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Home Environmental Influences on Childhood Obesity in the Latino Population: A Decade Review of Literature

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Abstract

Background—Latinos are the largest and fastest-growing ethnically diverse group in the United States. Latino children are also among the most overweight and obese ethnic groups of children in the United States. Research over the last decade has identified the home environment as a key influence on the diet and physical activity of children.

Objective—To summarize cross-sectional and longitudinal research that has identified factors within the home environment of Latino families that are associated with childhood obesity and to provide recommendations for future research and intervention development with Latino families.

Methods—A decade review from 2005-2015 was conducted. Studies identifying factors within the home environments of Latino families that were associated with childhood obesity were examined.

Results—Five main factors were identified across the literature as home environment factors that are associated with childhood obesity in Latino children. These factors included: parental influences (e.g., parent feeding practices, modeling), screen time, physical activity/sedentary behavior, socioeconomic status/food security and sleep duration.

Conclusions—The current review identified several home environment factors that may contribute to the disparities in childhood obesity for Latino children. Results from this review such as, focusing on decreasing controlling parent feeding practices, and increasing parent modeling of healthy behaviors and child sleep duration, can be used in developing culturally-specific interventions for Latino children.

INTRODUCTION

Latinos are the largest and fastest-growing ethnically diverse group in the United States.³⁹ Latino children are also amongst the most overweight and obese ethnic group of children in the United States.^{1, 39} For example, the National Survey of Children's Health study found

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was approved by the University of Minnesota IRB.

Informed consent: Informed consent and/or assent was reported in all studies included in this review paper.

that 47% of Latino children are overweight and 31% are obese, compared to 35% and 21%, respectively, for white children.¹ In addition, while the U.S. leads in the prevalence of overweight and obesity globally, Mexico is now second to the U.S. in experiencing the worst epidemic of childhood obesity. Overall, the prevalence and severity of childhood overweight and obesity in Latinos has risen dramatically in the past three decades and is recognized as a serious public health concern that requires immediate action.

These statistics are important because obesity is a risk factor for many health complications, including low self-esteem and depression, type 2 diabetes, pulmonary complications such as asthma, sleep apnea, hypertension, cardiovascular disease, some cancers, and arthritis.³ Additionally, children who are obese at young ages are more likely to become obese as adults. In a literature review conducted by Serdula (1993), it was identified that about a third (26 to 41%) of obese pre-school children became obese adults, and about half (42 to 63%) of obese school-age children became obese adults.³³ Because more Latino children are becoming overweight or obese, they are at increased odds of growing up to be adults with poor physical and mental health outcomes.³³ In addition, data from the National Health and Nutrition Survey (NHANES) showed that the diets of children as young as two years old include too much saturated fat, sodium, and calories from nutrient-poor and calorie-dense foods compared to national dietary guidelines.^{34,45} Because children's food preferences are established around the age of five,³⁵ it is important to understand what factors influence the formation of children's food preferences early, so interventions can be developed to reduce the risk of childhood obesity.

Previous research has suggested that some factors in the home environment are correlated with risk and protective factors for childhood obesity.^{8,46,47,48,49} Specifically, home environment factors such as, parenting style (e.g., setting limits on intake of unhealthful foods and engagement in sedentary behaviors), parent feeding practices (e.g., providing access to fruits and vegetables, not controlling the food environment) and parent modeling (e.g., playing with kids outside) influence a child's health, by shaping daily dietary and physical activity behaviors. Understanding which key factors in the home environment are associated with a higher risk of childhood obesity, will inform interventions regarding which home environment factors to target in family-based childhood obesity interventions. The aims of this decade review paper are to: (1) summarize and critically review the research between 2005-2015 on key factors in the home environment of Latino children that influence the risk for childhood obesity, and (2) to provide recommendations for future research in developing novel interventions, specifically for the Latino population.

METHODOLOGY AND RESULTS

Criteria Used for Including Studies in the Decade Review

Inclusion Criteria—(1) Types of studies: Cross-sectional or longitudinal quantitative or qualitative observational studies; (2) Sample population: studies where at least 50% of the participants identified as Latino, with children between the ages of 2-18; and (3) Predictors studied: factors within the home environment that were potential factors influencing childhood obesity risk (e.g., parenting style, parent feeding practices, parental modeling of

health behaviors, availability/accessibility of healthful foods and physical activity resources, sedentary resources in the home).

