

## Research Article

### Parents' BMI and Weight Perception are Associated with Overweight and Obesity among Children in Michigan Migrant and Seasonal Farm Worker Families

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## Abstract

Children from Migrant and Seasonal Farm Worker (MSFW) families are vulnerable to obesity, but little is known about the risk factors of obesity in this population. We examined the risk factors of overweight/obesity among Michigan MSFW's children. Participants were recruited from five Telamon's Michigan Migrant Head Start (MMHS) centers between July and August 2013. A total of 76 families who had at least one child enrolled in the MMHS completed the survey in English or Spanish. An online survey questionnaire was used for collection of data on parent's sociodemographic characteristics, lifestyle, nutrition knowledge level, and perception on weight status, and food security status of household. Height and weight were measured for the oldest child and their parent with a portable height and weight scale. Weight status for children was categorized into underweight, normal weight, overweight, and obese according to gender-specific BMI-for-age growth charts from the CDC. To test differences in risk factors between non-obese and overweight/obese children, the chi-square test was used for categorical variables and the t-test for continuous variables. The MSFW families were of low socioeconomic status with a high prevalence of food insecurity (58%) and overweight/obesity (75% of parents and 41% of children). Parents had poor nutrition knowledge and inaccurate perception on weight status for self and their children. Among overweight/obese children, the rates of overweight/obese parents and parents with inaccurate perception on weight status were higher than those of non-obese children. A higher BMI and inaccurate perception on weight status of parents were associated with overweight/obesity among the MSFW children and needs to be changed through nutrition intervention, in order to combat childhood obesity.

**Keywords:** Obesity Risks; Migrant and Seasonal Farm Worker; Hispanic Children; Perception on Weight Status

## Introduction

A Migrant and Seasonal Farm Worker (MSFW) are defined as "an individual who is employed in agricultural works on a seasonal basis within the last twenty-four months [1]." A total of 3.5 million MSFW families are in the U.S. and about fifty thou-

sands of MSFWs are employed in field agriculture, nursery/greenhouse work, reforestation, and food processing in Michigan (MI), which is the fifth in the nation for the number of MSFWs. MSFWs are an essential component of the U.S. agricultural industry and have a positive impact on the farms and society where they work and live in [1].

MSFW families and children are known to be vulnerable to many nutritional health risks. The transient lifestyle, long hours and hard work, English language barrier, low education level, and lack of health insurance have been attributed to the poor health status of MSFW families and children [2]. Especially, children of MSFW families are at higher risk of overweight/obesity compared to children in general population [3]. According to previous studies, low socio-economic status [4] and food insecurity status [5] of household, parents' overweight or obese [3,6], inaccurate parents' perception on health and weight [3,7], and inadequate dietary intake [6,8] have been reported as risk factors of overweight/obesity among Hispanic/Latino children. A significant proportion of MSFWs are of Hispanic/Latino ethnicity. However, we do not know if these risk factors are similar in the MSFW's children whose social, cultural, dietary and linguistic practices and lifestyles differ vastly from other low-income or Hispanic/Latino ethnicity groups that have been studied. Previous research has given little attention to overweight/obesity among children from MSFW families. It is partly because MSFW families and children are hard to reach for research and education. In the latest research on health status of MSFW's children, prevalences of overweight and obesity have been increased [9]. To reduce health disparities among minority and underserved children according to the goals of Healthy People 2020 [10], it is important to identify risk factors of overweight/obesity in the MSFW's children who are subjected to cultural, socioeconomical, environmental, and educational disadvantages. Therefore, the purpose of this study was to identify risk factors of overweight/obesity among MSFW's children attending the Migrant Head Start (MHS) program in MI. Specific aims were 1) to collect the information on sociodemographic characteristics of households; 2) to evaluate nutrition knowledge level of parents; 3) to measure parents' and children's weight status; 4) to assess parents' perception on weight status for self and their children; and 5) to assess food security status of household as potential risk factors of overweight or obesity among children from MSFW families. The hypothesis of this study is that low sociodemographic status of households, poor nutrition knowledge of parents, inaccurate perception on weight status of parents, and food insecurity of households are associated with children's overweight or obesity in the MSFW families.

