

## ORIGINAL ARTICLE

# Pathways of the association between maternal employment and weight status among women and children: Qualitative findings from Guatemala

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## Abstract

The double burden of malnutrition, defined by the coexistence of undernutrition and overweight, is well documented in low- and middle-income countries. However, the mechanisms by which employment may be related to maternal and child weight status in low- and middle-income countries are not well understood. We conducted in-depth interviews among 20 mothers who participated in Project MIEL, a contemporary trial which evaluated the effects of an integrated micronutrient supplement and parenting intervention in rural Guatemala. We utilized semi-structured interviews to explore the pathways by which maternal employment might influence bodyweight. Interviews were structured to explore the factors that mothers considered when deciding whether or not to participate in the labor force and how mothers perceived the influence of employment on determinants of their own bodyweight and that of their children. Themes were used to develop a conceptual framework. Mothers described four pathways through which employment could lead to changes in weight status: changes in food purchasing; improved household well-being; changes in time allocation; and psychological effects. Mothers described purchasing increased quantities and more varied types of food, as well as the purchase of energy-dense foods. Less time to devote to food preparation resulted in mothers preparing quicker meals and relying on substitute childcare. Mothers also expressed feelings of worry and neglect in relation to being employed, and perceived that these feelings would affect weight. A better understanding of these mechanisms is important for developing policies and programs to support women in the workplace and also reducing maternal and child overweight in Guatemala.

## KEYWORDS

Guatemala, low- and middle-income countries, maternal employment, nutrition transition, overweight

## 1 | INTRODUCTION

Over the past two decades, the proportion of women participating in the labor force in low- and middle-income countries (LMIC) increased 18 percentage points with recent estimates suggesting that on average, 50% of women in LMIC are currently employed (Adair, Guilkey, Bisgrove, & Gultiano, 2002; Head, Zweimueller, Marchena, & Hoel, 2014; International Labour Organization, 2012; Sivard, 1985; Standing, 1999). Increases in women's employment coincide with an increasing prevalence of overweight and a decreasing prevalence of undernutrition among women and children (Black et al., 2013; NCD

Risk Factor Collaboration, 2016; de Onis, Blossner, & Borghi, 2010). Shifts in the burden of malnutrition are documented both in urban and rural areas and are believed to occur as a result of countries' nutrition transitions, referred to as characteristic changes in the food environment (e.g., increased availability processed foods) and physical activity (e.g., declines in physical activity associated with a decrease in agriculture-based labor; Mendez, Monteiro, & Popkin, 2005; Popkin, Adair, & Ng, 2012). Subsequently, there has been an interest in investigating the association between maternal employment and both undernutrition and overweight among women and children in LMIC.

Early empirical work had evaluated the extent to which maternal employment was associated with indicators of undernutrition among women (e.g., underweight (body mass index [BMI] <18.5) and children (e.g., underweight [weight-for-age z-score [WAZ] < -2]). Some of these findings reported a decreased risk of undernutrition, while others indicated an increased risk of undernutrition or report null results (Bamji & Thimayamma, 2000; Brown, Yohannes, & Webb, 1994; De Groote, Kennedy, Payongayong, & Haddad, 1994; Engle, 1991, 1993; Engle & Pedersen, 1989; Lamontagne, Engle, & Zeitlin, 1998; Leslie, 1988; Popkin, 1980, 1983; Pryer, Rogers, & Rahman, 2003; Toyama, Wakai, Nakamura, & Arifin, 2001; Tucker & Sanjur, 1988). Results also suggested heterogeneity in the association by occupation type (e.g., agriculture-based employment) and number of hours worked (Engle, 1991; Engle & Pedersen, 1989; Glick & Sahn, 1998; Leslie, 1988).

More recent studies have begun to explore the association between maternal employment and maternal and child overweight (Goryakin & Suhrcke, 2014; Lopez-Arana, Avendano, van Lenthe, & Burdorf, 2013; Oddo, 2016). These studies also suggest heterogeneity by contextual factors. For example, a study of 33 LMIC from North Africa or West and Central Asia, South and Southeast Asia, sub-Saharan Africa, and Latin America reported that mothers working in professional occupations had higher odds of overweight compared to those working in agriculture (Lopez-Arana et al., 2013). The largest association was observed in South Asia and sub-Saharan Africa. A recent study of 38 LMIC from sub-Saharan Africa, Asia, and Latin America found that women engaged in formal employment had higher odds of overweight, and informally employed mothers had lower odds of overweight (Oddo, 2016). A complementary analysis found that maternal employment was not associated with overweight among children in most LMIC (Oddo, 2016).

Overall, maternal employment is associated with maternal and child weight status in LMIC, but that the direction of the association varies by a variety of individual and contextual factors, including type of work, maternal education, and country-level economic development. Many of these studies employ preexisting, cross-sectional data which limits the ability to better understand potential mediators (Collier, Brady, & Seawright, 2010). Therefore, the mechanisms by which maternal employment may be related to maternal and child weight status in LMIC, particularly overweight, remain not well understood.

The aim of this study is to address this gap in the literature by utilizing in-depth qualitative data to explore the pathways by which maternal employment may be associated with weight status among women and children in LMIC, in order to inform the development of a conceptual framework. We explore potential pathways in an exemplar setting, Guatemala, where persistent undernutrition among children accompanies an increasing prevalence of overweight among women (~50%) and children (~19%) and an increasing prevalence of women's employment (47%; Asfaw, 2011; Ramirez-Zea, Kroker-Lobos, Close-Fernandez, & Kanter, 2014; Razak, Corsi, & Subramanian, 2013). As countries undergo their nutrition transitions, a better understanding of how maternal employment may influence weight status among women and children is important for developing policies and programs that support women as they take on additional roles in the workplace.

## Key messages

- Prior studies have documented a quantitative association between maternal employment and both undernutrition and overweight among women and children in low- and middle-income countries (LMIC). However, the mechanisms by which employment may be associated with maternal and child weight status, particularly in an increasingly "obesogenic" food environment, are not well understood.
- Mothers' comments described 4 primary pathways by which employment may play a role in maternal and child weight status: 1) employment may result in changes in food purchasing; 2) employment may result in improved household well-being; 3) employment may result in changes in mothers' time allocation; and 4) employment may have psychological effects leading to changes in health and weight.
- The context of maternal experiences may explain the previously documented differences in the association of maternal employment and weight status; the pathways described may promote weight gain among some populations, but weight loss among others.

