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Stress as a Contributing Factor for Pediatric Obesity: Literature Review and Internship Experience

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Honors Internship Experience Reflection

Introduction

Stress is a significant contributing factor to the health of a child in America today (Centers for Disease Control [CDC], 2021). The effects of socioeconomic status, education access, peer relationships, family relationships, and so much more all present stressors to a child, as well as their family unit (CDC, 2021). My experience interning at Harvey Pediatrics with Marilou Shreve (APRN) centered around the idea that holistic analysis of physiological processes as well as family stressors and resilience gives providers a better basis for developing a plan of care for their patients. It became a common theme throughout my internship and research for the literature review that stress can significantly change a child's overall health and wellbeing in America today, and I therefore placed special emphasis on this notion throughout my experience. I began my honors experience with the goal of evaluating children's health from a primary care perspective. I was able to dive deeper and create new goals and questions as the experience progressed. This internship experience allowed me to ask a multitude of questions about the practical aspects of working as an APRN. I have a significant interest in working with children not only in the acute setting, but in the primary care setting as well. I went into the experience wondering how working as an APRN changed with the global pandemic and was able to identify some key areas of adaptation that were required. This experience also allowed me to answer the question of how health promotion can impact a family unit. America is notoriously one of the most child-obese countries in the world (CDC, 2021), and I wanted to investigate how health promotion plays into the prevention of the epidemic of pediatric obesity. With growing rates of pediatric obesity in the United States, this experience allowed me to better prepare myself for a future profession as a pediatric nurse. My passions are related to community health and empowerment, and this experience allowed me to analyze how health promotion strategies

can be utilized to combat population disease processes such as obesity. The importance of this experience centers around the notion that children's healthcare does not only entail the care of the child but requires critical thinking and implementation of care for the family unit.

Reflection

The first semester of my honors internship experience centered around creating health promotion materials and helping Dr. Shreve with data entry for her research. I was tasked with creating three flyers containing health promotion tips for diet, physical activity, and stress reduction. This was a timely assignment, as many of Dr. Shreve's patients and their families were in the midst of beginning a new school year, and likely needed some anticipatory guidance on maintaining their health and wellbeing in this time of pandemic. The health promotion materials I created were made available to Dr. Shreve's clients, that which provided me with very tangible insight into how even my health promotion tactics as a student can affect the community around me. As I continued into the second semester of this experience, I was able to visit Harvey Pediatrics, where Dr. Shreve works as an APRN. It was at the clinic that I was really able to gain insight into what it looks like to be a Nurse Practitioner. I followed Dr. Shreve as she had patient appointments, learned her charting and prescribing process, and was able to ask questions about the various conditions I witnessed. A major part of each of her visits was an explanation of the collection of stress, resilience, and ACE data from parents. The COVID-19 pandemic has put parents in a unique position stress-wise, and trends in increasing stress have been associated with increasing COVID-19 cases. Watching Dr. Shreve explain why we asked our parents to fill out these stress surveys gave me great insight into how I can explain the importance of collecting data with my patients in the future. One process that I was able to participate in near the end of my experience was surveying parents about how they felt

specifically filling out the ACE data forms at their visit. Dr. Shreve explained that, while the American Academy of Pediatrics does recommend completing these screenings, some parents may feel uncomfortable with this information being in their child's chart. My responsibility was to complete standardized surveys with the parents, of which the data will lead the clinic to make a decision to implement ACE data screening for all patient caregivers in the future.

