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COMBATING CHILDHOOD OBESITY IN RURAL AREAS – A SYSTEMATIC REVIEW

by

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A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
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A Research Paper Submitted in Partial

Fulfillment of the Requirements

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Approved by:

Dr. Juliane Wallace, Chair

Graduate School
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CHAPTER 1

INTRODUCTION

Globally, it is estimated that there are 43 million overweight children under the age of five. In the United States, approximately 38% of children in rural areas are overweight or obese compared with 30% of children living in urban areas (Ogden et al., 2018). Rural areas often do not have the same resources, like physical activity/recreation centers, available to them as urban areas. Many of the families who live in rural areas have lower income compared to families from urban areas and because of this lower socio-economic status (SES), rural families have an increased risk of childhood obesity. Rural school districts have fewer resources to help overweight children to achieve healthier lifestyles. These are some of the reasons why childhood obesity has been increasing over the years in the rural areas. In addition, many of these children's parents do not have education beyond high school or a high school diploma. Compared to urban areas, 19% more parents do not have a high school diploma (McGranahan, 1994). Level of education can affect how parents approach their young children's unhealthy lifestyle versus having a better understanding of the problem. Another barrier in preventing childhood obesity is parental involvement in the process. Findholt et al. (2013) suggests there are three major barriers with families; family lifestyle, lack of parent motivation to change, and low family income/lack of health insurance. Due to the lack of health insurance, it can be difficult for families to get proper medical attention for their children. It can also limit access to important information on the prevention of childhood obesity for parents who are struggling. Parents can often lack motivation to change lifestyle habits for their children and even for themselves, especially as it can be very expensive to afford a healthier lifestyle. The added expense creates an additional barrier if they are struggling financially. To this end, our review attempted to address the

following questions: how can interventions educate parents on childhood obesity in rural areas?

Does socioeconomic status influence childhood obesity in rural areas?

CHAPTER 2

METHODS

We used the Preferred Reporting Items for Systemic Reviews and Meta-analyses (PRISMA) to outline the retrieval and selection of articles for review. We searched Pubmed, google, and google scholar using the terms *family intervention on childhood obesity* in ANY FIELD and *rural areas childhood obesity* in ANY FIELD. With respect to Pubmed, the main terms used were *childhood obesity* and family or parents' education on preventing childhood obesity. Inclusion criteria for articles consisted of: (1) published in English; (2) identified in peer-reviewed science outlets; (3) examined the effects of parent's involvement in preventing child obesity; (4) published from 2014-2020 years; (5) only in United States rural areas; and (6) add the ages from childbirth- 18 years and 6-12 years. We reviewed study abstracts to determine eligibility-based inclusion criteria. We recovered full reports for all articles that appeared to meet the inclusion criteria. We analyzed the included articles' reference lists for additional published works not otherwise identified. For each included article, as appropriate to the specific questions under study, we noted the study participants, variables measured, the type of study design, and notable outcomes or findings.