## 2 | METHODS

Characterized by an emergent design, we conducted semi-structured interviews to better understand the pathways by which maternal employment might influence the weight status of women and their children (Maxwell, 2012). This study sought to develop a conceptual framework detailing potential pathways, interviews were structured by exploring (a) the factors that mothers considered when deciding whether or not to participate in the labor force and (b) how mothers perceive the influence of employment on determinants of their own bodyweight and that of their children.

### 2.1 | Sampling and data collection

We drew on a sample of 20 mothers participating in Project MIEL (Mejorando la Inteligencia en la Niñez del Takalik Abaj), a trial which evaluated the effects of an integrated micronutrient supplement and parenting intervention in Nuevo San Carlos Guatemala. Nuevo San Carlos is a rural, largely agrarian, community in Southeastern Guatemala, with a large indigenous population (K'iche' Maya). Mother-child dyads ( $N = 860$ ) were enrolled between February and May 2015. The parent study enrolled children (aged 4–71 months) whose length or height-for-age z-score [HAZ] or WAZ was not more than 3 standard deviations below the reference median. Project MIEL excluded non-Spanish speaking children and those with identified chronic illness or disabilities.

Mothers who were  $\geq 18$  years of age were eligible to participate in the interview sub-sample. Mothers were excluded from the sub-sample if they received the parenting intervention delivered as part of the parent study. Project staff recruited mothers to participate in semi-structured interviews during regular project visits. We used stratified, purposive sampling to identify a balance of mothers who were formally employed ( $n = 7$ ), informally employed ( $n = 7$ ), and non-employed ( $n = 6$ ), based on prior literature which suggests that (a) reasons for labor force participation differ across labor market sectors, (b) informal sector employment yields lower wages, and (c) evidence which suggests that the maternal employment-weight status relationship differs by employment type in LMIC (Bernard, 2006; Günther & Launov, 2012; Oddo, 2016). Mothers were considered formally employed if they worked structured hours and were regularly paid (e.g., teacher). Informal employment included occupations in which hours and pay were unstructured or irregular (e.g., street vendors).

Demographic data, collected as part of the parent study, were retained for the 20 participating mothers. Between October and December 2015, we conducted 20 interviews in Spanish, using a semi-structured interview guide, at the study's health clinic. Data were collected by a graduate student (CL) who worked as a research assistant on the parent study and had familiarity with the local community, as well as didactic and experiential training in qualitative theory and methods. Interviews lasted approximately 30 min and were digitally recorded and transcribed. Data were collected until data saturation was achieved, when a repetition of themes emerged and no new themes or information was being gathered through additional interviews (Glaser & Strauss, 1967).

## 2.2 | Data analysis

Concurrent with data collection, interviews were translated into English and reviewed to ensure accuracy. The first author (VO) and interviewer (CL) participated in weekly meetings to discuss findings and methodological decisions, including modifying the semi-structured interview guide and the sampling strategy based on emerging themes. We incorporated emergent themes into interviews throughout the data collection period (Creswell & Miller, 2000).

Data analysis combined deductive and inductive methods. First, we constructed descriptive categories based on the a priori research question, using a deductive approach. Categories included reasons for employment status; food environment; time allocation; food purchases; utilization of childcare; and impacts on weight status and health. We then employed inductive methods using coding modified from Grounded Theory (Charmaz, 2014). We conducted line-by-line coding on five interviews to identify additional emergent categories to create a codebook, which contained 26 descriptive codes (Supplemental Table S1). Finally, we used analytic categories that were most relevant to the research question as focused codes to identify salient themes. All interviews were coded by two investigators. We extracted exemplar quotes to present key findings that aligned with our aim of developing a conceptual framework. All data management was conducted using Dedoose (SocioCultural Research Consultants, Manhattan Beach, CA). Demographic characteristics of the participants are presented in Table 1.

This study was approved by the Universidad Francisco Marroquín and the Institution Review Board of the University of Maryland School of Medicine. All participants provided informed oral consent and were compensated 30 quetzales (~\$4 U.S. dollars) for their participation.

## 3 | RESULTS

Using a codebook with 26 descriptive codes, we first identified four themes that characterized women's decision-making process around work force participation. We then identified 16 key themes, which illustrated mothers' perceptions of the influence of employment on determinants of maternal and child weight status, including increased quantity of food purchased, improved financial stability, and reduced time preparing meals. We organized these 16 emergent themes by their relationships to one another and their possible impacts on weight status to create a conceptual framework detailing the plausible pathways through which maternal employment may be associated with weight status among women and children in LMIC.

### 3.1 | Factors influencing women's decision-making process around work force participation

Participating mothers described a complex decision-making process regarding working outside the home. Among formally and informally employed mothers, their need for income most directly influenced their decision to work. Several employed mothers were single, and others noted that their husband's income was "insufficient," and the additional income was needed to feed their children: "There is no day in which I can rest. If I rest for a day, we won't have money to eat that day" (informally employed, three children, primary education). Children's well-being or betterment also influenced mothers' decision to work outside the home. Participants explained that they worked because they wanted their children "to have what they didn't have" or "to get ahead."

Conversely, nonemployed mothers (who reported lower household-level incomes) perceived that employment would be neglectful towards their children and/or household, which strongly influenced their decision to not work outside the home: "my reason is the baby, I wouldn't like to neglect him because I'm certain no one will look after him as I will, right? So that's the reason why I don't work" (nonemployed, one child, secondary education). This notion that substitute childcare was not adequate was salient among nonemployed mothers.

Both employed and nonemployed mothers acknowledged the tradeoffs of employment. Commonly, mothers noted that employment increased their income, which was often used to support their children, but also, it increased time away from home.