It was very interesting to see just how busy the clinic could get on some days, as well as the fact that many of the "sick visit" patients exhibited extremely similar symptoms as a whole. For example, one day we saw four patients in a row with reported generalized pressure in the sinus region, redness of the throat, and upset feeling in the GI system. Almost all of these patients were experiencing seasonal allergies. Another week, a few other patients presented with similar symptoms, but one was actually COVID positive. Seeing the patient population's conditions as a whole provided me with interesting insight into how Nurse Practitioners analyze trends such as seasonal allergies each year. The pandemic has likely made it a little more difficult to focus just on these trends, adding another layer of assessment and lab testing in order to ensure community health as a whole. Another challenge that I had not necessarily experienced before was when patients, namely infants and toddlers, would get upset and agitated when Dr. Shreve assessed them. If I were in her position as a new graduate nurse, I can imagine myself becoming distracted with the crying and screaming, but her experience in pediatrics obviously allowed her to remain calm and adapt to the children's needs during the assessments. It was a good reminder that, if and when I am in that position as a pediatric nurse, staying calm and continuing the work of assessing is vital to the child's health.

Asking questions was my goal every time I visited the clinic. I know from past clinical experiences that if I am not fully engaged and asking questions, I can oftentimes forget how to

apply what I have learned to my own nursing practice in the future. It was especially helpful that I was taking my pediatrics lecture course during this experience and was able to see first-hand the disease processes we had learned about in class. I was also able to see anticipatory guidance in action, an experience I hope to implement as I teach patients and their caregivers in the future. One of my objectives was to critically think through effective manners of teaching and health promotion, and I found that creating the health promotion materials earlier in the experience and seeing anticipatory guidance in action significantly met this objective. I also met my objectives of learning about my mentor's role at the clinic and having significant conversations about how the COVID-19 pandemic is affecting her patient and family stress levels. I also had a goal of assisting and being helpful whenever possible, and hope that I was somewhat able to contribute to either the tasks Dr. Shreve had at hand or the clinic functioning as a whole.

This experience was a perfect match with my S1 semester in pediatrics coursework. During the pediatrics lecture course, I learned both about primary and acute pediatric care. I was then able to participate in acute pediatric care at Arkansas Children's Hospital in Little Rock. I am thankful to have also been able to experience primary pediatric care at Harvey Pediatrics. I was able to see primary care strategies, prevention, health promotion, and organizational tactics in practice and could apply them to my learning in the pediatrics lecture coursework. Completing a literature review on top of this experience also contributed to my knowledge and implementation of evidence-based practice. I was able to learn and apply how to research in the nursing profession by crafting a research question and conducting a literature review about stress, diet, and physical activity as they contribute to pediatric obesity. I found it especially helpful to analyze the data that Dr. Shreve was collecting for her own research and saw how stress related to her patients' blood pressures and body mass indexes. Research is an essential

aspect of the BSN curriculum and coursework, and I found that this experience acted as a means for me to tie everything that I had learned from my coursework together.

This experience only strengthened my passion for pediatrics and goal of entering into pediatric nursing when I graduate. I was able to see both acute and primary care strategies this semester in particular, and loved both experiences. Obtaining an advanced practice degree is definitely something that I am interested in, and seeing a Nurse Practitioner in action (in the clinic and in the research setting) solidified that interest even more. I also think that I gained valuable nursing judgement and confidence with this experience. Confidence has been a point of constructive criticism from several of my clinical instructors in the past, and I found that I was able to challenge myself to become more assertive and confident while at the clinic and in researching for my literature review. I know that I will enter into nursing and very quickly become a leader with my BSN status, and an internship experience like this will only strengthen the self-confidence necessary to competently maintain that leadership ability and status.

Stress, Diet, and Physical Activity in Relation to Pediatric Obesity

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Abstract

This article is an examination of how stress drives diet and physical activity behaviors that contribute to pediatric obesity in the United States. An increasing rate of childhood obesity is being reported in the United States and therefore a multitude of studies and reviews have been conducted on the topic. This review of the literature systematically analyzes how stress, diet, and physical activity behaviors contribute to this rising rate of pediatric obesity. An analysis of the chosen articles for review indicates that stress and its counterpart (resilience) tend to be driving forces in how American children and adolescents participate in their diet and physical activity practices. In order for pediatric obesity rates to decrease, a more in-depth evaluation and implementation of stress-reduction amongst American youth and their family units must be obtained, thereby causing healthier nutrition and activity behaviors.