## Methods

### Study Design and Participants

Since 1992, MI Telamon Corporation has offered the MHS program, which is a support network for MSFW families to strive to improve the overall health and nutritional status of children from MSFW families in MI [11]. There are a total of 18 MHS center locations throughout MI and estimated number of MSFW children aged 0–5 years in the service area were 11,793

in 2013 [1]. In the summer of 2013, the MI Telamon Corporation collaborated with Michigan State University (MSU), Department of Food Science and Human Nutrition to conduct a nutritional needs assessment for the purpose of continuously improving its programs. This preliminary needs assessment was necessary in order to recognize and identify gaps in knowledge about the health and nutritional status of MI MSFW families and children and help expand current efforts.

The current needs assessment was carried out in five MI MHS centers (Conklin, Hart, Keeler, Sodus, and Watervliet), which were selected based on the directors' assessment of family participation of their programs (e.g. annual nutrition banquet program or parents night), MSFW families' interest in participation, distance for travel, space available for the assessment team, and having more than 100 children during the 2012 agricultural season. Two weeks prior to the on-site visit for the needs assessment by the research team, a flyer, prepared both in English and Spanish, was sent to directors of each center and posted at each center to encourage participation of MSFW families.

Families participated are those with at least one child enrolled in the MI MHS centers (0–5 years of age) between July and August 2013. If the family had more than one child enrolled in MI MHS, the data were collected from the older child and their mother or father. A total of 80 families participated in this needs assessment, but four families had incomplete data. Therefore, 76 families were included in the final data analyses for the Telamon Corporation as a part of the on-going efforts to improve the MI MHS programs. The formal approval to conduct this needs assessment was obtained by the IRB of the MI Telamon Corporation. Informed written consent was obtained from each family and data were released to MSU collaborators for this report.

### Data Collection

This nutritional needs assessment was accomplished by English and Spanish bilingual speaking students in College Assistance Migrant Program (CAMP) Scholars Initiative [12] and dietetic students at MSU. Seventeen bilingual research volunteers from the CAMP and six dietetic student volunteers were trained by nutritional professionals (one MPH, RD and one PhD, RD) for collecting data.

Height and weight of the parent and the child were measured with a portable height and weight scale, and these data were obtained by the trained volunteers. BMI was calculated as weight (in kg) divided by height squared (in m<sup>2</sup>). Weight status for children was categorized into four groups according to gender-specific BMI-for-age growth charts from the Centers for Disease Control and Prevention [13]: underweight (BMI <

5th percentiles), normal weight (5th  $\leq$  BMI < 85th percentiles), overweight (85th  $\leq$  BMI < 95th percentiles), and obese (BMI  $\geq$  95th percentiles). Weight status for parents was categorized into four groups: underweight (BMI < 18.5 kg/m<sup>2</sup>), normal weight (18.5  $\leq$  BMI < 25 kg/m<sup>2</sup>), overweight (25  $\leq$  BMI < 30 kg/m<sup>2</sup>), and obese (BMI  $\geq$  30 kg/m<sup>2</sup>).

The online survey questionnaire was developed by nutritional professionals of the team using an advanced and user-friendly online survey software tool (SurveyGizmo, Boulder, CO, USA) to examine nutritional health risks and related characteristics among MSFW families and children. The survey questionnaire was divided into 1) sociodemographic information, 2) nutrition knowledge, 3) perception of weight status, and 4) household food security. Nutrition knowledge questions were adapted from the study by Sharma and colleagues that was developed for Head Start teachers in Texas [14]. Food security status of households, adults, and children was assessed based on the 2012 U.S. Household Food Security Survey Module [15]. This survey questionnaire was back-translated between English and Spanish by native speakers to provide an accurate translation.