*"Well, yes because there would be another income for the house, right? We would be a little better...everything costs us now... it costs us to buy the things for the house, so yes it would be a good thing to work. But on the other hand it would be bad too because you neglect your children" (nonemployed, one child, secondary education).*

But among mothers who were not employed, the amount of potential income earned was often not enough. Several of the

**TABLE 1** Characteristics of interview participants<sup>a</sup>

	Mean (SD) or N (%)			
	Overall (n = 20)	Formally employed <sup>b</sup> (n = 7)	Informally employed <sup>c</sup> (n = 7)	Nonemployed (n = 6)
<b>Maternal characteristics</b>				
Mean age (years)	31 (11)	33 (15)	27 (6.0)	32 (10)
Number of children	2.3 (1.3)	1.8 (0.41)	2.3 (1.5)	2.8 (1.7)
Underweight <sup>d</sup>	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Overweight/Obesity <sup>d</sup>	12 (60%)	4 (57%)	3 (43%)	5 (83%)
<b>Education</b>				
< primary education	2 (10%)	1 (14%)	0 (0.0%)	1 (17%)
Primary education complete	6 (30%)	1 (14%)	3 (43%)	2 (33%)
≥ secondary education complete	12 (60%)	5 (71%)	4 (57%)	3 (50%)
<b>Marital status</b>				
Married	10 (50%)	4 (57%)	4 (57%)	2 (33%)
In relationship	4 (20%)	1 (14%)	1 (14%)	2 (33%)
Single, widowed, divorced	6 (30%)	2 (29%)	2 (29%)	2 (33%)
<b>Child characteristics</b>				
Males	15 (75%)	6 (86%)	5 (71%)	4 (67%)
Mean age (months)	36 (16)	39 (15)	36 (13)	31 (20)
Stunting <sup>e</sup>	6 (30%)	1 (14%)	3 (43%)	2 (33%)
Overweight/Obesity <sup>e</sup>	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
<b>Household characteristics</b>				
No. of household members	6.7 (2.9)	5.5 (0.5)	8.6 (4.1)	5.7 (1.4)
<b>Household income quartiles<sup>f</sup></b>				
Quartile 1: lowest	4 (20%)	2 (29%)	0 (0.0%)	2 (33%)
Quartile 2: low	8 (40%)	1 (14%)	4 (57%)	3 (50%)
Quartile 3: high	1 (5.0%)	0 (0.0%)	1 (14%)	0 (0.0%)
Quartile 4: highest	6 (30%)	4 (57%)	2 (29%)	0 (0.0%)
<b>Household composition</b>				
Lives with mother	10 (50%)	4 (57%)	4 (57%)	2 (33%)
Lives with mother-in-law	2 (10%)	1 (14%)	1 (14%)	0 (0.0%)

<sup>a</sup>Missing observations included number of children (n = 1); number of household members (n = 1); and household income (n = 1).

<sup>b</sup>Formal occupations: teacher, janitor, secretary, regular housekeeper.

<sup>c</sup>Informal occupations: seasonal cane harvester, irregular housekeeper, street vendor.

<sup>d</sup>Underweight was defined as BMI <18.5 kg/m<sup>2</sup>, and overweight or obesity was defined as BMI ≥ 25 kg/m<sup>2</sup>.

<sup>e</sup>Estimated using the 2006 World Health Organization Multicentre Growth Standards. Stunting was defined as HAZ < -2. and overweight or obesity was defined as BMI z-score > 2.

<sup>f</sup>Wealth quartiles are estimated based on the sample of the parent project (N = ~800). Total household income (monthly) in Quetzales, from the lowest (quartile 1) to the highest (quartile 4) income.

nonemployed mothers perceived that they “wouldn't earn much” if they did in fact work outside of the home.

*“If you find someone to look after them you will have to pay them, so you'll end up the same, with nothing, because what you earn you'll have to pay to the person looking after the kids”(nonemployed, one child, primary education).*

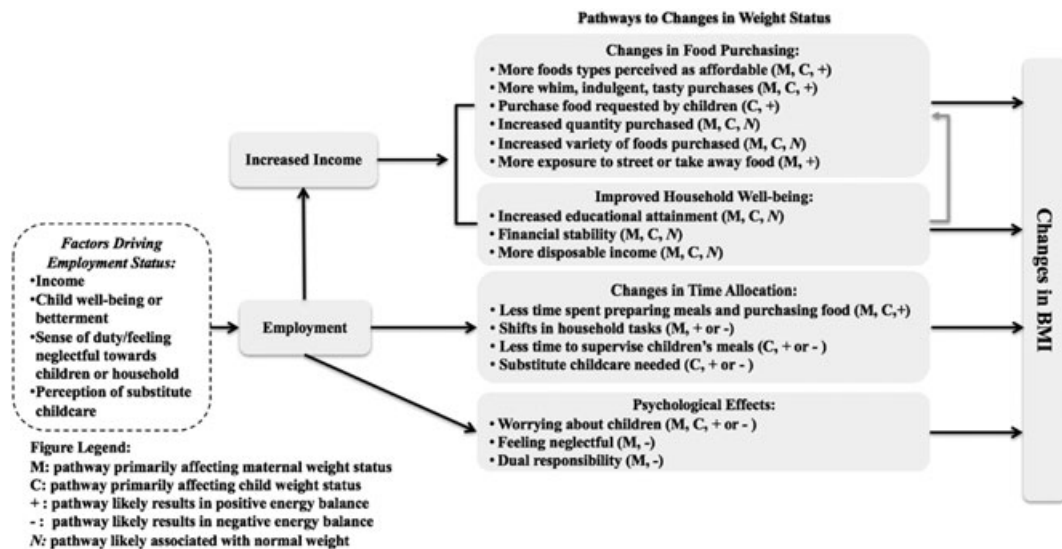
### 3.2 | Mothers' perceptions of the influence of employment on determinants of maternal and child weight status

Mothers' comments described four primary pathways by which employment may play a role in maternal and child weight status: (a) employment may result in changes in food purchasing; (b) employment

may result in improved household well-being; (c) employment may result in changes in mothers' time allocation; and (d) employment may have psychological effects leading to changes in health and weight among women and children (Figure 1).