Stress, Diet, and Physical Activity in Relation to Pediatric Obesity

Every 1 in 5 children in the United States are impacted by obesity (Centers for Disease Control and Prevention [CDC], 2018a). According to a National Center for Health Statistics (NCHS) Data Brief detailing the prevalence of obesity in the United States, the prevalence of obesity among children aged 2-19 years in 2015-2016 was 18.5% (Hales et al., 2017). Health behaviors and genetic factors contribute to childhood obesity in a complex manner, making the disease process difficult to manage and eradicate from a public health standpoint (CDC, 2021). The health risks and consequences of obesity in childhood and adolescence alone warrant a need to establish peer-reviewed research and evidence-based practices to prevent and control its prevalence. Obesity is a major contributing risk factor for many health issues, including high blood pressure and high cholesterol contributing to cardiovascular disease, glucose tolerance, insulin resistance, and type 2 diabetes, breathing problems, joint problems, and fatty liver and gastro-esophageal reflux diseases (CDC, 2021). Childhood obesity is also a risk factor for psychological issues, low self-esteem and lower self-reported quality of life, and social problems such as bullying and stigma (CDC, 2021). Research also shows that those who have obesity in childhood are more likely to become adults with obesity, thereby increasing their risk for conditions such as cardiovascular disease, type 2 diabetes, and cancer (CDC, 2021).

With a highly established percentage of children with obesity in the United States, it is essential to pursue implementation of standards and practices to reduce such prevalence. The complex risk factors surrounding obesity must be targeted both holistically and individually, and health professionals must educate their patients on the increasing importance of implementing a healthy lifestyle within their family units and communities. One such manner of education is in the primary care setting, where I have had the opportunity to shadow my honors mentor and

nurse practitioner as she studies the relationship between stress levels in children and their caregivers, resilience in both parties, and childhood body mass index (BMI) and blood pressure (BP) levels. BMI and BP levels in particular are key indicators of an obesity diagnosis in children (CDC, 2018b). Taking into account this research, I decided to evaluate three contributing factors to childhood obesity: diet, physical activity, and stress. While three factors are unique in their own right, a complex connection exists between them, creating a triad of risk factors for unhealthy practices in childhood weight management.

This literature review exists to evaluate the complex connection between diet, physical activity, and stress, with the purpose of analyzing this connection as an underlying cause of obesity in American children. Diet will be defined as nutrition practices, caloric intake, and other general eating habits. Physical activity includes exercise practices in children and their family units, mobility and movement occurrences, and/or a lack of intentional movement practices that enhance wellbeing. Stress will refer to the emotional and neurobiological components contributing to a stress response in a child and/or caregiver. What became apparent in the process of this review was that stress and resilience are key factors that can either hinder or enhance, respectively, healthy lifestyle decisions related to diet and physical activity. Therefore, discussion focuses on how stress is a major contributing factor to all of the other risk factors contributing to childhood obesity.

Methods

The CINAHL and PubMed databases were accessed to in order to identify literature pertaining to the purpose previously stated. Three searches were conducted on the CINAHL database and one search on the PubMed database. The first of the CINAHL searches utilized the terms “stress, psychological” and “pediatric obesity.” The second CINAHL search utilized the

major subject headings “pediatric obesity,” “child nutrition,” and “diet.” The third CINAHL search utilized the major subject headings “health behavior, physical activity” and “pediatric obesity.” The PubMed search included Medical subject headings (MeSH) “pediatric obesity,” “stress, psychological,” “diet,” and “exercise.” Inclusion criteria used to determine studies for review were that studies had to (1) be published in English after 2010, (2) be available as a full text article per University of Arkansas library database allowances, (3) come from academic journals as defined by their respective databases, (4) and be published in the United States.

The electronic search yielded a total of 44 articles for review. After reviewing the abstracts of all 44 articles, two were chosen for this review from the PubMed database, and the other thirteen were chosen for review from the CINAHL database.

