in low SEP regions improves the home food environment (food availability) and in turn children’s diet. Understanding the ways in which we can most efficiently and effectively support women living in disadvantage to improve their nutrition knowledge remains a compelling focus for research.
Competing interests

The authors have no conflict of interests to declare.

Author’s contributions

KJC conceived the manuscript, lead the writing, and oversaw the analyses and interpretation of data; GA conducted all analyses and contributed to interpretation and writing; KB and DAC conceived the idea for and implemented the READI study, developed the measures and methods, and consulted on analyses, interpretation and editing of the manuscript; SAM contributed to development of measures, interpretation of results and editing of the manuscript; ACS contributed to writing and interpretation of results. All authors read and approved the final manuscript.

Acknowledgements

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References


socioeconomically disadvantaged neighbourhoods. [Comparative Study Research Support, Non-U.S. Gov't]. *The Medical Journal of Australia, 192*(3), 137-140.


### Table 1. Characteristics of children and mothers

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n(^a)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (M[SD])</td>
<td>9.4 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>254</td>
<td>47.4</td>
</tr>
<tr>
<td>Female</td>
<td>282</td>
<td>52.6</td>
</tr>
<tr>
<td>BMI category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not overweight</td>
<td>379</td>
<td>70.7</td>
</tr>
<tr>
<td>Overweight</td>
<td>107</td>
<td>20.0</td>
</tr>
<tr>
<td>Obese</td>
<td>50</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (M[SD])</td>
<td>38.7 (5.0)</td>
<td></td>
</tr>
<tr>
<td>Highest level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not complete high school</td>
<td>139</td>
<td>26.0</td>
</tr>
<tr>
<td>Year 12 or equivalent</td>
<td>258</td>
<td>48.3</td>
</tr>
<tr>
<td>Tertiary</td>
<td>137</td>
<td>25.7</td>
</tr>
<tr>
<td>BMI category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not overweight</td>
<td>263</td>
<td>50.5</td>
</tr>
<tr>
<td>Overweight</td>
<td>138</td>
<td>26.5</td>
</tr>
<tr>
<td>Obese</td>
<td>120</td>
<td>23.0</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>Mothers’ nutrition knowledge</td>
<td>5.6 (1.8)</td>
<td>0–8</td>
</tr>
</tbody>
</table>

**Child intake (serves/day)**

<table>
<thead>
<tr>
<th>Fruit</th>
<th>2.1 (1.1)</th>
<th>0–6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>2.2 (1.2)</td>
<td>0–6</td>
</tr>
<tr>
<td>Salty snacks</td>
<td>0.3 (0.3)</td>
<td>0–2.5</td>
</tr>
<tr>
<td>Confectionary</td>
<td>0.3 (0.3)</td>
<td>0–2.5</td>
</tr>
<tr>
<td>Cakes</td>
<td>0.3 (0.4)</td>
<td>0–2.5</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>0.6 (0.9)</td>
<td>0–10</td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>0.8 (0.8)</td>
<td>0–6.5</td>
</tr>
</tbody>
</table>

**Availability in home**

<table>
<thead>
<tr>
<th>Fruit</th>
<th>3.9 (0.4)</th>
<th>2–4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>3.9 (0.3)</td>
<td>2–4</td>
</tr>
<tr>
<td>Salty snacks</td>
<td>2.4 (0.8)</td>
<td>1–4</td>
</tr>
<tr>
<td>Confectionary</td>
<td>2.4 (0.7)</td>
<td>1–4</td>
</tr>
<tr>
<td>Cakes</td>
<td>2.5 (0.7)</td>
<td>1–4</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>2.2 (0.9)</td>
<td>1–4</td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>3.0 (0.9)</td>
<td>1–4</td>
</tr>
</tbody>
</table>

\(^{a}\) The column totals of some characteristics are smaller than the study sample (n=536) due to missing demographic data

\(^{b}\) 1=never, 4=always
Table 2. Associations between maternal nutrition knowledge and child dietary outcomes and home availability of selected foods

<table>
<thead>
<tr>
<th>Nutrition knowledge</th>
<th>Child intake</th>
<th>Home availability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>B (95% CI)</td>
</tr>
<tr>
<td><strong>Child intake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>0.09</td>
<td>0.05 (0.00, 0.10)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>0.10</td>
<td>0.06 (0.01, 0.11)</td>
</tr>
<tr>
<td>Salty snacks</td>
<td>-0.10</td>
<td>-0.06 (-0.10, -0.01)</td>
</tr>
<tr>
<td>Confectionary</td>
<td>0.03</td>
<td>0.02 (-0.03, 0.07)</td>
</tr>
<tr>
<td>Cakes</td>
<td>0.17</td>
<td>0.10 (0.05, 0.14)</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>-0.09</td>
<td>-0.05 (-0.10, -0.01)</td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>-0.03</td>
<td>-0.02 (-0.07, 0.03)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Home availability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>0.20</td>
<td>0.04 (0.03, 0.06)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>0.12</td>
<td>0.02 (0.01, 0.03)</td>
</tr>
<tr>
<td>Salty snacks</td>
<td>-0.09</td>
<td>-0.04 (-0.08, 0.00)</td>
</tr>
<tr>
<td>Confectionary</td>
<td>0.05</td>
<td>0.02 (-0.01, 0.05)</td>
</tr>
<tr>
<td>Cakes</td>
<td>0.07</td>
<td>0.03 (0.00, 0.06)</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>-0.14</td>
<td>-0.07 (-0.12, -0.03)</td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>-0.03</td>
<td>-0.02 (-0.06, 0.03)</td>
</tr>
</tbody>
</table>

*Analyses for child dietary outcomes were adjusted for child age*
Table 3. Associations between home availability of foods and child consumption of these foods

<table>
<thead>
<tr>
<th>Intake</th>
<th>β</th>
<th>B (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>0.27</td>
<td>0.71 (0.49, 0.93)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Vegetables</td>
<td>0.21</td>
<td>0.73 (0.44, 1.01)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Salty snacks</td>
<td>0.43</td>
<td>0.57 (0.47, 0.67)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Confectionary</td>
<td>0.37</td>
<td>0.54 (0.43, 0.66)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Cakes</td>
<td>0.38</td>
<td>0.57 (0.45, 0.69)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>0.36</td>
<td>0.41 (0.32, 0.50)</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>0.45</td>
<td>0.48 (0.40, 0.56)</td>
<td>&lt;0.0005</td>
</tr>
</tbody>
</table>

*a Analyses adjusted for maternal nutrition knowledge and child age*
Figure 1. Graphical illustration of the significant mediational pathways between maternal nutrition knowledge, home food availability and child food/drink consumption. Note: dotted line indicates direct effect when controlling for home availability. Data represent unstandardised effects.