Exclusion criteria—(1) Types of studies: experimental studies, such as studies that included an intervention component, whether they were prevention or treatment studies. Studies were also excluded if basic information, such as the sample size or age of target child was missing, or if there was an insufficient definition of obesity “risk factor,” or if an outcome was not measured; (2) Sample population: study samples that were less than 50% Latino; (3) Predictors studied: childhood obesity predictors not within the home environment, such as the school cafeteria or neighborhood playgrounds.

Search strategy—Article searches were conducted using the following databases: Academic Search Premier, PubMed, Web of Science and OVID Medline. Searches were conducted between September 2014 to June 2015. Literature searches were conducted using various combinations of the following key words: obesity, overweight; children, childhood, parents; Latinos, Latinas, Hispanic; factors, predictors, influences, parenting, screen time, sleep, physical activity, sedentary behaviors, family meals, shared meals, sociocultural, socioeconomic, food security, home, weight, weight-related behaviors. The searches were conducted by the authors and cross-checked by a professional librarian.

Search Results—This initial search yielded 135 abstracts, which were screened by the authors for possible inclusion. Abstracts of studies identified by electronic searches were examined on screen. Those thought possible to meet inclusion criteria were obtained as full paper copies and read in their entirety, to determine whether they met the study inclusion criteria (n=34). A further 22 articles were rejected because they included one of the above exclusion criteria, leaving a total of 13 studies included in this final review. The age of the target child varied between 2 and 18 years at baseline. However, the majority of studies included children under the age of 7 years.

Data Extraction—For the thirteen studies meeting the inclusion criteria, the following information was extracted: (1) Year of publication, Article Title, Author(s); (2) Sample characteristics (sample size, participant age and sex, location of study); (3) Study design (i.e., cross-sectional, longitudinal); (4) Obesity predictors in the home environment; (5) Method of analysis; (6) Main findings and implications. **Table 1** lists the extracted information, with the studies arranged in chronological order and grouped by themes. The present review is also divided by the five main factors that studies identified as risk and/or protective factors for childhood obesity in the home of Latino children, including: (1) Parental Influence (i.e. parenting styles, feeding practices, modeling), (2) Screen Time, (3) Physical Activity/ Sedentary Behaviors, (4) SES/Food Security, and (5) Sleep Duration. Each section starts with a summary of the number and types of studies found, followed by a description of the findings. Although all relevant primary source articles are cited within the text, to limit redundancy, **Table 1** includes details of the review articles. Limitations and gaps in the scientific literature, in addition to recommendations for future research are then described at the end of the review.

OVERVIEW OF FINDINGS

Parental Influence

While factors such as genetics and physical activity contribute to childhood obesity, parental influences may have the largest impact on a child's eating behavior. Consequently, this is the home environment factor that yielded the most literature (n=7) with Latino populations. The studies in this review focused on parenting style, parent feeding practices, parent modeling of health behaviors, and knowledge and perspectives about family mealtimes. Additionally, most studies focused on the maternal role or perspective.^{8, 11-16}

Parenting Style—Some parenting styles (e.g., authoritarian, permissive) have been associated with the use of certain types of feeding behavior, which in turn, can be predicative of a child's weight status.⁴⁰ Overall, studies in this review found that Latino parents often showed a permissive and indulgent parenting style, which is characterized by low demands for the child's self-control, but lots of warmth and sensitivity. Studies also found that children of mothers with indulgent feeding styles had the highest BMIs.^{40,41,42} The authors of these studies hypothesized that children of indulgent mothers may be at higher risk for the development of obesity for the following reasons. First, indulgent mothers may show low levels of control in the feeding context, thereby allowing children too many choices in today's obesogenic food environment.⁴⁰ Second, an indulgent approach to parenting may not provide children with the guidance/limit setting they need for the development of self-regulation in both the eating and non-eating domains.^{40, 43} Third, indulgent mothers may cater more to their children's unhealthy food preferences and possibly serve them less healthy food, or provide less encouragement for physical activity and/or allow their children to engage in more sedentary behaviors (e.g., screen time).⁴⁰

Parent feeding practices—Regarding parent feeding practices, the most common feeding practice among Latino parents was pressure-to-eat feeding practices, characterized by parents encouraging their children to eat more food (e.g., "you must eat all the food on your plate before you leave the table").^{10,13} The least common parent feeding practice among Latino parents was restriction, characterized by parents keeping specific foods away from their children, so they don't overeat (e.g., don't give children second helpings, hide foods such as sweets and chips).^{12,13} Excessive parental control and pressure-to-eat feeding practices have been shown in previous research to influence dietary intake such as, disrupting children's short-term behavioral control of food intake⁴³ and impeding children's ability to develop awareness of hunger and satiety.¹⁰ In addition, dealing with picky eating was also a problem noted in Latino households.¹⁰ Picky eating in Latino children was associated with a higher BMI, because many picky eaters tend to prefer foods rich in fat and energy and thus, may be more prone to becoming overweight and obese. Research has shown that the best time to develop healthy eating habits is during childhood.³⁵ This is the time when the child develops taste preferences for certain foods. Picky eating at this stage may cause a child to develop poor habits and avoid foods like milk, vegetables, fish, fruits, etc. It may be difficult to get a child to eat these foods later in life.