Results

The search and inclusion criteria for this review focused on childhood and family unit dietary, physical activity, and stress behaviors. A thematically categorized reflection of the results of studies on these topics follows:

Diet

Most American children attend public schools, where they receive one to two meals per school day (National Center for Education Statistics, 2021). Government and institutional nutrition assistance and education programs have been implemented across the United States, and therefore act as an effective target for studies conducted to evaluate dietary practices among the nation’s obese and non-obese children. It is well known that diets high in fruit and vegetable intake, with a limit on excessive sugars and emphasis on protein and the adequate amount of vitamins contributes to a child’s weight and overall health status (Rosemond et al., 2015). As

schools teach children and their families about recommended caloric and nutritional intake each day, they can play a pivotal role in preventing childhood obesity (Rosemond et al., 2015).

Rosemond et al. (2015) evaluated one Junior Doctors of Health (JDOH) nutritional education program for its effectiveness towards preventing childhood obesity. The evaluated JDOH program consists of interactive education for children to participate in in their schools, learning about health concepts, building healthy snacks, and participating in health skill-building activities. The evaluation on the effectiveness of the JDOH program suggested that the curriculum fostered positive changes in youth dietary behaviors, as well as precursors to these behaviors. One such precursor was self-efficacy in healthy dietary behaviors, as supported by parents providing healthier food options for their children (Rosemond et al., 2015).

The Coordinated School Health Program (CSHP), used interventions at school as an effective approach to reach children and their parents in an attempt to change their nutritional behaviors, increase physical activity, and improve health knowledge. An evaluation of this program's effectiveness in a predominantly minority community over a 2-year period noted a significant decrease in reported consumption of unhealthy foods by participating children and parents (Rausch et al., 2015). A similar approach focused on parental nutrition practices, particularly in eating food away from home (FAFH), showed promising qualitative results as parents discussed a lower amount of fast food and FAFH consumption than other research suggests (Pinard et al., 2015). Parents exhibited a desire for healthier food choices for their children at various restaurants, but some themes emerged of more relaxed feeding styles when families eat away from home (Pinard et al., 2015). This suggested that a relaxed feeding style, in conjunction with higher rates of families eating FAFH, may be contributing to the United States' increasing rates of childhood obesity (Pinard et al., 2015). This is supported by another study that

reported higher parent-perceived stress, and therefore the choice of less stressful eating options was associated with the consumption of fast food as well (Baskind et al., 2019).

Research indicates that childhood obesity runs along a line of economic, racial, and ethnic disparities in the United States (Watt et al., 2013). Watt et al., (2013) noted for Hispanic mothers, maternal consumption of an unhealthy diet increased the risk for infant obesity. They also noted a mother's consumption of sweets and sugar-sweetened beverages significantly increased her infant's risk for developing childhood obesity, as well as other related risk factors. The study also emphasized the importance of not only intervening these risk factors with a provision of information, but to evaluate the influence of stress of these dietary practices (Watt et al., 2013). Supplemental Nutrition Assistance Programs (SNAPs/food stamps) also showed a significant relationship with infant obesity risk among the included population (Watt et al., 2013).

Physical Activity

Physical activity being a main lifestyle factor contributing to the maintenance of a healthy childhood weight, one study examined how minority youth physical activity levels were affected by their caregivers' physical activity practices (Gallo et al., 2017). Latino youth whose caregivers engaged in at least 150 minutes of physical activity per week were almost twice as likely to obtain at least 60 minutes of physical activity daily, indicating that parent physical activity patterns are associated with pediatric physical activity patterns (Gallo et al., 2017).

One study comparing the physiological markers of obesity between girls and boys indicated that physical activity and sedentary behavior were contributors to the difference between obese and nonobese children within the study population (Govindan et al., 2013). Data supported the findings that interventions to reduce sedentary time and increase time spent in

physical activity would reduce the prevalence of obesity among young children (Govindan et al., 2013). Biro & Wien (2010) found evidence to support reduction in sedentary time. They find that unhealthy coping mechanisms include sedentary activities such as television viewing, playing video games, and computer activities, which contribute to the obesity epidemic that we see in children in the United States today. Physical activity acted as one of the many mechanisms included in the complex interactions contributing to childhood obesity (Biro & Wien, 2010).

