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# Interventions for Afterschool Programs to Decrease the Likelihood of Childhood Obesity

Anna R. Boyd  
*Oral Roberts University*

Lauren E. Hendricks  
*Oral Roberts University*

Elexus T. Morton  
*Oral Roberts University*

Kayleigh S. Phillips  
*Oral Roberts University*

Corie VanArsdale, MSN  
*Oral Roberts University*

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INTERVENTIONS FOR AFTERSCHOOL PROGRAMS TO DECREASE THE  
LIKELIHOOD OF CHILDHOOD OBESITY

Anna R. Boyd, Lauren E. Hendricks, Elexus T. Morton, Kayleigh S. Phillips,  
Corie VanArsdale MSN, Nursing Instructor

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### **Abstract**

This systematic research review (SRR) looked at the epidemic of childhood obesity and subsequent complications. Afterschool programs (ASPs) were targeted as a key area where children spend many hours each day and, therefore, an ideal place for obesity interventions. The purpose of this SRR was to search the current benefits ASPs can have on decreasing the risk and prevalence of childhood obesity and to answer the research question, "What are nursing interventions within ASPs that decrease the risk of obesity in children in the United States of America?" Childhood obesity influences nurses in many areas, including inpatient hospitals, schools, and community settings. Obesity strains the healthcare system by increasing the number of acute and chronic children requiring care which increases the demand for nurses. This SRR was conducted from January 2017 to August 2017, using a total of eight databases. The time frame and incorporated databases offered the widest range of available literature on the topic. Inclusion criteria included a date range of 2012-2017, a population of children ages 2-19, English, full text available or able to borrow from another library, peer reviewed, and evidence-based reports. ASPs are effective means to reduce childhood obesity through the implementation of healthy interventions such as nutritional interventions, physical activity (PA), and staff education. The results of this study indicate that a combination of PA and nutritional education show the most significant results in decreasing the risk and prevalence of childhood obesity. Nurses actively involved in ASPs positively impact the development of the nutrition, PA, and staff training, resulting in improved outcomes for the participants.

Key terms: "afterschool programs," "nursing," "intervention," "community," "childhood," "obesity," "prevention," "nutrition," and "physical activity"

## Interventions for Afterschool Programs to Decrease the Likelihood of Childhood Obesity

In the 21<sup>st</sup> century, childhood obesity has become the primary health problem identified within the United States and worldwide (American Heart Association, 2016; Global Strategy, 2016). Childhood obesity presents an increased risk for early death and debilitating complications (Why does childhood..., WHO, 2017). In America, one out of every six children is obese (Childhood Overweight, 2015; Nutrition, O&I, HealthyPeople.gov, 2017). The term obesity refers to having a weight heavier than measured to be healthy. Obesity is measured by a person's body mass index (BMI), a number reflecting both weight and height and in children also considers age (Defining Childhood Obesity, 2015). Due to multiple considerations, sole measurement of BMI is a poor indicator of a child's weight status. The factor of age plays a key role in the measurement of a child's BMI. Percentiles are used to indicate whether or not a child is obese (Apovian, 2016; Defining Childhood Obesity, 2015; National Guidelines Clearinghouse (NGC), 2013).

The issue of obesity has become a major health issue over the past several decades. The cause of this increasing epidemic can be traced to several different factors including socioeconomic status, environment, diet, and physical activity (PA) (Apovian, 2016). Research shows children of non-Caucasian backgrounds or from a low socioeconomic status (SES) have higher rates of childhood obesity (O'Brien, 2012; O'Hara & Haynes-Maslow, 2015).

Afterschool programs (ASPs) are utilized by families across the United States. Almost 20% of children in the United States participate in an ASP (Yamashiro & Rinehart, 2014). ASPs vary in structure and provide numerous educational benefits for

children and families. ASPs enable parents to maintain employment by providing care and activities for children after school. Children receive additional academic help, social interaction, and extracurricular activities. Yamashiro & Rinehart (2014) reported families of lower socioeconomic status or minority groups tend to participate in and request the resources of ASPs more than those of higher socioeconomic status or Caucasian background.

### **Background**

In the years 1999-2000 the percentage of childhood obesity in the United States was 13.9% and increased 3.3% by the years 2013-2014 (Ogden, Carroll, Fryar, & Flegal, 2015). Early elementary aged children, specifically, are at increased risk to become overweight, with higher risk noted in school areas of lower socioeconomic status compared to higher socioeconomic areas (Apovian, 2016; Cunningham, Kramer, & Venkat Narayan, 2014; Miyazaki & Stack, 2015; NGC, 2013). Socioeconomic status has been shown to be a higher indicator than race of childhood obesity risk in the United States (Rogers et al., 2015). Students in suburban and urban schools were also found to have a lower BMI than students in rural schools (Miyazaki & Stack, 2015). Obesity rates increase in children from SES and minority backgrounds (O'Hara & Haynes-Maslow, 2015). Not all non-Caucasian groups are at higher risk for childhood obesity. The rate of childhood obesity among Asian non-Hispanic populations was only 8.6% from 2011 to 2014, compared to rates ranging from 14.7% among Caucasian non-Hispanic children, 19.5% for black non-Hispanic children, and 21.9% among Hispanic children (Nutrition, LD, HealthyPeople.gov, 2017).