#### 3.2.1 | Pathway 1: employment may result in changes in food purchasing

Most participants described changing their food purchases after becoming employed. Mothers often described using their additional income, stemming from employment, to purchase food for the household and in some cases, to “overcome” food insecurity. One informally employed women explained that, “with his job and my job, we overcome, because there were some days in which we didn't even eat” (informally employed, three children, primary education). All employed mothers described increasing the quantity, as well as the variety of



**FIGURE 1** Pathways by which maternal employment may play a role in maternal and child weight status

foods purchased, particularly purchasing more meat and dairy once employed. Several formally mothers also explained that they purchased “indulgent” or more energy-dense foods once employed.

*“Well, when we have money we can easily buy them, at least a piece, right? Pizza, or a Mexican “torta” that they ask for, and we buy it for them”(formally employed, one child, less than primary education).*

*“Sometimes I indulge myself, I buy my ham and cheese” (formally employed, two children, secondary education).*

Most nonemployed mothers also perceived that they would purchase a greater quantity of foods and animal source proteins, and in some cases, “tastier,” energy-dense foods, if employed:

*“If I worked, the first thing I would do is to buy a large pizza for the children [laughs]” (nonemployed, four children, secondary education).*

*“Because if I came with money, I could prepare more tasty meals” (nonemployed, five children, primary education).*

Overall, mothers described the purchase of take-away or prepared foods as infrequent. However, the interview data suggested that employed mothers are at least exposed to take-away or street food more often than nonemployed mothers, and in a few cases, they described consuming street food due to lack of time.

With additional income, mothers were also inclined to purchase the food requested by their children. When asked if they purchased snacks or sodas at the store, several mothers indicated that they purchased junk food because their children asked for it.

*“yes, yes, [laughs] chocolate, marshmallows. That's the first thing she asks for [referring to her daughter]”(informally employed, one child, primary education).*

*“Because the kids right? “Mom, I want candy,” so yes” (formally employed, two children, secondary education).*

### 3.2.2 | Pathway 2: employment may result in improved household well-being

Most employed mothers described an improvement in household well-being stemming from increased income. Participants explained that their income was often used to improve the overall financial stability of the household as they contributed to household bills and the home, more generally.

*“After I get paid, I invest everything at home, paying for electricity, water, and buying my cooking things” (formally employed, one child, less than primary education).*

Income earned from employment was also allocated towards children's educational attainment.

*“I save money for them, because I want to send my two boys to school this year...I save some money for their studies” (informally employed, two children, secondary education).*

Mothers reported investing virtually all of their disposable income in their children, whether that be to invest in material positions or their health.

*“I buy things for my children to eat, when they need shoes or clothes, and that's all. I invest in them” (informally employed, three children, secondary education).*

*“I have to work, so that we can spend his salary and try to save something from mine, because sometimes they get sick and we have to take them to the doctor” (formally employed, two children, primary education).*

Nonemployed mothers also perceived that their income would be directed towards their children, if employed.

*“I would see what is needed at home for the children, because that is the most important thing...whatever*

they need" (nonemployed, four children, secondary education).

### 3.2.3 | Pathway 3: employment may result in changes in mothers' time allocation

Participants described changes in the time allocated for household duties as a result of employment. The most salient of these changes included a decrease in time spent on meal preparation and food procurement: "when one works, one makes quick meals" (formally employed, two children, secondary education). Among employed mothers, extended households facilitated working outside the home as the grandmother often helped with meal preparation, childcare, and food procurement in their absence: "my mom is the one who goes to shop because I work" (informally employed, one child, secondary education). Nonemployed mothers also perceived that they would have less time to prepare meals or go to the market if employed.

Mothers who recently changed their employment status were able to provide useful contrasts regarding their time allocation. When one mother who recently stopped working was asked how it affected her food preparation routine she said: "One has more time to think about "what am I going to cook?" I have all the time to do it" (currently nonemployed, five children, less than primary education).

Employed mothers also explained that they shift other household responsibilities, such as cleaning or spending time with their children, to the afternoons or weekends, or will wake up earlier, in order to accommodate their work schedules. Some employed mothers described having limited time to supervise their children's meals or would skip eating due to time scarcity: "I have to be in one place and then in another and sometimes one doesn't eat" (formally employed, two children, secondary education).

In order to work outside the home, formally employed mothers relied on substitute childcare, often a family member. Overall, these mothers perceived the childcare to be trustworthy and similar to the care they themselves would provide.

*"There is almost no difference because as my mom is with us, she knows more than me and she takes better care of my son and prepares the food more carefully for him" (formally employed, two children, primary education).*

Informally employed mothers were less reliant on substitute childcare and ascribe this to the flexibility of their employment (e.g., seasonal cane harvester, tortilla vendor), which allows them to bring their children to work. In stark contrast to the perspective of formally employed mothers, many nonemployed mothers perceived substitute childcare as untrustworthy: "there may be someone who can do those things but I don't have much trust in that" (nonemployed, two children, primary education). In some cases, they believed it could be harmful to the child's health. When asked if employment affects health or nutritional status, one mother reported: "it all depends who is taking care of the child" (nonemployed, one child, secondary education).

### 3.2.4 | Pathway 4: employment may have psychological effects leading to changes in health and weight among women and children

The perceived impact of employment on mental health was a strong, underlying theme that emerged among both employed and nonemployed mothers. Although this perception was more salient among nonemployed mothers, all subgroups of women described how employment could affect their health or weight as it led them to worry about their children: "a mother always worries about their children. And that would be bad for my health. Because I worry more than anything" (informally employed, five children, primary education). Similarly, when asked to contrast her health now that she is not working, one mother said: "I used to get depressed, thinking about if he had eaten. Did he have his bottle already? Did he do this, did he do that? One can't be at peace" (nonemployed, five children, less than primary education, recently changed employment status).

Mothers also perceived that employment has psychological effects on their children: "well you see the past few days he has been feeling a little sad...it's because I don't spend much time with him" (informally employed, one child, secondary education). Some mothers more directly commented on how they perceived that psychological effects stemming from employment affected children's weight; for example, many nonemployed women believed that their children would not eat or would not eat well if they (the mothers) were not present.