Among the qualitative studies in the review, an interesting finding focused on the meaning of the word “diet” in Spanish. Mothers believed children should have a balanced intake of good quality food, and did not like the word “diet” because it implied restriction of food. Mothers believed restriction not appropriate for a growing child. Mothers across all studies emphasized the importance of a growing child to “eat well”.

Another finding in the review that focused on the maternal role in relation to childhood obesity risk was mothers’ perspectives’ about disciplining in the food environment. Mothers said food discipline meant not eating junk food or eating at unscheduled times. They talked about letting their children eat junk food in moderation.¹⁶ These findings highlight an important issue to consider when working with Latino mothers. Specifically, although Latino mothers may have an inability to recognize feeding problems that they are engaging in themselves (e.g., pressure-to-eat feeding practices), they are not unwilling to act to change their behavior(s) once the problem is recognized (e.g., are willing to set limits on junk food).

Parent modeling of health behaviors—Studies measured parent’s (typically the mother’s) diet, physical activity, cultural viewpoints around feeding and cooking and parent feeding strategies. Studies indicated that parents play an important role in the formation of children’s dietary and activity-related behaviors, by modeling food preferences, dietary restraint and possibly dietary disinhibition.^{12,13,45} Parents also play an influential role in fostering children’s physical activity.

Parental knowledge of obesity risk and perceptions of weight status—Studies measured parents’ perspective of healthy eating, physical activity, and weight management and how parents’ beliefs and behaviors influenced obesity risk for Latino children. Latino parents demonstrated reasonably good knowledge about the health consequences of obesity.¹¹ They reported high levels of perceived control over their children’s eating, activity behaviors and weight, but also underestimated their own child’s weight status, which is a trend common in parents across all ethnicities. In fact, parents are able to perceive their own weight better than their child’s weight.¹⁵ Studies also showed that parents were more concerned with their children being underweight versus overweight.^{8,11-16}

The following themes emerged in qualitative studies focusing on mothers and their perceptions of what constituted a healthful feeding environment in the home: (a) feeding attitudes (e.g. feeling like a “good mother” by giving enough food to their children) were found to be central to the maternal responsibility of having well-fed children; (b) feeding behaviors that centered on cooking methods were important to a healthful feeding environment; and (c) maternal supportive behaviors and reinforcement strategies to help their child “eat well”.

Overall, findings from the seven studies on parental influences on childhood obesity indicated that Latino parenting style (specifically maternal indulgent parenting style), parent feeding practices (i.e., pressure-to-eat) and parental beliefs, knowledge and perceptions about child weight status and obesity risk were associated with child weight status.

Screen Time/Sedentary Behavior

Four of the studies examined the association between television viewing and childhood obesity risk. Specifically, studies focused on the prevalence of television in bedrooms and parent's reasons for allowing TV viewing and TV's in children's bedrooms.

Prevalence of Television Viewing—Extensive research has confirmed the link between TV viewing and obesity in children and adults in countries around the world. Across the studies included in this review, television viewing was associated with a higher weight status for children who viewed more than 2 hours of television per day compared to those who did not.^{19,20} Studies also showed higher rates of TVs in bedrooms of Latino (74%) children compared with white children (22%).¹⁸

Parental Reasons for Allowing Television Viewing—Across all studies, the most common reasons parents gave for allowing their kids to watch TV was convenience and to keep their children occupied.¹⁷⁻¹⁹ The top three reasons parents cited for putting a TV in a child's bedroom were: (a) to keep the child occupied so that the parent could do other things around the house, (b) to help the child sleep, and (c) to free up the other TVs so that other family members could watch their shows.¹⁸ A finding that was specific to first generation immigrant Spanish-speaking families was that parents encouraged their children to watch TV to improve their English pronunciation and learn more English words. This raises an acculturation issue that is discussed later in the recommendations for future research section. In general, parents were unconcerned about the amount of television their children were watching and were unaware of adverse consequences associated with child health when having a television in their child's bedroom.