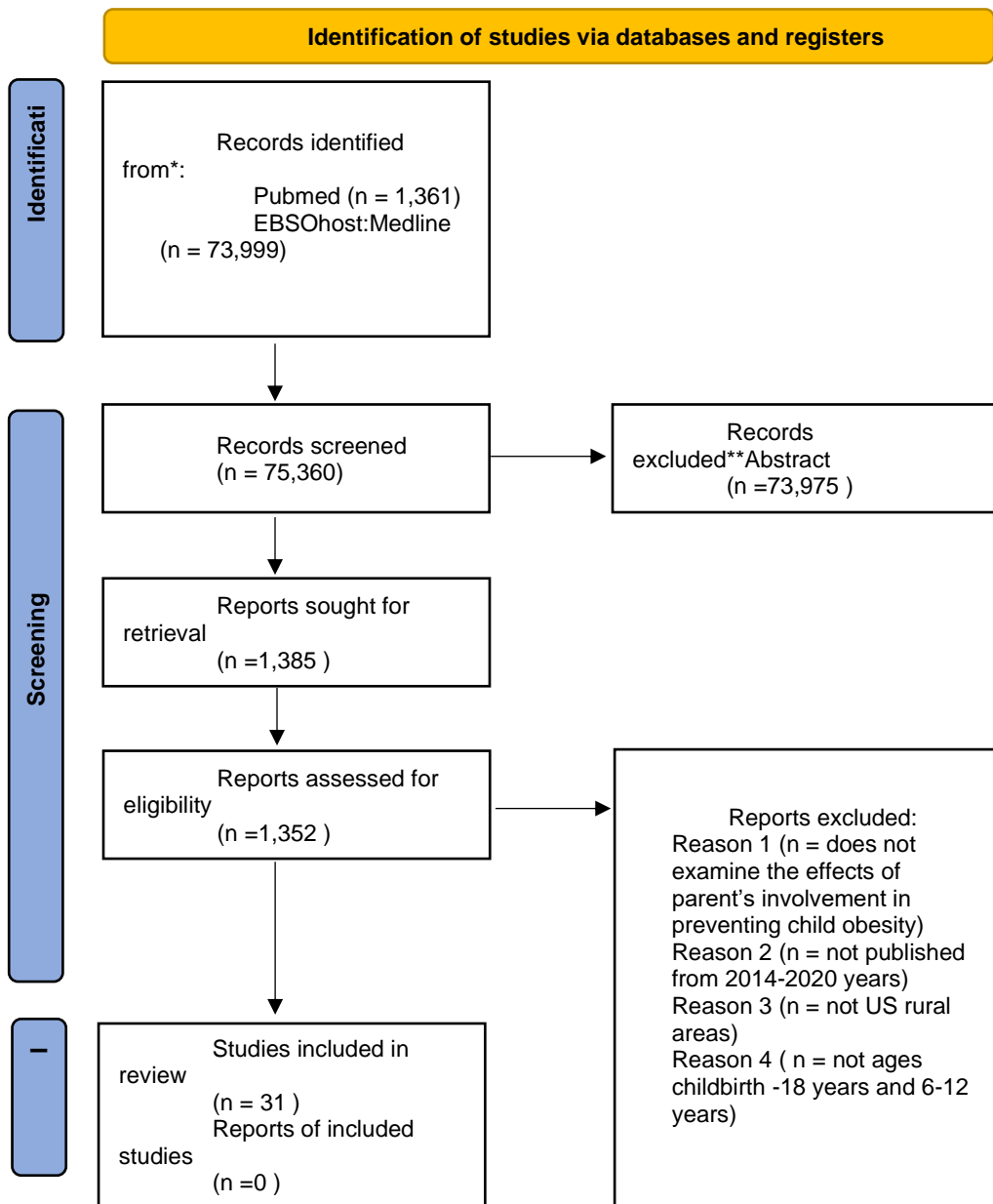


Figure 1
PRISMA Flow Diagram

CHAPTER 3

RESULTS

According to Figure 1, roughly 1,361 articles were located from PubMed search engine and 73,999 were found from EBSOhost (medline). The initial findings for ‘how can interventions educate parents on childhood obesity in rural areas?’ was to focus on family-based interventions. Overall, 31 articles were used for the findings of this review. These findings included 21 articles on this question (Table 1). The main idea behind focusing on family-based treatments is to change the family dynamics to influence weight-related behaviors (Pratt & Skelton, 2018). Indicating new changes in the family dynamics can motivate families to lose weight and eat healthier. A example of family dynamics could be making healthier meals as a family and doing physical activity as a family. In addition, parents play a large role in their children’s health, by modeling their children’s lifestyle with positive parenting approaches to weight loss goals (Hayes et al., 2018). In a study, where researchers had children play games focused on food vs. junk food and about 95% of children enjoyed the game very much (Mack et al., 2020). Researchers followed up after 2 years and found a large decrease in the BMI for children in the intervention that was focused on the parents-child group (Yackobovitch-Gavan et al., 2018). The final finding was that vulnerable children who are dealing with overweight/obesity show greater improvement with parental support and are more likely to change to a better lifestyle as a family.