*"Well compared to before, he is "gordito"<sup>1</sup> and has gained weight. And it would affect him because if he doesn't see me he wouldn't eat" (nonemployed, five children, less than primary education, recently changed employment status).*

It emerged that most participants across all employment categories had concerns about neglecting their household and children due to employment. One nonemployed mother speculated that being neglectful would affect her children's health: "It affects their health because you are not keeping up with them, you neglect them a lot" (nonemployed, four children, primary education). Underlying these perceptions were descriptions suggesting that employed women perceived the dual responsibility of working and being the primary caretaker of the children to be stressful: "I take care of everything. I look after them and do all the rest" (informally employed, three children, primary education).

## 4 | DISCUSSION

This study uniquely utilizes qualitative data to explore multiple pathways by which maternal employment may be associated with weight status among women and children in Guatemala, a country with a rapidly increasing prevalence of overweight. Data suggested that women who enter the workforce are influenced by different factors than those who chose to remain nonemployed. Mothers' need for income most directly influenced their decision to work outside the home. Nonemployed mothers explained that feeling neglectful and negative

<sup>1</sup>Gordito is a term of endearment and has a connotation of healthy.

perceptions of substitute childcare most strongly influenced their decision to refrain from working. Mothers' comments described four primary pathways through which maternal employment could influence weight status: (a) changes in food purchasing; (b) improved household well-being; (c) changes in time allocation; and (d) psychological effects.

In this sample, formally and informally employed mothers had relatively similar levels of education. Therefore, informally employed mothers may enter the informal labor market (rather than the formal labor market) voluntarily, rather than being forced into informal employment due to lower education. These women do so to take advantage of desirable features of this market, which in rural Guatemala included being able to bring their child to work. It could also be that there are too few jobs in the formal labor market in rural Guatemala, so that not all qualified women seeking work are able to obtain a job in the formal labor market. Nonemployed mothers in this sample had lower levels of education, on average. Therefore, if employed, these women may receive lower wages (or be qualified for occupations which pay lower wages), as was expressed by several nonemployed women. These mothers may not perceive the tradeoff of increased time constraints to be worthwhile, given the limited opportunity for income in this rural area (Becker, 1965).

Both formally and informally employed mothers described using their additional income to increase the quantity of food purchased for the household. This is consistent with prior literature indicating that maternal employment is associated with increased household food expenditures (Popkin, 1980, 1983; Tucker & Sanjur, 1988). Mothers are likely to allocate these food purchases towards their children (Yoong, Rabinovich, & Diepeveen, 2012). Increased income has been shown to improve dietary quality and assist households in meeting their basic caloric needs, which is aligned with some participants' descriptions of employment helping them become more food secure (Blumberg, 1991; Engle, 1993; Tucker & Sanjur, 1988). However, other participants described using the income to purchase more energy-dense foods, which is increasingly common in Guatemala given the major shift away from the consumption of staple crops towards highly processed foods (Asfaw, 2011). Per capita food supply in Guatemala increased from 2,244 kilocalories (kcal) in 1996 to 2,502 kcal in 2011, and both sugar and palm oil now rank among the top 10 foods available for consumption (FAO, 2014). With workforce participation, we would expect mothers to rely on processed or take-away foods, particularly as higher-fat foods become more affordable and preferred (Caballero, 2005; Drewnowski, 2000; Popkin & Gordon-Larsen, 2004). But these varied experiences in our sample may be reflective of mothers' participation in different labor force sectors and may offer some explanations for the documented country-level dual burden of undernutrition and overweight in Guatemala and more broadly, the heterogeneity in the previously reported employment-weight status associations (Lee, Houser, Must, de Fulladolsa, & Bermudez, 2012). Informally employed mothers in this sample had lower levels of household income, compared to formally employed mothers (Table 1). This is consistent with broader evidence indicating that wages in the informal sector are more than 50% lower than wages in the formal sector (Günther & Launov, 2012). More nominal increases in income may prohibit these mothers from purchasing energy-dense foods. As compared to formally employed women,

who are often engaged in professional occupations which tends to be more sedentary, informally employed women are more likely to be engaged in occupational physical activity, particularly those employed in agriculture-based occupations (Günther & Launov, 2012). It is possible that smaller increases in income and more active occupations associated with informal work could promote a normal bodyweight or in some cases, underweight. At the same time, formally employed women in this sample have higher household incomes. We might expect that, in these households, income results in increases overall household food expenditures, but also renders energy-dense foods affordable and accessible in Guatemala's food environment (Engle, 1993; Popkin, 1980, 1983). Among formally employed women, trading up to energy-dense foods may result in a positive energy balance and becoming overweight. In Guatemala, changes in the food environment coincide with increases in BMI; data from a 2,000 survey reported that a 10% increase in the share of processed foods was associated with a 4.3% increase in the BMI of Guatemalans (Asfaw, 2011).

Of the pathways described, we hypothesize that changes in food purchasing most directly influence maternal and child weight status. However, the three additional pathways described may also influence maternal and child bodyweight, albeit less directly. Participants explained that their income was often used to improve the households' overall financial stability and/or be allocated towards child health care or education. This is consistent with prior work suggesting women are likely to use resources in ways that improve family well-being, especially that of children (Katz et al., 2007; Rawlings & Rubio, 2005; Thomas, 1990; Yoong et al., 2012). Improved household-level financial stability and investments in human capital have been shown to improve indicators of undernutrition among women and children through improved diet, access to health care and improved sanitation; however, it is unclear if these mechanisms promote optimal nutritional status or if it would initially increase risk for maternal or child overweight in LMIC (Black et al., 2013).