Stress

Greater levels of stress have been strongly associated with higher likelihood of developing obesity (Fahrenkamp & Sato, 2018). Adolescents in particular exhibit risks that increase that likelihood and are easier to examine due to increased activity in the HPA axis, a source of cortisol level changes that occur related to stress (Fahrenkamp & Sato, 2018). Fahrenkamp & Sato (2010) conceptualized stressors that may occur in adolescence into three developmental levels: the child-level, maternal-level, and environmental-level. Through interviews and direct observations of 675 adolescents and their mothers; data was collected on each child's BMI and W-to-H ratio; Using zBMI cut-off criteria by the World Health Organization (WHO). They noted that 29.5% of adolescents were overweight/obese, and 16.9% were characterized as a part of the "at risk" range for W-to-H ratio (Fahrenkamp & Sato, 2018). The data supported the study's hypothesis that greater levels of stressors from the three defined areas of development were significantly associated with higher levels of zBMI and W-to-H ratios. Research also shows that there is a relationship between parent-perceived stress and risk for child obesity (Baskind et al., 2019). Frontini et al. (2016) suggested that higher levels of parent-perceived stress were associated with higher levels of permissive parenting style (as

opposed to an authoritative parenting style), which, in turn, were associated with higher levels of pediatric obesity and lower levels of child and adolescent-reported quality of life.

Stress markers and contributing factors may change depending on race, ethnicity, gender, and background, as supported by studies comparing data grouped by race (Baskind et al., 2019). Baskind et al., (2019) noted the relationship between parent-perceived stress and risk for child obesity was only found among children in low-income households and among non-Hispanic black children. It has been noted that parent-perceived chronic stress among Hispanic and Latino families was not associated with increased childhood obesity (Isasi et al., 2017). The notion that children classified as minorities may be at a higher risk for obesity related to stress was supported by a New York City study that identified family and cost as a barrier to healthy eating and academic pressures and the neighborhood environment as barriers to physical activity (Van Oss et al., 2014).

A 2018 study conducted to examine the relationship and contrast between chemical and non-chemical stressors as components affecting childhood obesity concluded that inconsistencies in data collection have thus hindered the scientific community from studying obesogens, that is chemicals introduced into the child's environment that contribute to obesity, and how they may play into the relationship between stress and the development of pediatric obesity (Lichtveld et al., 2018). Interrelated risk factors of stress in the development of both depression and obesity concluded that stressors did predict trajectories of both depressive symptoms and weight over time in a pediatric population (Carter et al., 2015). The primary goal of this study was to examine how four lifestyle factors contributing to resilience could protect children from developing depression and obesity. Social support and self-esteem were both found to significantly buffer the trajectory of developing depressive symptoms and weight gain over time, and physical

activity and sedentary time did not buffer the effects of stressors contributing to the trajectories that were outlined (Carter et al., 2015). Foster & Weinstein (2019) support the claim that emotional stability, a component of child resilience, held a significant association with lower obesity in children across all income strata (income being a life stressor contributing to obesity). In contrast to the previously mentioned studies on parent-perceived stress, this study showed no significant association between family resilience and lower prevalence of overweight or obesity (Foster & Weinstein, 2019).

Discussion

The main findings of this review of literature center around the notion that behaviors related to stress and resilience are key drivers in the modifiable behaviors of diet and physical activity in children who are obese. Stress not only affects the child at risk for obesity, but the family unit's health behaviors and attitudes as a whole, thereby affecting the child's health behaviors and attitudes. An analysis of the literature relevant to the factors contributing to childhood obesity in the United States reveals an interrelationship between stress and diet and physical activity practices.