Specifically, these findings showed that when children had a TV in the bedroom, they had an even higher probability of viewing more television. Investigators suggested that removing televisions from children's bedrooms might be an important step in the fight against childhood obesity in the US. They suggested removing television from a child's bedroom even over limiting screen time, which may require consistent parental monitoring.

Physical Activity/Sedentary Behaviors

Studies that reviewed children's physical activity focused on children ages 3-9 yrs. Studies measured sedentary behavior of both the parent and the child, as well as the effect of parental support on sedentary behaviors.

Parental Role in Establishing Physical Activity—Studies showed that compared with black or white populations, Latinos had the least amount of "leisure time" physical activity.^{23,24} Studies emphasized the importance of parental role modeling in establishing child physical activity. Additionally, for Latino preschool-aged children, sedentary behaviors were common when Latino parents were also sedentary themselves; studies showed a high mean percentage of time spent in sedentary behaviors (82%) by Latino parents.²³ Child's age and gender were not significant predictors of child physical activity levels. Overall, the main predictor of child percentage of awake time per day spent in sedentary behavior was parental activity level.

Causes of Sedentary Behaviors—Studies in the current review attempted to examine the underlying causes of physical inactivity in Latino children. Results showed that parents reported challenges with getting their kids to exercise due to expense, time constraints and neighborhood safety.²⁵ Latino children living in lower-income communities and unsafe neighborhoods were more likely to be physically inactive, overweight and/or obese. There was a strong correlation between inactivity and the amount of time spent watching TV. Latino children spent more time using media (e.g., watching television, playing video games) and had fewer limitations placed on them by their parents regarding the use of media, compared to White or Black parents and this inactivity was associated with child weight gain.

Overall, studies regarding physical activity and sedentary behavior in Latino children in this review suggest that parents play a critical role in setting expectations for physical activity patterns in their children through role modeling. Thus, it may be important that Latino parents develop a better understanding of sedentary behavior in relation to physical activity and overweight for preventing and reducing overweight among their children.

Socioeconomic Status/Food Security

Some of the studies measured how socioeconomic status and food insecurity affected parent food purchasing behaviors and availability/accessibility of healthful foods in the home food environment.²⁹⁻³¹ In these studies, Latino families resided in low-income neighborhoods with limited food access. Additionally, the studies showed significant associations between parent food purchasing behaviors and the availability and accessibility of healthful and less healthful foods in the home environment and childhood obesity risk.

Socioeconomic Status—The association between socioeconomic status and childhood obesity among Latino families was quite complex, because socioeconomic status is a multidimensional construct, based on numerous major components including an individual's income, education, occupational prestige and family background, which can be predictive of a child's education, health and physical activity. Studies in the current review showed an increase in weight status for Latino children when they were from lower socioeconomic status households.^{27,30} As of 2010, the poverty rate among Latinos was 26.6% compared to 15.1% for the total U.S. population.⁶ About 27% of children from families with incomes below the federal poverty level are obese, compared to about 10% of children in households with incomes at or above 40% of the poverty level.

Food Insecurity—Studies included in this review showed that compared with food-secure participants, marginal or low/very low food-secure caregivers reported significantly more obesity-promoting foods in the home, more microwavable or quick-cook frozen foods, and greater access to less healthful foods in the kitchen. However, Latino parents' argument for purchasing nutritionally poor food was related to the high cost of healthier foods. Given the greater prevalence and accessibility of less healthful foods in Latino households, targeting the home food environment may improve diet quality and health status in children of low-income, food insecure households.

Sleep Duration

Only one study was found that evaluated the impact of sleep duration on Latino children ages 13 or less.²² The study suggested that the short sleep of Latino children was associated with increased risk for obesity.

Sleep Duration—Findings revealed that on average, Latino children were sleeping less than 9 hours a day, although the recommendation is that school-aged children sleep 10-11 hours a day.²² Socioeconomic status had no effect on the amount of sleep duration of children. In this study, obese children slept less than normal-weight children.²² These findings are important because other research (including all ethnicities) has found convincing evidence that getting less than recommended amounts of sleep during early childhood is an independent and strong risk factor for obesity.²¹ In a study by Taveras (2009), chief of general Pediatrics at Mass General Hospital for Children, insufficient sleep was defined as less than 12 hours per day from age 6 months to 2-years old, less than 10 hours a day for children ages 3 and 4, and less than 9 hours a day for children ages 5 to 7. Considering Latino children are getting insufficient sleep, it is important to further investigate this topic and its association with childhood overweight/obesity.