The online survey was administered by the trained bilingual volunteers. The interviews were conducted in the language of the participants' choice with either English or Spanish. Most parents (n=48) chose to be interviewed in Spanish. The interviews were conducted in a private and quiet area within the migrant head start center. The online survey took 20 to 30 minutes to complete. The completed computerized survey data were submitted via-online directly onto a secured database, with access limited to those coordinating the project. Participating families received a \$10 gift card certificate to a local grocery chain store as an incentive to participating in this needs assessment.

## Statistical Analyses

All statistical analyses were conducted using SAS (version 9.3, 2012, SAS Institute Inc., Cary, NC, USA). This needs assessment was not driven by hypothesis testing, and thus power test to determine the sample size was deemed unnecessary. This needs assessment attempted to contact many families as feasible during farming season. Categorical variables were presented and compared as frequencies and percentages, whereas continuous variables were expressed as means and SDs for further inferential statistics. To test the differences in risk factors between non-obese and overweight/obese groups of children, the chi-square test was used for categorical variables and the t-test for continuous variables. All tests of significance were two-tailed, and P-values < 0.05 were considered statistically significant.

## Results

### Characteristics of MI MSFW families

Among 76 families who participated in the survey, 10 were completed by fathers and the remaining surveys were completed by mothers. The results about characteristics of MSFW families did not differ whether surveys for answered by mother or father [data not shown]. The mean age of parents was 29.3 years (SD=6.3). About 99% of the parents were of Hispanic/Latino ethnicity. About 49% of parents reported that they were cohabiting, meaning they were not married and living with their partners. In terms of educational background, about 53% of the parents had no school or primary school education. MSFW parents reported having low level of English use ability and the majority of families (66%) used only Spanish at home. About 43% of families lived in a trailer or mobile home with 83% of the housing provided by their employers. Thirty six percent of the parents reported that they had been a MSFW for 10 or more years. About 72% of families did not have health insurance. The majority (58%) of MSFW households reported low or very low food security status with a higher rate in adults (53%) than those in children (40%) (Table 1).

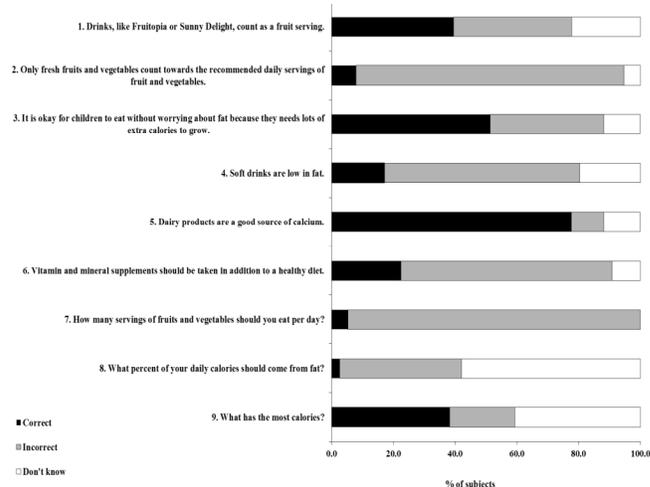
	<u>n</u>	<u>%</u>
<b>Parent's gender</b>		
Father	10	13.2
Mother	66	86.8
<b>The oldest child's gender</b>		
Boys	35	46.1
Girls	41	54.0
	<u>Mean</u>	<u>SD</u>
<b>Parent's age (years)</b>	29.3	6.3
<b>The oldest child's age (months)</b>	36.1	21.0
	<u>n</u>	<u>%</u>
<b>Parent's ethnicity</b>		
American Indian/Alaskan	0	0.0
Asian/Pacific Islander	0	0.0
Black/African American	0	0.0
Hispanic/Latino	75	98.7
White/Caucasian	1	1.3
<b>Parent's marital status</b>		
Single	13	17.1
Married	21	27.6
Cohabiting	37	48.7
Separated/Divorced/Widowed	5	6.6
<b>Parent's education level</b>		
None or primary school	40	52.6
Secondary school	28	36.8
High school or more	8	10.6
<b>Parent's English use ability</b>		
Not at all	51	67.1
Not very well	15	19.7
Very well	10	13.2