Stress, as defined in the child and parental unit, alone has shown to significantly contribute to a child's increased risk for developing obesity (Fahrenkamp & Sato, 2018). Child, maternal, and environmental stressors, with the additive effects of stressors related to race, economic status, and gender, increase a child's cortisol levels, in turn increasing their risk for obesity (Fahrenkamp & Sato, 2018). Chemical changes do occur as a result of these stressors, thereby inducing physical changes, but child, maternal, and environmental stressors also depend upon child and parent-perceived perceptions of stress. Parent-perceived stress, in particular, varies and depends upon background, ethnicity, and gender. This review's analysis of literature

in the context of themes divided by diet, physical activity, and stress supports the conclusion that parent responses to parent-perceived stress are key drivers of health behaviors related to diet and physical activity for themselves and their children.

Analysis of literature related to diet and stress indicated a relationship between parent-perceived stressors and their subsequent responses to the risk for and reality of obesity in their children. Lower socioeconomic status is widely accepted as a stressor in the United States, and supplemental nutrition assistance programs (SNAP) have been linked with greater risk for obesity in the children that these programs serve (Watt et al., 2013). Low-income and non-white Americans have also notably dealt with nutritional disparities for decades, for example, receiving poorer nutrition education and support as they raise children (Watt et al., 2013). Families also oftentimes utilize unhealthy dietary choices as a coping mechanism for stress (Pinard et al., 2015). Nutrition education programs, run primarily through public schools that aim their teaching at the child as well as the family unit, have shown to increase the nutritional and dietary self-efficacy that is a precursor to preventing childhood obesity (Rosemond et al., 2015). Empowerment of the family unit to be resilient in the midst of their economic and social stressors equips them for dietary practices that reduce their child's risk for developing obesity.

Physical activity is also a modifiable mechanism that can be affected by parent and child-perceived stressors, ultimately contributing to the development or prevention of childhood obesity. A gap in literature was noted through this writer's search for studies on the interrelationship between physical activity and childhood obesity, but research does show that sedentary lifestyle, as utilized for coping with stress, may be related to higher obesity rates (Biro & Wien, 2010). An interrelationship may occur between the effects of depressive symptoms and depression in children upon motivation to take part in physical activities (Carter et al., 2015). A

more in-depth search of more databases may reveal more notable data on this topic and fill in the gaps experienced in this literature review.

A family unit's stress has shown to be an ultimate causative factor for the likelihood of a child to develop obesity. A child's resilience, or lack thereof, has shown an effect on their physical activity choices, which are modifiable behaviors that contribute to their overweight and obesity risk. Parent resilience, or lack thereof compounded with environmental and socioeconomic stressors, has shown an effect on family and child dietary habits and behaviors, which are also modifiable risk factors contributing to the development of pediatric obesity. While it may not always be the case that stress drives physical and dietary behaviors, analysis of literature does support the claim that stressors and their opponent of resilience are determinants of diet and physical activity as they relate to the development of obesity in children.

Ramifications of this analysis on clinical practice should be centered around prevention of childhood obesity. Assessing the family unit's resilience with systematic screening tools, as well as children and adolescent depression screenings will allow parents and providers ample knowledge of an individual child's risk for becoming overweight and/or obese. Education programs, primarily via school-based intervention programs such as the JDOH nutritional program or the CSHP approach, have shown to modify health behaviors related to diet and physical activity in children. School-based intervention programs that are geared towards the child, parent, and the family unit as a whole, may significantly contribute to the modification of resilience behaviors that in turn drive dietary and physical activity behaviors.

The main limitation for this literature review was the general complexity of the subject matter. Childhood obesity is related to a complex interworking of many different internal and external factors, and the limitation of inspection focused purely on diet, physical activity, and

stress may differ from a more widespread approach to the subject matter. This researcher suggests that a further, widespread and overarching study into how stress impacts all aspects contributing to pediatric obesity may provide a clearer picture of prevention and treatment strategies in the future.

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