Table 1
Studies of interventions on parent’s education on childhood obesity in rural areas

Authors	Type of Study	Major Findings
Ash et al (2017)	Review	<ul style="list-style-type: none"> ● Focuses on family interventions to deal with childhood obesity. ● Targeting diverse populations and focuses on

		diet, physical activity, and media usage for overweight children.
Pratt and Skelton (2018)	Intervention	<ul style="list-style-type: none"> ● On family based interventions with family systems theory that focuses on targeting family dynamics to influence weight-related behaviors through higher-level changes in the family.
Seo et al (2019)	Intervention	<ul style="list-style-type: none"> ● Developed an integrative lifestyle intervention for young and older children with little to severe obesity. ● It will test the different effects of exercise compared to their usual day to day activities
Jastreboff (2018)	Experimental	<ul style="list-style-type: none"> ● Parents mindful of health, plus nutrition (PMH+N) had better attendance, greater improvements in parental involvement, and decreased parental emotional eating rating compared to the control group.
Hammersley & Jones & Okely (2016)	Review	<ul style="list-style-type: none"> ● With the help of eHealth interventions to gap the hole between parents' care and overweight children over a period.
Hayes et al (2018)	Review	<ul style="list-style-type: none"> ● Family- based multicomponent behavior weight loss treatment (FBT) can be an effective treatment option for young children suffering from obesity. ● “In FBT, parents are an integral part of treatment, as they control

		the home environment and can use positive parenting approaches and modeling to help children reach their weight loss goals.”
Seguin et al (2017)	Case Study	<ul style="list-style-type: none"> • The help of low-cost healthier groceries can motivate the community to work together and decrease the number of children who are suffering from obesity.
Mack et al (2020)	Experimental	<ul style="list-style-type: none"> • Children played a game that focused on healthier foods vs. unhealthy foods and about 95% of children enjoyed the game very much.
Simione et al (2020)	Experimental	<ul style="list-style-type: none"> • Children with more support from parents and enhanced primary care indicated greater improvements rates for overall as a family.
Brown et al (2019)	Review	<ul style="list-style-type: none"> • Reported on the mistakes to avoid when treating childhood obesity with parents' involvement.
Blake-Lamb et al (2016)	Intervention/Review	<ul style="list-style-type: none"> • Based on different interventions in previous studies, nine were effective. • Those effective interventions focused on family level behavior with home visits and individual & group counseling.
Boutelle et al (2017)	Intervention/Experimental	<ul style="list-style-type: none"> • Parent based treatment was as effective as family based treatment on child weight loss and even increased physical activity in parents and children.

Evans & Albar & Vargas-Garcia & Xu (2015)	Intervention/Review	<ul style="list-style-type: none"> ● “School-based interventions are also effective at reducing obesity if components to increase physical activity and reduce sedentary behaviors are also targeted but not if only dietary behaviors are tackled”
Davis et al (2019)	Intervention	<ul style="list-style-type: none"> ● “iAmHealthy is a family-based behavioral, nutrition and physical activity intervention developed with input from rural children and families that capitalizes on the innovative use of mobile health applications (mHealth)”.
Chai et al (2016)	Review	<ul style="list-style-type: none"> ● How parents or primary caretakers can be effective when treating obesity in children. ● “The umbrella review intends to compare and summarize existing systematic reviews of experimental studies that address a range of family-based interventions for overweight children”.
Fleming-Milici & Harris (2020)	Review	<ul style="list-style-type: none"> ● Changing how food marketing can affect children’s health from a negative influence to a positive.
Calvert & Turner (2019)	Review	<ul style="list-style-type: none"> ● “ These summer nutrition programs are designed to decrease food insecurity and improve health outcomes among at-risk populations”. ● These summer nutrition programs can indicate what some children's dietary intake is

		or what kind weight outcomes come from it.
Smith et al (2018)	Experimental	<ul style="list-style-type: none"> • Demonstrated different aims to decrease obesity in children with community based services and parent training and some were successful compared to others.
Fulkerson et al (2018)	Intervention/Review	<ul style="list-style-type: none"> • Parents that were involved in the community setting interventions showed more improvement in identifying appropriate portion sizes than the control parents. • In addition, intervention children were less likely to consume sugar-sweetened beverages daily than control children.
Hayes et al (2019)	Intervention	<ul style="list-style-type: none"> • “FBT utilizes a socio-ecological treatment approach that focuses on the development of individual and family healthy energy-balance behaviors as well as positive self- and body esteem, supportive family relationships, richer social networks, and the creation of a broader environment and community that facilitates overall physical and mental health.”
Yackobovitch-Gavan et al (2018)	Experimental	<ul style="list-style-type: none"> • Over the 2-year follow up, it showed a decrease in BMI for children in the intervention that was focused on parents-child group.