Employed mothers perceived that they spent less time on meal preparation and food procurement. Limited descriptive evidence from LMIC suggests that working mothers spend less time cooking and that maternal work hours are associated with lower energy intakes from home and higher intakes from commercially prepared foods (Bisgrove & Popkin, 1996; Tucker & Sanjur, 1988). Changing demands on women's time and in the family unit in Guatemala may promote a shift towards purchasing commercially prepared foods. Economic migration in rural Guatemala, resulting in the father being away from home for extended periods of time, and fewer extended family households in general mean that it is often cheaper to buy premade food for a smaller family unit rather than cooking from scratch for larger, extended families (Yates-Doerr, 2015). We would expect that a reduction in time spent on meal preparation and food procurement, leading to increased consumption of commercially prepared foods, would increase the risk of being overweight among both mothers and children. Alternatively, some mothers themselves may be consuming fewer total calories due to time scarcity. When balancing employment and domestic duties, women may reduce food consumption or miss meals, as was described by a few women interviewed in our study (Devine et al., 2009).

Employed mothers in our sample also explained that they were more reliant on substitute childcare due to time constraints. Although most employed mothers perceived their substitute childcare provider to be similar to the care they themselves would provide, nonemployed mothers expressed concern that substitute childcare providers would be inadequate. When the mother participates in the labor force, adequate substitute care from an adult has been shown to prevent child undernutrition (Engle, 1991; Lamontagne et al., 1998; Tucker & Sanjur, 1988). However, substitute caregivers can include older siblings or adult caregivers who do not provide timely and appropriate feeding (Nair, Ariana, & Webster, 2014; Popkin, 1980). Based on nonemployed mothers' perceptions, and key demographic characteristics (i.e., lower household income and few live with their mothers or mothers-in-law), it is plausible that affordable and adequate substitute childcare is not widely available in this setting. There is increasing recognition that feeding behaviors and styles—how and when children are fed—in addition to what they are fed, could influence children's acceptance of food and dietary intake and therefore their weight status (Bentley, Wasser, & Creed-Kanashiro, 2011). Therefore, it is possible that reliance on substitute childcare could be associated with either higher or lower bodyweight among young children. Substitute childcare could decrease weight if the child consumes fewer total calories because the caregiver does not provide adequate feeding (e.g., skips meals or does not provide an appropriate portion size). However, substitute childcare could spur weight gain among the child if the substitute caregiver opts to feed the child junk foods, rather than prepare meals.

Finally, unlike prior quantitative studies, which have largely focused on food expenditures, we found that mothers perceived there to be psychological effects of employment, which could influence both maternal and child bodyweight. Prior evidence indicates that adverse maternal mental health is associated with childhood underweight in LMIC and overweight in the United States (Surkan, Kawachi, & Peterson, 2008; Surkan, Kennedy, Hurley, & Black, 2011). Evidence also suggests that mothers who report stress or depression are at risk for nonresponsive feeding, which has been associated with risk of both undernutrition and overweight among young children (Bentley et al., 2011; Hurley, Black, Papas, & Caufield, 2008). Additionally, mothers view themselves as responsible for ensuring the health and well-being of their children and may feel stress when this role competes with their employment responsibilities or when their employment yields fewer monetary rewards (Santana, Loomis, Newman, & Harlow, 1997; Slater, Sevenhuysen, Edginton, & O'Neil, 2011). Although adverse mental health is associated with overweight among the women in the United States, we hypothesize that the effect of employment is different on women in Guatemala, whereby stress could lead to increased risk for underweight among women (Petry, Barry, Pietrzak, & Wagner, 2008; Pickering, Grant, Chou, & Compton, 2007).

Overall, pathways that would be expected to increase or decrease the risk of underweight were both described, suggesting that there are simultaneous factors acting at once. These qualitative findings shed light on prior quantitative findings, which report mixed associations for both undernutrition and overweight (Brown et al., 1994; De Groote et al., 1994; Engle, 1993; Engle & Pedersen, 1989; Lamontagne et al., 1998; Lopez-Arana et al., 2013; Mascie-Taylor, Marks, Goto, & Islam, 2010; Pierre-Louis, Sanjur, Nesheim, Bowman, & Mohammed, 2007;

Popkin, 1980; Toyama et al., 2001). Varied experiences among women may explain differences in the employment–weight status association, as the pathways described may spur weight gain among some populations, but weight loss among others. For example, how mothers change their food purchases likely depends on the food environment, as well as factors at the household (e.g., household composition) and individual (e.g., education) levels. These findings further suggest that, in Guatemala, a model of intersectoral governance for the promotion of optimal nutrition is critical, and one such component should include behavioral settings, such as the workplace. Employers could consider offering individual-level nutrition education in combination with environmental approaches, such as increasing the availability of healthier food and beverage choices in the workplace and offering onsite childcare.

Our study is limited by several factors. First, we employed a stratified purposive sampling strategy in order to identify three types of mothers: formally employed, informally employed, and nonemployed. However, the number of participants within each stratum was small, despite having a total sample of 20 participants. Nonetheless, including women representing each of these three groups as well as some having recently transitioned in or out of employment, gave us a rich variety of experiences to draw on. The transferability of our findings may be limited to rural areas, or areas with similar sociocultural norms, and in similar a stage of the nutrition transition as Guatemala. It is also possible that participants' responses were subject to social desirability bias, particularly their report of purchasing processed or junk foods. Despite limitations, we improve upon the existing evidence in two key ways. First, we utilize an emergent design and qualitative data to explore mothers' own perceptions of how employment affects weight status, an understanding of which is important for the development of policies and programs that target multiple pathways in order to support women's participation in the work force, while also promoting optimal maternal and child nutrition. Additionally, few prior studies focus on the mechanisms of the employment–undernutrition association, whereas we aim to capture the mechanisms of this association in an increasingly “obesogenic” food environment.

## 5 | CONCLUSIONS

This study adds to our understanding of the various pathways by which maternal employment may influence maternal and child weight status in a country progressing through the nutrition transition. Mothers describe four pathways through which employment could lead to changes in bodyweight; employment changes their food purchasing and time allocation, improves household well-being, and has psychological effects. Although formally employed, informally employed, and nonemployed women describe similar pathways, varied experiences in how they respond may offer explanations for heterogeneity in the previously documented employment–weight status relationship. A better understanding of this area is critical, given the increasing prevalence of women engaged in wage-earning employment, coinciding with the shifting burden of undernutrition and overweight in LMIC. Subsequent studies should further explore the aforementioned pathways in other LMIC.