<b>Languages spoken at home</b>		
English only	1	1.3
English and Spanish	11	14.5
Spanish only	50	65.8
English and other	1	1.3
Spanish and other	8	10.5
Other	5	6.6
<b>Housing structure</b>		
Apartment	16	21.1
Single family home	26	34.2
Trailer/Mobile Home	33	43.4
Other	1	1.3
<b>Housing provided by employer</b>		
Yes	63	82.9
No	13	17.1
<b>Years as MSFW of parents</b>		
0-2 years	10	13.2
3-5 years	17	22.4
6-9 years	22	29.0
10 or more years	27	35.5
<b>Having health insurance</b>		
Yes	21	27.6
No	55	72.4
<b>Food security status of household</b>		
High	15	19.7
Marginal	17	22.4
Low	22	29.0
Very low	22	29.0
<b>Food security status of adults</b>		
High	17	22.4
Marginal	19	25.0
Low	24	31.6
Very low	16	21.1
<b>Food security status of children</b>		
High or marginal	46	60.5
Low	18	23.7
Very low	12	15.8

**Table 1.** Characteristics of Michigan Migrant and Seasonal Farm Worker (MSFW) families (n=76).

**Nutrition knowledge level of MI MSFW parents**

Most questions about nutrition knowledge were answered correctly by 50% or fewer of the parents. One third of the questions were answered correctly by 10% or fewer of the parents. Question 5 (Are dairy products a good source of calcium?) had the highest percentage of parents answering correctly (78%) whereas question 8 (What percent of your daily calories should come from fat?) had the lowest percentage of parents answering correctly (3%). Higher percentages of parents answered question 8 and 9 (Which macronutrient (per 1 g) has the most calories?) as “don’t know” compared to other questions (Figure 1).



**Figure 1.** Nutrition knowledge level of Michigan Migrant and Seasonal Farm Worker parents (n=76).

**Actual and perceived weight status of MI MSFW parents and children**

Table 2 shows the actual and perceived weight status of MSFW parents’ their own (n=76) and their children (n=70). The prevalence of overweight/obesity was 76% in MSFW parents, but the percentage of parents who perceived their own weight status to be overweight/obese was about 39%. The percentage of MSFW parents who did not recognize their weight status correctly was 67%. The prevalence of overweight/obesity of the MSFW children was 10% and 31%, respectively. No significant differences were observed between boys and girls (P-value=0.747) in the distribution of actual weight status. The majority of parents (94%) perceived their children’s weight status as underweight or normal. Only 6% of parents perceived their children’s weight status as overweight. Half of the parents perceived their child’s weight status incorrectly.

	n	%
<b>Actual weight status of parents</b>		
Underweight	0	0.0
Normal	18	23.7
Overweight	27	35.5
Obese	31	40.8
<b>Actual weight status of children</b>		
Underweight	4	5.7
Normal	37	52.9
Overweight	7	10.0
Obese	22	31.4
<b>Parent’s perception of their weight status</b>		
Underweight	3	4.0
Normal	43	56.6
Overweight	28	36.8
Obese	2	2.6
<b>Parent’s perception of their child’s weight status</b>		
Underweight	2	2.9
Normal	64	91.4
Overweight	4	5.7
Obese	0	0.0

**Table 2.** Actual and perceived weight status of Michigan Migrant and Seasonal Farm Worker parents (n=76) and children (n=70).

## Risk factors of overweight/obesity among MI MSFW children

Almost all overweight/obese children (97%) had parents who were also overweight/obese. This rate was significantly higher than that in parents of non-obese children. The majority (76%) of overweight/obese children reported living in an apartment or single family home, while about 54% of non-obese children reported living in a trailer or a mobile home. About 83% of families with overweight/obese children had no health insurance. The parents of overweight/obese children had more inaccurate perception on weight status of self and children than those of non-obese children (self: 86% vs. 54%, children: 100% vs. 15%). The food security status of household and the nutrition knowledge level of parents were not associated with children's weight status (Table 3).