DISCUSSION

The findings from this decade review of the literature on Latino families provides evidence that Latino children are at higher risk for obesity compared to their white counterparts. These findings may provide insight to why there are obesity disparities for Latino children. For example, it appears that there may be key home environment risk and protective factors that contribute more to obesity disparities in Latino children. The following are six recommendations for future research, based on the results of this decade review, to move the field forward in researching childhood obesity with Latino families.

Recommendation #1: Use a Family System Theoretical Framework to Understand Research with Latino Families

Family systems theory (FST) suggests that individuals cannot be understood in isolation from one another. Because families are systems of interconnected and interdependent individuals, they cannot be understood in isolation from one another or the family system. Several predictors have been identified as correlates of childhood obesity from a family systems framework. For example, having a TV in the bedroom was associated with increased sedentary behaviors and less sleep duration. Decisions, such as putting a TV in a child's bedroom, are influenced by parenting style and socioeconomic status. Thus, it seems there is a strong interplay between all of these home environment factors and they reinforce each other. FST provides a framework to explore how the environment and family system may influence a child's weight status. This is encouraging because it would imply that modifying one behavior would positively impact other behaviors. However, navigating behavior change in this area is complicated because some behaviors are rooted in culture and knowing that change in one habit would simultaneously change other habits, could hinder people's desire to change altogether.

Recommendation #2: Intervene with Parents Directly to Address Childhood Obesity in Latino Children

Considering that dietary patterns of children are greatly influenced by the foods that are made available to them by their parents, it was not surprising that one of the most important overall findings in the current review was the importance parents influencing their child's beliefs and behaviors around eating and exercising. Specifically, the review found that the majority of parents of overweight children underestimated their children's weight status and did not perceive their children to be at risk for obesity or other health problems. Much of this may be traced back to the Latino culture, where having a well-fed child is a sign of prosperity and the means to contribute to their child's well-being. The research from these studies found that it is common for Latino mothers to equate providing a lot of food with good parenting, which can be a source of pride and competition. Because of these values, it might be difficult to change feeding practices that are viewed as contrary to their traditional beliefs; changing these feeding practices might have greater implications for parenting competence and the ability to provide for the family. Health practitioners need to be aware of these differences in parental feeding practices and concerns among parents of diverse demographic backgrounds. Future interventions need to address this cultural attitude/belief so that mothers feel like they are feeding their children well and being a good parent, but also feeding their children in a healthful manner.

Ultimately, parents have a profound influence on children by promoting certain values and attitudes, by rewarding or reinforcing specific behaviors, discouraging other behaviors, and serving as role models. This would suggest that involving parents is essential in working with their children to establish healthy habits. Additionally, parents are the policy makers for the home, making daily decisions on what the home culture will be. They determine the quality and amount of foods eaten in the home, the environment around mealtimes and who will be at the table. Parents also influence physical activity, sleep and screen time, by placing or removing televisions from bedrooms, setting "bed times" and encouraging outdoor play. Future studies should focus on how the maternal role is impacted by Latino culture and create interventions that teach good parenting and modeling, while maintaining cultural beliefs and values.

Recommendation #3: Focus Interventions on Parent's Own Health Behaviors and Modeling of Health Behaviors to their Children

This review suggested that many times a child's weight and physical activity can be influenced by parent's weight and health behaviors. This implies that an indirect way of preventing obesity in preschool children is to address the parent's obesity. Only a few studies have focused on developing interventions to address the risk for obesity in preschool children by targeting mothers instead of the children. The reasons for focusing on the mother instead of the child is that the behavioral changes that occur in the mother could produce greater, long-term changes in the child through modeling. If interventions provide weight loss classes for low-income mothers (through nutrition and physical activity education), the potential result could be weight loss in mothers and in mothers' food choices for their children, ultimately resulting in better health for both themselves and their children. Healthcare providers may want to consider including overweight or obese mothers in weight

loss interventions as a means of preventing childhood obesity. Practitioners should consider explaining to parents that eating and physical activity behavior change in children may be facilitated and maintained in the long-term when parents model the same behaviors.

Recommendation #4: Conduct Longitudinal Studies on Young Latino Children to Identify Early Risk and Protective Factors for Childhood Obesity

A great deal of previous cross-sectional research focused on studying the dietary behaviors of older children. Only one longitudinal study was found for the current review. Research suggests that children's food preferences are established around the age of five,³⁵ thus, more formative research is needed to develop interventions for younger children and to determine effective avenues for delivering these types of interventions. Future interventions should specifically target Latino parents with young children, between the ages of 2-6 years with follow-up over time to be able to identify temporal ordering of risk and protective factors for childhood obesity.