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## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## CONTRIBUTIONS

Author contributions are as follows: VO, JJS conceptualized the research question; VO, PS, KH, JJS designed the analytic approach; CL, SdP collected data; VO, CL analyzed data; VO wrote the first draft of the manuscript; all authors provided critical revisions of the manuscript; all authors read and approved the final manuscript.

## REFERENCES

- Adair, L., Guilkey, D., Bisgrove, E., & Gultiano, S. (2002). Effect of childbearing on Filipino women's work hours and earnings. *Journal of Population Economics*, 15(4), 625–645.
- Asfaw, A. (2011). Does consumption of processed foods explain disparities in the body weight of individuals? The case of Guatemala. *Health Economics*, 20(2), 184–195.
- Bamji, M. S., & Thimayamma, B. V. (2000). Impact of women's work on maternal and child nutrition. *Ecology of Food and Nutrition*, 39(1), 13–31.
- Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517.
- Bentley, M. E., Wasser, H. M., & Creed-Kanashiro, H. M. (2011). Responsive feeding and child undernutrition in low-and middle-income countries. *The Journal of Nutrition*, 141(3), 502–507.
- Bernard, H. R. (2006). *Research methods in anthropology* (Vol. 2). Thousand Oaks, CA: Sage Publications.
- Bisgrove, E. Z., & Popkin, B. M. (1996). Does women's work improve their nutrition: Evidence from the urban Philippines. *Social Science & Medicine*, 43(10), 1475–1488.
- Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis, M., ... Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427–451.
- Blumberg, R. L. (1991). *Income under female versus male control. Gender, Family and the Economy: The Triple Overlap*. Newbury Park, CA: Sage Publications.
- Brown, L. R., Yohannes, Y., & Webb, P. (1994). Rural labor-intensive public works: Impacts of participation on preschooler nutrition: Evidence from Niger. *American Journal of Agricultural Economics*, 76(5), 1213–1218.
- Caballero, B. (2005). A nutrition paradox—underweight and obesity in developing countries. *The New England Journal of Medicine*, 352(15), 1514–1516.
- Charmaz, K. (2014). *Constructing grounded theory*. Thousand Oaks, CA: Sage Publications.
- Collier, D., Brady, H. E., & Seawright, J. (2010). Outdated views of qualitative methods: Time to move on. *Political Analysis*, 8, 506–513.
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, 39(3), 124–130.
- De Groote, H., Kennedy, E., Payongayong, E., & Haddad, L. (1994). Credit with education for women in Mali: Impacts on income, food security, and nutrition. *Report to USAID. Washington DC: IFPRI*.
- De Onis, M., Blössner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *The American Journal of Clinical Nutrition*, 92(5), 1257–1264.
- Devine, C. M., Farrell, T. J., Blake, C. E., Jastran, M., Wethington, E., & Bisogni, C. A. (2009). Work conditions and the food choice coping strategies of employed parents. *Journal of Nutrition Education and Behavior*, 41(5), 365–370.
- Drewnowski, A. (2000). Nutrition transition and global dietary trends. *Nutrition*, 16(7–8), 486–487. [https://doi.org/10.1016/S0899-9007\(00\)00295-1](https://doi.org/10.1016/S0899-9007(00)00295-1)
- Engle, P. L. (1991). Maternal work and child-care strategies in peri-urban Guatemala: Nutritional effects. *Child Development*, 62(5), 954–965.
- Engle, P. L. (1993). Influences of mothers' and fathers' income on children's nutritional status in Guatemala. *Social Science & Medicine*, 37(11), 1303–1312.
- Engle, P. L., & Pedersen, M. E. (1989). Maternal work for earnings and children's nutritional status in urban Guatemala. *Ecology of Food and Nutrition*, 22(3), 211–223.
- FAO. (2014). Country profiles: Guatemala. Retrieved from <http://www.fao.org/countryprofiles/index/en/?iso3=GTM>. (accessed 2 December 2016).
- Glaser, B., & Strauss, A. (1967). *The discovery grounded theory: strategies for qualitative inquiry*. London, England: Wiedenfeld and Nicholson.
- Glick, P., & Sahn, D. E. (1998). Maternal labour supply and child nutrition in West Africa. *Oxford Bulletin of Economics and Statistics*, 60(3), 325–355.
- Goryakin, Y., & Suhrcke, M. (2014). Economic development, urbanization, technological change and overweight: What do we learn from 244 Demographic and Health Surveys? *Economics & Human Biology*, 14, 109–127.
- Günther, I., & Launov, A. (2012). Informal employment in developing countries: Opportunity or last resort? *Journal of Development Economics*, 97(1), 88–98.
- Head, S., Zweimueller, S., Marchena, C., & Hoel, E. (2014). *Women's lives and challenges: equality and empowerment since 2000*. Rockville, Maryland: ICF International.
- Hurley, K. M., Black, M. M., Papas, M. A., & Caufield, L. E. (2008). Maternal symptoms of stress, depression, and anxiety are related to nonresponsive feeding styles in a statewide sample of WIC participants. *The Journal of Nutrition*, 138(4), 799–805.
- International Labour Organization. (2012). Global Employment Trends 2012. *Preventing a Deeper Job Crisis*. Retrieved from [http://www.ilo.org/global/research/global-reports/global-employment-trends/WCMS\\_171571/lang-nl/index.htm](http://www.ilo.org/global/research/global-reports/global-employment-trends/WCMS_171571/lang-nl/index.htm). (accessed 14 March 2017).
- Katz, J., West, K. P. Jr., Pradhan, E. K., Leclercq, S. C., Khatri, S. K., & Shrestha, S. R. (2007). The impact of a small steady stream of income for women on family health and economic well-being. *Global Public Health*, 2(1), 35–52.
- Lamontagne, J. F., Engle, P. L., & Zeitlin, M. F. (1998). Maternal employment, child care, and nutritional status of 12-18-month-old children in Managua, Nicaragua. *Social Science & Medicine*, 46(3), 403–414.
- Lee, J., Houser, R. F., Must, A., de Fulladolsa, P. P., & Bermudez, O. I. (2012). Socioeconomic disparities and the familial coexistence of child stunting and maternal overweight in Guatemala. *Economics & Human Biology*, 10(3), 232–241.
- Leslie, J. (1988). Women's work and child nutrition in the Third World. *World Development*, 16(11), 1341–1362.
- Lopez-Arana, S., Avendano, M., van Lenthe, F. J., & Burdorf, A. (2013). Trends in overweight among women differ by occupational class: Results from 33 low-and middle-income countries in the period 1992–2009. *International Journal of Obesity*, 38(1), 97–105.
- Mascie-Taylor, C. G., Marks, M. K., Goto, R., & Islam, R. (2010). Impact of a cash-for-work programme on food consumption and nutrition among women and children facing food insecurity in rural Bangladesh. *Bulletin of the World Health Organization*, 88(11), 854–860. <https://doi.org/10.2471/BLT.10.080994>
- Maxwell, J. A. (2012). *Qualitative research design: an interactive approach: an interactive approach*. Thousand Oaks, CA: Sage Publications.
- Mendez, M. A., Monteiro, C. A., & Popkin, B. M. (2005). Overweight exceeds underweight among women in most developing countries. *The American Journal of Clinical Nutrition*, 81(3), 714–721.