The initial finding for ‘does socioeconomic status influence childhood obesity in rural areas?’ was to focus on socioeconomic characteristics. These findings included 10 sources for this particular question. Researchers performed a meta-analysis that showed higher family meal frequency and better diet quality ($r = 0.13$), more healthy diet ($r = 0.10$), less unhealthy diet ($r = 0.04$) and lower BMI ($r = 0.05$). In this study, the researchers stated, “different outcomes can come from sociodemographic and mealtime characteristics” (Dallacker et al., 2018, p. 644). Families who are financially struggling are at a disadvantage when it comes to providing high quality food options and do not have the time to commit to more physical exercise (Duncan et al., 2014).

One review explored school interventions for improving pediatric obesity in areas that have lower socioeconomic status families. It focused on how in rural areas schools or communities have fewer physical activity resources and healthier food options for children. These rural areas do have a disadvantage compared to urban areas with lack of resources (financial, education, and healthcare access (economic, cultural; Luybli & Schmillen & Sotos-Prieto, 2019). These food deserts have been drowning with no healthier resources or higher income to help families struggling with their children’s obesity. The final finding was that parents who suffer from food insecurity could affect their young children (Canales et al., 2015).

Table 2
Studies of socioeconomic status influence childhood obesity in rural areas

Authors	Types of Study	Major Findings
Robbins & Ling & Wen (2020)	Experimental	<ul style="list-style-type: none"> ● Based on what kind sociodemographic and physical characteristics a student (girls) comes from can influence their weight and exercise activity. ● The intervention raised the number of

		females that were overweight and obese but the not the healthy girls.
Dallacker & Hertwig & Mata (2018)	Review	<ul style="list-style-type: none"> • Different outcomes can come from sociodemographic and mealtime characteristics. • “Separate meta-analyses revealed significant associations between higher family meal frequency and better overall diet quality ($r = 0.13$), more healthy diet ($r = 0.10$), less unhealthy diet ($r = -0.04$) and lower body mass index, BMI ($r = -0.05$). Child's age, country, number of family members present at meals and meal type (i.e. breakfast, lunch or dinner) did not moderate the relationship of meal frequency with healthy diet, unhealthy diet or BMI”.
Faienza et al (2016)	Review	<ul style="list-style-type: none"> • Unhealthy diets, genetics, low-income families, and childhood growth patterns are risk factors that play a crucial part in childhood obesity.
Chi & Chu & Luu (2017)	Review	<ul style="list-style-type: none"> • Certain things cannot be modified to prevent childhood obesity, like sociodemographic factors (parents education and unemployment).
Brown et al (2015)	Intervention/Review	<ul style="list-style-type: none"> • Making public policy and the help with environment interventions can assist children to make healthy nutrition and physical activities.
Kim & Lee (2020)	Review	<ul style="list-style-type: none"> • In a family based environment, stats show a

		decrease in childhood weight.
Luybli & Schmillen & Sotos-Prieto (2019)	Intervention/Review	<ul style="list-style-type: none"> • Focuses on low socioeconomic settings and implementing new interventions in rural areas in school-based.
Duncan & Magnuson & Votruba-Drzal (2014)	Review	<ul style="list-style-type: none"> • Lower income families are at disadvantage when it comes to providing high quality food options and lacking time to commit to more physical exercise.
Camp et al (2019)	Experimental	<ul style="list-style-type: none"> • “Child characteristics consistently associated with correct coding in both pre- and post-intervention included children with obese body mass index percentiles (vs. overweight) and older-aged children (vs. toddlers)”.
Canales & Coffey & Moore (2015)	Review	<ul style="list-style-type: none"> • Young children with food-insecure parents are affected negatively by food insecurity and even the food assistance field is affected.

CHAPTER 4

DISCUSSION

We identified 31 studies examining different interventions the influence of parents' education on childhood obesity in rural areas and how sociodemographic factors can influence childhood obesity in rural areas. Our review suggests a family based intervention can be a crucial part of helping children with obesity. Parents using a positive parenting approach to assist their children reach the best weight loss goals (Hayes et al., 2018). In rural areas, they do not have the same resources available as the urban areas, such as close fresh markets or physical activity centers for children. Parents play a big part in the rising numbers of childhood obesity. Based on which parenting style rural parents are using, they could be hurting or enabling their children's bad eating and lack of physical activity. In addition, about 73% of rural children whose parents have less than a high school diploma live in low-income families (Douglas-Hall et al., 2007). This lack of education can mean the majority of these parents have little to no knowledge on how to prevent obesity.