Recommendation #5: Consider Measuring Acculturation in Latino Families in Relation to Childhood Obesity

When conducting future research specifically for the Latino population, acculturation level needs to be considered. A study reviewed in this decade review showed that Spanish-speaking Latino parents were more likely than the English-speaking Latino parents to be concerned about their children being underweight and to use foods to calm their children.¹⁰ These findings are similar to an earlier study which found that Spanish-speaking Latino parents were more likely to report pressuring their child to eat and to use positive incentives to get children to eat more³⁶—two behaviors that have been associated with an increased dislike for the food and an increased caloric intake by children. These results suggest an association between acculturation and parental feeding practices. These differences may be attributable to cultural differences between more and less acculturated parents. Compared to English-speaking Latino, Spanish-speaking Latino parents may have retained more values and concerns of their native countries, and pushing children to eat may be a reasonable behavior for natives of Latin American countries.

In addition, studies in this decade review found that Latino parents used food to calm children and this is a common practice in the Latino culture, as is the belief that parents should show love for their children by feeding them well. Additionally, an overweight child is not perceived as obese, but as well-fed and well-loved child.³⁷⁻³⁸ These results have implications for intervention development. Presently, health education professionals tend to focus on ethnic and racial differences when developing culturally specific interventions; however, it may be more worthwhile to focus on acculturation differences. As identified earlier, obesity and behavior change is complex. Economy and culture are key, thus as long as Latinos continue to face challenges accessing quality, affordable, and healthy foods, in conjunction with limited opportunity to be physically active, it will be difficult to fight the growing epidemic of childhood obesity and decrease the health risks that are associated with being overweight.

Recommendation #6: Include other Latino groups (non-Mexican) in Latino research studies, not just Mexican American and Mexican

It should be noted that almost a third of the analyzed papers focused on Mexican American or Mexican immigrants. This is a limitation because the findings in this review could be indicative of Mexican American or Mexican immigrant lifestyle patterns, as opposed to all Latinos. Although most Latinos share a strong connection to the Spanish language, Latinos in the U.S. have many different cultures rather than a common culture. In fact, according to the Pew Research Center, when it comes to describing their identity, most Latinos prefer their family's country of origin over pan-ethnic terms. That includes such terms as "Mexican," "Cuban," or "Dominican," for example. When conducting literature searches to include in this review, the authors observed that most research studies that focused on Latino families were mainly or solely concentrated on Mexican Hispanics. Because diets, culture and practices are different throughout Latin America, more research studies should include Latinos from all of Latin America.

Recommendation #7: Conduct more Research Specifically around Screen Time and Sleep Duration in Latino Children

This decade review identified strong relationships between having a television in the bedroom and being overweight/obese among Latino children. It is important to note that televisions may be the main form of media exposure for children; however, children are now exposed to media through other types of electronic devices, such as smartphones and laptop computers, which encourage long periods of inactivity. Further studies should be conducted to assess whether these types of media exposures contribute to weight gain in children. In addition, little is known about aspects of the home environment that are associated with short sleep duration, which is highly prevalent among low-income, Latino children and has been consistently associated with weight gain and obesity status in cross-sectional studies.²²

CONCLUSION

Overall, this decade review identified research (n= 13 studies) conducted between 2005-2015 examining childhood obesity risk factors in the home environments of Latino children. As childhood overweight and obesity increases, especially among minority groups such as Latinos, so does the need for innovative intervention strategies to combat this problem. As the largest racial and ethnic minority population in the United States, Latinos make up a significant portion of obese or overweight children in the U.S. This problem is widespread and must become a major focus for the community and the nation.

Despite the complexity of fighting obesity, several home environment factors were identified in the current decade review that may be important for future research and intervention studies. Specifically, studies showed an increased risk for childhood obesity when Latino children had parents with neglectful parenting styles, had a TV in their bedroom, came from a lower socioeconomic status household, did not get adequate sleep, and did not have enough having time for physical activity. Thus, focusing on the parental role in child eating behaviors and exercise models, removing TV's from children's bedrooms, eat family meals as often as possible, becoming more physically active as a family and setting a standard bed

time for their children may be small steps in the right direction to prevent childhood obesity in Latino children. Future research should continue to examine the association between home environment factors in Latino households and childhood obesity in order to reduce the gap in obesity disparities by race/ethnicity. Additionally, future research should examine disparities by socioeconomic status as well.

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Table 1

Literature Regarding Factors in the Home Food Environment that Influence Childhood Obesity in the Latino Population.