- Nair, M., Ariana, P., & Webster, P. (2014). Impact of mothers' employment on infant feeding and care: A qualitative study of the experiences of mothers employed through the Mahatma Gandhi National Rural Employment Guarantee Act. *BMJ Open*, 4(4) e004434-002013-004434. <https://doi.org/10.1136/bmjopen-2013-004434>
- NCD Risk Factor Collaboration. (2016). Trends in adult body-mass index in 200 countries from 1975 to 2014: A pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *The Lancet*, 387(10026), 1377–1396.
- Oddo, V. M. (2016). The weight of work: The association between maternal employment and maternal and child overweight in low- and middle-income countries. (Doctoral dissertation). Johns Hopkins Bloomberg School of Public Health, Baltimore MD.
- Petry, N. M., Barry, D., Pietrzak, R. H., & Wagner, J. A. (2008). Overweight and obesity are associated with psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychosomatic Medicine*, 70(3), 288–297.
- Pickering, R. P., Grant, B. F., Chou, S. P., & Compton, W. M. (2007). Are overweight, obesity, and extreme obesity associated with psychopathology? Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *The Journal of Clinical Psychiatry*, 68(7), 998–1009.
- Pierre-Louis, J. N., Sanjur, D., Nesheim, M. C., Bowman, D. D., & Mohammed, H. O. (2007). Maternal income-generating activities, child care, and child nutrition in Mali. *Food and Nutrition Bulletin*, 28(1), 67–75.
- Popkin, B. M. (1980). Time allocation of the mother and child nutrition. *Ecology of Food and Nutrition*, 9(1), 1–13.
- Popkin, B. M. (1983). *Rural women work and child welfare in the Philippines. Women and Poverty in the Third World* (pp. 157–176). Baltimore, MD: Johns Hopkins University Press.
- Popkin, B. M., & Gordon-Larsen, P. (2004). The nutrition transition: World-wide obesity dynamics and their determinants. *International Journal of Obesity*, 28, S2–S9.
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3–21.
- Pryer, J. A., Rogers, S., & Rahman, A. (2003). Factors affecting nutritional status in female adults in Dhaka slums, Bangladesh. *Social Biology*, 50(3–4), 259–269.
- Ramirez-Zea, M., Kroker-Lobos, M. F., Close-Fernandez, R., & Kanter, R. (2014). The double burden of malnutrition in indigenous and nonindigenous Guatemalan populations. *The American Journal of Clinical Nutrition*, 100(6), 1644S–1651S.
- Rawlings, L. B., & Rubio, G. M. (2005). Evaluating the impact of conditional cash transfer programs. *The World Bank Research Observer*, 20(1), 29–55.
- Razak, F., Corsi, D. J., & Subramanian, S. V. (2013). Change in the body mass index distribution for women: analysis of surveys from 37 low-and middle-income countries. *PLoS Med*, 10(1), e1001367.
- Santana, V. S., Loomis, D., Newman, B., & Harlow, S. D. (1997). Informal jobs: Another occupational hazard for women's mental health? *International Journal of Epidemiology*, 26(6), 1236–1242.
- Sivard, R. (1985). *Women: a world survey*. Washington, DC: United Nations Entity for Gender Equality and the Empowerment of Women.
- Slater, J., Sevenhuysen, G., Edginton, B., & O'Neil, J. (2011). 'Trying to make it all come together': Structuration and employed mothers' experience of family food provisioning in Canada. *Health Promotion International*, 3(3), 405–415.
- Standing, G. (1999). Global feminization through flexible labor: A theme revisited. *World Development*, 27(3), 583–602.
- Surkan, P. J., Kawachi, I., & Peterson, K. E. (2008). Childhood overweight and maternal depressive symptoms. *Journal of Epidemiology and Community Health*, 62(5), e11–e11.
- Surkan, P. J., Kennedy, C. E., Hurley, K. M., & Black, M. M. (2011). Maternal depression and early childhood growth in developing countries: Systematic review and meta-analysis. *Bulletin of the World Health Organization*, 89(8), 607–615.
- Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of Human Resources*, 25(4), 635–664.
- Toyama, N., Wakai, S., Nakamura, Y., & Arifin, A. (2001). Mother's working status and nutritional status of children under the age of 5 in urban low-income community, Surabaya, Indonesia. *Journal of Tropical Pediatrics*, 47(3), 179–181.
- Tucker, K., & Sanjur, D. (1988). Maternal employment and child nutrition in Panama. *Social Science & Medicine*, 26(6), 605–612.
- Yates-Doerr, E. (2015). *The weight of obesity: hunger and global health in postwar Guatemala*. Oakland, CA: University of California Press.
- Yoong, J., Rabinovich, L., & Diepeveen, S. (2012). The impact of economic resource transfers to women versus men. Retrieved from [http://www.rand.org/pubs/external\\_publications/EP201200154.html](http://www.rand.org/pubs/external_publications/EP201200154.html). (accessed 2 December 2016).

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