Interventions influence parents' skills on how to prevent childhood obesity.

Researchers have used different interventions to influence family behavior and improve healthier lifestyles. One intervention focused on a mobile health applications called iAmHealthy, which was a family-based behavioral, nutrition and physical activity technique designed to obtain get information from rural children. That information allows them to capitalize on innovative ways to improve health (Davis et al., 2019). Many interventions have had success with parent-based treatment, which increases physical activity in parents and young children. Many parents have very stressful workdays and trying to provide healthier options for their children can be very difficult. In one study, researchers experimented with parents who were

mindful of health plus nutrition (PMH+N) and a control group (CG) where the parents were not. In the results, researchers found PMH+N had greater improvements in parental involvement, decreased parental emotional eating and overall better attendance than the control group (Jastreboff et al., 2018). Parents' involvement in eating better and getting more exercise can set a great example for young children but also help with parents' risk for obesity. In addition, researchers implemented a family-based treatment (FBT), like other studies have tried, but in this FBT parents are the biggest factor and want them to control their home environment with more positive parenting approaches to help children reach their weight loss goals (Hayes et al., 2018). In one study, researchers found more parents who cooked healthy and ate meals together led to decreases in screen time for their children and less consumption of sugary drinks or food (Pinard et al., 2012). Overall, parents being involved in their young children's health journey has proven to decrease cases of obesity.

Impact of socioeconomic factors on children obesity in rural areas. Many risk factors contribute to childhood obesity; unhealthy diets, genetics and socioeconomic status families (Faienza et al., 2016). About 38% of children in rural areas are at risk for being overweight (Ogden et al., 2018). One of the biggest differences between urban and rural areas is that rural areas lack access to healthy food and if there is healthy food available, it can be very expensive for lower-income families. Researchers have defined these areas as 'food deserts', which means areas with poor access to healthy and affordable food (Whitacre et al., 2009). In one study, researchers interviewed some parents in rural areas and received feedback on why sociodemographic status influences their children's diets. Some of the feedback indicated that parents are on a budget and cannot afford the best quality for their families due to the expensive groceries (Yousefian et al., 2011). When parents start changing their parental strategies the

home environment changes, which can allow their children to live a healthier lifestyle. Some parents who are lower-income have a hard time accepting that their children might be obese and need to change their diet and be more active (Baughcum et al., 2001). Those parents are also less likely to participate in obesity prevention interventions due to high stress or having lower education levels (Gross et al., 2001).

Limitations

We must note certain limitations related to this study. First, this study utilized a limited number of databases based on the narrow time-period. Some databases in the time-period did not have eligible articles on interventions on parents' education for childhood obesity. In addition, some search terms such as *parents' education on childhood obesity* and *other factors that influence childhood obesity* had some limited sources. Another limitation of this study was most of the articles were in different countries because childhood obesity is a global problem so it was hard to narrow it down to rural areas in the United States. By limiting our search, it is possible that a few eligible studies were missed.

CHAPTER 5

CONCLUSION

Children are suffering from obesity in the rural areas due to lack of lower socioeconomic status and parents education on how to improve their children's lifestyle. Different interventions have explored various changes in families' lifestyle to lower the risk of childhood obesity. One of the main focuses of this review was how parents' education could affect their children's eating habits and their view on a healthier lifestyle. Lack of education on obesity can prevent parents from accepting the fact that their children could be battling this dangerous disease. The other focus was families with lower SES can influence childhood obesity in rural areas. Parents can have a lack of motivation to improve their lifestyle to a healthier one because lower income parents can only afford certain healthy options or even none. Parents in rural areas also have fewer resources compared to urban areas. To conclude, existing literature confirms the treatment of childhood obesity can be decreased when focusing on parents' education and improving resources for parents with lower SES. Future work is needed to confirm this conclusion and to examine the progression and interaction of childhood obesity with SES and parents' education.

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