PARENTAL INFLUENCE			
Reference	Sample Characteristics	Design/Measures	Findings
Evans et al, 2009 ¹⁰	Parents of children ages 1–5 years. 659 parents, 55% of whom were Hispanic.	Cross-sectional questionnaire in which parent answered questions about: child overeating concerns, child underweight concerns, difficulty with picky eating, using food to calm, and pushing child to eat.	Three significant findings: 1) Most common feeding practices were pressuring children to eat more and dealing with picky eating. Parents were less likely to restrict their children from eating; 2) There are differences between less acculturated and more acculturated Latino parents; 3) There were significant differences in parent feeding practices and concerns according to demographics, suggesting that parental feeding practices may not be the cause of the disparities but instead they may be rooted in the environment in which these children and their families live.
Larios et al, 2009 ¹²	30 mothers for phase 1 and 91 mothers for phase 2. 100% of the mothers were Hispanic. Mothers had average of 3 children under age 18 (mean=7 years) but when answering surveys they imagined a 5-8 year old.	For phase 1, mothers participated in focus groups. For phase 2, mothers completed a one-time survey- the child-feeding questionnaire (CFQ). The intent of phase 1 was to identify types of parenting strategies used in participant homes that may be related to child feeding activity. In phase 2, the CFQ measured limit setting, monitoring, discipline, control and concern.	Results from the focus groups suggested three primary themes: 1) Latina mothers restrict snacks and other foods; 2) The day of the week (week day vs. weekend) affected the rules for sedentary behaviors; 3) Discipline strategies used in home are generally communicated verbally to children. From the CFQ in phase 2, it was concluded that parenting strategies characterized as controlling were associated with a lower BMI among children.
Olvera et al, 2009 ⁴⁰	Sixty-nine low-income Mexican American mothers and their 4- to 8-year-old children	4-year longitudinal study. Mothers completed demographic and parenting measures. Children's body weight and height were assessed annually. Body mass index was calculated to determine weight status.	Analyses examined how parenting styles at baseline predicted child's weight status 3 years later, controlling for initial weight status. Children of indulgent mothers were more likely to become overweight 3 years later than children of authoritative or authoritarian mothers. This study provides longitudinal evidence for the role of indulgent parenting in predicting overweight in Mexican American children. Possible mediating factors that may account for this relationship (e.g., dietary patterns, physical activity patterns, and children's self-regulation) were identified.
Kersey et al, 2010 ¹¹	Parents of children ages 2-5. 369 parents, 100% of whom were Mexican immigrants.	Examine the knowledge, attitudes and health beliefs regarding childhood obesity among parents of Latino	Parents underestimated their own child's weight status and had high levels of perceived control over their children's

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PARENTAL INFLUENCE			
Reference	Sample Characteristics	Design/Measures	Findings
		preschoolers. Determine whether the knowledge, attitudes and beliefs of parents with overweight children differ from those of parents with non-overweight children.	eating and activity behaviors. Parents of overweight (>95th percentile-for-age-and-sex BMI) versus non-overweight (<95th percentile BMI) children did not differ in their beliefs about ideal child body size. Latino parents of overweight children did not differ from parents of non-overweight children with respect to their knowledge, attitudes and health beliefs about childhood obesity.
Gallagher, Martina. 2010 ¹⁶	Mothers of at least two children, one of them between the ages of 2-5. 100% of the mothers were of Mexican descent.	A qualitative, naturalistic design using ethnographic interviews was selected for this study. Study measures views that mothers of Mexican descent have related to lifestyle habits (such as nutrition, physical activity, and television viewing) that put children at risk for obesity.	Participants held views that were congruent with the American Academy of Pediatrics' recommendations. Participants understood the role that healthy habits play in their children's lives. A unique finding was the perspective of discipline in eating- the behaviors and beliefs mothers expressed are congruent with an authoritative feeding style, which provides a supportive environment for healthy eating. An unexpected finding was the mothers' view of the benefits of viewing television. Parents encouraged their children to watch English television shows to learn words and pronunciation.
Guerrero et al, 2011 ¹⁵	Mothers of children ages 2-5 years. 24 mothers, 100% of whom were Mexican.	Mothers participated in focus groups led by the authors and were asked open-ended questions and elaboration was sought as topics arose. Focus groups were designed to measure Latina's mother's perception of child's weight status and definition of health and obesity in their children and perceptions of physician weight assessments.	Mothers define health as a function of their children's ability to play and engage in all aspects of life. Causative factors of obesity included family role-modeling and psychosocial stress, physical inactivity, and high fat foods consumed outside the home.
Flores et al , 2012 ²⁵	19 parents, 100 % of whom were Hispanic. School- aged Latino children (6-18 years), all of whom were overweight.	Parents were asked 33 questions in focus groups and sampled 4 healthy substituted for Latino foods. The study aim was to identify parents' perspective on healthy eating, physical activity, and weight management strategies for overweight Latino children.	Parents identified 22 themes regarding the most important things parents can do to help overweight children lose weight, including encouragement, not making the child feel left out, the whole family eating healthy, and the parent setting a good example for example. Parents identifies 17 themes regarding the most important things overweight children can do to help themselves lose weight, including eating healthier, limiting portion size and second helpings, drinking more water, increased physical activity, decreased screen time, asking parents for help and participating in interventions that include the whole family. Challenges to getting kids to exercise