	Non-Obese (n=41)		Overweight /Obese (n=29)		P-value <sup>a</sup>
	mean	SD	mean	SD	
<b>Parent's age</b>					
Years	28.6	5.3	29.6	7.3	0.526
<b>The oldest child's age</b>					
Months	35.6	21.6	34.1	17.3	0.760
<b>Parent's BMI</b>					
kg/m <sup>2</sup>	27.9	5.6	31.0	6.0	0.030
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	
<b>The oldest child's gender</b>					
Boys	20	48.8	12	41.4	0.629
Girls	21	51.2	17	58.6	
<b>Parent's ethnicity</b>					
American Indian/Alaskan	0	0.0	0	0.0	0.414
Asian/Pacific Islander	0	0.0	0	0.0	
Black/African American	0	0.0	0	0.0	
Hispanic/Latino	41	100	28	96.6	
White/Caucasian	0	0.0	1	3.5	
<b>Parent's marital status</b>					
Single	9	22.0	4	13.8	0.350
Married	12	29.3	9	31.0	
Cohabiting	18	43.9	15	51.7	
Separated/Divorced/Widowed	2	4.9	1	3.5	
<b>Parent's education level</b>					
None or primary school	20	48.8	17	58.6	0.340
Secondary school	12	29.3	8	27.6	
High school or more	9	22.0	4	13.8	
<b>Parent's English use ability</b>					
Not at all	22	53.7	23	79.3	0.139
Not very well	13	31.7	2	6.9	
Very well	6	14.6	4	13.8	
<b>Housing structure</b>					
Apartment	6	14.6	9	31.0	0.009
Single family home	12	29.3	13	44.8	
Trailer/Mobile Home	22	53.7	7	24.1	

Other	1	2.4	0	0.0	
<b>Housing provided by employer</b>					
Yes	34	82.9	24	82.8	0.985
No	7	17.1	5	17.2	
<b>Years as MSFW of parents</b>					
0-2 years	5	12.2	5	17.2	0.379
3-5 years	9	22.0	5	17.2	
6-9 years	14	34.2	8	27.6	
10 or more years	13	31.7	11	37.9	
<b>Having health insurance</b>					
Yes	16	39.0	5	17.2	0.066
No	25	61.0	24	82.8	
<b>Parent's actual weight status</b>					
Underweight	0	0.0	0	0.0	0.003
Normal	15	36.6	1	3.5	
Overweight	12	29.3	15	51.7	
Obese	14	34.2	13	44.8	
<b>Parent's perception of their weight status</b>					
Correct	19	46.3	4	13.8	0.005
Wrong	22	53.7	25	86.2	
<b>Parent's perception of their child's weight status</b>					
Correct	35	85.4	0	0.0	< 0.001
Wrong	6	14.6	29	100	
<b>Food security status of household</b>					
High	7	17.1	7	24.1	0.286
Marginal	9	22.0	6	20.7	
Low	10	24.4	10	34.5	
Very low	15	36.6	6	20.7	
<b>Food security status of adults</b>					
High	7	17.1	9	31.0	0.137
Marginal	10	24.4	7	24.1	
Low	14	34.2	9	31.0	
Very low	10	24.4	4	13.8	
<b>Food security status of children</b>					
High or marginal	23	56.1	18	62.1	0.756
Low	11	26.8	6	20.7	
Very low	7	17.1	5	17.2	
<b>Number of correct answer for nutrition knowledge questions</b>					
0	1	2.4	2	6.9	0.477
1	4	9.8	5	17.2	
2	19	46.3	6	20.7	
3	8	19.5	4	13.8	
4	7	17.1	9	31.0	
5	2	4.9	3	10.3	

**Table 3.** Risk factors of overweight/obesity among Michigan Migrant and Seasonal Farm Worker (MSFW) children (n=70).

## Discussion

The current study provides a solid foundation of research in addressing the current nutritional-health risk factors and be-

haviors that MSFW families and children currently face. We found that the parents' BMI and perception of weight status of self and their children were key risk factors of overweight/obesity among children from MI MSFW families.