PARENTAL INFLUENCE			
Reference	Sample Characteristics	Design/Measures	Findings
			include expense, time constraints, and neighborhood safety. Parents were open to integrating healthy substitutes into traditional Latino meal/snacks, and found them palatable.
Martinez et al, 2014 ¹³	41 mothers, 100% were Hispanic. Elementary school-aged children.	Using qualitative methods through focus groups, this study explored the attitudes and behaviors of Latino mothers around feeding their children. The focus groups were in Spanish.	The following themes around feeding emerged: feeding attitudes central to the maternal responsibility of having well-fed children and feeding behaviors that centered on cooking methods, supportive behaviors, and reinforcement strategies for "eating well". These findings increase our understanding of the Latino maternal role to feed children and can help to inform more culturally appropriate research to effectively address nutritional issues and obesity prevention in Latino children.
SCREEN TIME			
Del Rio Rodríguez et al, 2013 ¹⁹	20 parents, 100% were Hispanic. 5-8 year old overweight or obese children.	This qualitative study used semi-structured interviews to explore parental outcome expectation regarding children's television viewing among parents of overweight or obese children.	Parent's positive OE for allowing TV viewing were the convenience of using TV for entertainment or as a babysitter. Hispanic parents would limit children's TV viewing to improve their children's health, restrict content, and promote other activities. Negative OE such as children misbehavior and the loss of positive OE for allowing TV emerged as reasons parents may not limit TV.
PHYSICAL ACTIVITY/SEDENTARY BEHAVIORS			
Ruiz et al, 2011 ²³	Children ages 3-5.	Measures activity pattern associations between Latino parents and their preschool-aged children.	Results suggest that parental activity levels are a powerful explanation of preschool-aged child activity levels, except for vigorous activity, which children do on their own without parental participation. Latino parents play a critical role in setting physical activity patterns in their children.
SOCIOECONOMIC STATUS			
Cortés et al. 2013 ³⁰	20 Spanish-speaking, low-income Latino families.	Analyze food selection practices in shopping practices. Participants received nutrition education during home visits and a supermarket tour. Grocery receipts for grocery purchases were collected at baseline and at the end, to analyze exact nutritional content of purchased foods.	After receiving nutrition education sessions over a 6-month period, many families adopted instructions on buying budget-friendly, healthier alternative foods. This study demonstrated that grocery-shopping practices are important factors to address in childhood obesity.
Kaufman et al., 2007 ²⁷	12 Latin American families with children between the ages of 2	Ethnographic study that uses participant observation, interviews, and life	Many low-income Latino families provide/care for their

PARENTAL INFLUENCE			
Reference	Sample Characteristics	Design/Measures	Findings
	months and 21.	histories to understand the sociocultural roots of childhood obesity by exploring the food practices and everyday lives of Latino families.	children using strategies such as, everyday food practices (e.g., nurturing=feeding). Many parents associate these food practices with good parenting and well-being. These practices drive food choices and related activities of families, often leading to overweight and obesity in their children.
SLEEP DURATION			
Wong et al, 2013 ²²	333 Latino children ages 9-12.	Sleep duration and hours spent in physical activity were measured objectively with accelerometers over 5-7 consecutive days.	Children slept ~8.8 h/d and spent ~45 min/d on moderate-vigorous physical activity. Obese children slept 0.2 h/d less than normal-weight children. SES had no effect on amount of sleep. There was a significant interaction between gender and age; girls aged 11-12 y slept 0.3 h/d less than boys and the younger girls. Children slept 0.6 h/d longer during the weekend than weekdays. Overall, minority children were not meeting the National Sleep Foundation recommendation for sleep duration which is 10-11 h/d.

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