The prevalence of overweight/obesity in children of Hispanic/Latino population is significantly higher than in those of non-Hispanic Black or non-Hispanic White children [16,17]. Particularly, the increasing prevalence of overweight/obesity in low-income preschool children was more prominent among Hispanic/Latino children compared to other ethnic groups of children [18]. The prevalence of overweight/obesity among children in the current study was 41%, which was consistent with those in the previous studies from children who have similar characteristics. These studies of children aged 2 years and older in MSFW families reported that the prevalence of overweight/obesity were between 37% and 49% [3,19,20]. Furthermore, the prevalence of overweight and obesity have been increasing in this population [9]. The high prevalence of overweight/obesity among the MSFW children may be attributed to their ethnicity and socioeconomic status of household as well as a result of their parents' occupation as MSFWs.

Parents' weight status in the MSFW families was positively associated with the prevalence of overweight/obesity of children in this study. This finding can be explained by genetics, eating styles, and foods consumed in home shared by parents and children. A previous study also showed that a major risk factor of overweight/obesity is parental obesity in Mexican-American preschool-aged children of low-income families [8].

Among overweight/obese children of the present study, the rates of parents with inaccurate perception on weight status were higher than those of non-obese children. Hispanic/Latino men and women were more likely to perceive weight status of themselves [21,22] and their child [23-25] inaccurately due to the cultural influences and socioeconomic status of this population. Parents of an overweight/obese child misclassified their child as normal weight, and typically considered a larger body size as healthy [26,27]. On the other hand, they perceived that thinness was associated with poor health [28]. Parents play a key role in addressing issues regarding childhood obesity because parents with incorrect perceptions on their own child's weight status are less likely to engage in efforts to prevent and manage childhood obesity [29]. Therefore, understanding the impact of a specific MSFW parents' perception on their children's weight status and its influence of dietary and health behavior in the cultural context, is needed to provide an effective nutrition intervention to this target population.

Our data did not reveal an association of low socioeconomic status, parents' nutrition knowledge level, and food insecurity status of the household with children's obesity. This finding was not consistent with those from previous studies in which

low socioeconomic status was associated with poorer health status and a higher rate of children's obesity [4]. In addition, children in the overweight/obese status were more likely to experience lower food security as compared to those in the normal weight status [5,30]. The association between food insecurity and children's obesity can be explained by the fact that children in a household with food insecurity had a greater risk for having unbalanced diets, including the consumption of fatty and salty foods and high energy-dense desserts [5,31]. A low parental nutrition knowledge level might be associated with children's obesity due to unhealthy feeding practices [32]. Hispanic/Latino mothers reported that they had difficulties buying, preparing, and serving healthy foods and deciding good feeding practices, which could be barriers to engage in children's obesity preventive behaviors [28]. We speculate that our results contrast with those of other studies because majority participants in our needs assessment were in food insecure with below poverty income.

Our study was conducted in the part of MI, so findings from this study were limited to be generalized into the entire MSFW population throughout the U.S. However, the MSFW families are the most vulnerable population in public health and hard to reach for collecting data. Therefore, our study has uniqueness and our findings are important for providing information on the nutritional-health risk factors of MSFW families and children and to help expand on future research and unknown knowledge of this population.

Childhood obesity is an important issue in public health, particularly among children of MSFW families who are prone to nutritional-health risks and experience a health disparity. Children who are obese might continue to be obese in adulthood, which may cause other health problems in their lifetime. Therefore, it is important to identify risk factors of overweight/obesity and address obesity in the early stage of a child's life.

## Conclusions

Our study suggests that MSFW parents' weight status and perception on weight status (self and their child) are key risk factors of children's overweight/obesity. These findings imply that culturally relevant interventions that are focused on obesity-related risk factors including all the family members are necessary to reduce the prevalence of overweight/obesity among MSFW children. Although the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provide nutrition education for low socioeconomic families, these programs need to be tailored to specific target populations based on their cultural and lifestyle background. Further longitudinal studies with large samples are also needed to determine the risk factors of overweight/obesity in this population.

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