To avoid controversy surrounding the use of BMI for the diagnosis of children as obese, a percentile scale is used factoring in age, as well as height and weight (Defining Childhood Obesity, 2015; Griffiths, Gately, Marchant, & Cooke, 2012). A healthy weight for children lies between the 5<sup>th</sup> and 84<sup>th</sup> percentiles on the BMI scale. A category considered to be unhealthy is underweight defined by the National Guideline Clearinghouse as a child having a BMI lower than the 5<sup>th</sup> percentile. Overweight is defined as having a BMI in the 85<sup>th</sup> to 94<sup>th</sup> percentile. This category is distinct from obesity, defined as having a BMI at or above the 95<sup>th</sup> percentile for their age group (NGC, 2013). Obesity is more specific than overweight. The definition states excess body fat contributes to the excess weight (NHLBI, n.d.).

Low levels of PA are highly associated with childhood obesity (10 Facts, 2017). Consistent PA contributes to a healthier lifestyle and decreases the likelihood of chronic diseases (Physical Activity Basics, 2015). As children age, their daily PA decreases. During the 5<sup>th</sup> and 6<sup>th</sup> grades, a 21% decrease in PA was observed among girls while a 16% decrease was observed among boys. PA was less likely to decrease when children felt PA was supported by friends and parents (Dishman, Dowda, McIver, Saunders, & Pate, 2017). Children can spend around 60% of their time in sedentary activities such as viewing movies or television, playing video games, and being on a computer (Gao, Chen, Huang, Stodden, & Xiang, 2017; Kim, Umeda, Lochbaum, & Stegemeier, 2016).

Childhood obesity carries a higher risk for developing many chronic diseases throughout the lifetime, such as cardiovascular disease (CVD), obstructive sleep apnea, cancer, gallbladder disease, hypertension, cerebrovascular accidents (CVA), abnormal cholesterol levels, osteoarthritis, and type 2 diabetes mellitus (Nutrition, O&I,

HealthyPeople.gov, 2017; NHLBI, 2013). Obese children are at a greater risk for being overweight or obese into adulthood, multiplying the risk for the development of life-threatening chronic diseases (Nutrition, LS&D, HealthyPeople.gov, 2017). Obesity can affect a person's mental health by leading and contributing to binge eating disorder and bipolar disorder (Segura-Garcia et al., 2017). Obese children are also more frequently targeted by bullies (Apovian, 2016). Depression and anxiety are also found to be high in obese children (Esposito et al., 2014). While depression was found to increase as BMI increased, rates of suicide were found to decrease with increasing BMI (Bjørngaard et al., 2015). Obesity affects children's social abilities, attendance in school, academic achievement, and wage earnings later on in life (Apovian, 2016).

In the United States, 10.2 million children attend an ASP every year (Yamashiro & Rinehart, 2014). Availability within ASPs is limited, causing 19.4 million children to be unable to attend an ASP (America After 3PM, 2014). Parents are supportive of ASPs due to a reduction in the rates of crime, drug use, or teen pregnancy (Yamashiro & Rinehart, 2014). The influence of ASPs extends beyond the social behaviors of children into health habits as well (Changes in YMCA, 2016).

### **Significance**

The significant increase of childhood obesity over the past years affects the field of nursing in a variety of areas. The influence of childhood obesity reaches the individual, family, and community setting, expanding the nurse's responsibility for prevention and education (Messiah et al., 2015). Reduction of childhood obesity on a large-scale requires a multi-faceted approach, involving changes from the familial level to the governmental level. The nurse has the ability to influence families towards a healthier lifestyle on an



individual level (Penn & Kerr, 2014). Nurses desiring to help obese children and families, confront barriers of community resources that decrease childhood obesity, such as access to healthier foods, recreational areas, and ASPs (Gurnani, Birken, & Hamilton, 2015; Messiah et al., 2015; Opalinski, Dyess, & Grooper, 2015).

Obesity influences the ability of nurses to adequately care for obese patients due to inadequate equipment or staffing (Lumley, Homer, Palfreyman, Shackley, & Tod, 2015). The effects of childhood obesity correlate into lengthier stays in hospitals for children who are obese, as well as higher rates of infection and mortality (Bechard, Rothpletz-Puglia, Touger-Decker, Duggan, & Mehta, 2013). The higher rates of comorbidities and lengthier stays in hospitals translate into an increased demand for healthcare workers. Demand for care is already increasing due to recent changes in United States healthcare, allowing more people to receive healthcare services (American Nurses Association, 2017). The subsequent increase in demand for nurses to care for patients has the potential to sustain the nursing shortage throughout the country (American Nurses Association, 2017; Occupational Outlook Handbook, 2015).

The increase of obesity amongst children requires nurses to be aware of specific demands and challenges associated with childhood obesity (Lumley et al., 2015). Nurses are required to provide continuing care and education to clients throughout the lifespan with different chronic diseases such as obesity (Occupational Outlook Handbook, 2015). Childhood obesity also causes a greater demand for acute and chronic care as a result of acute and chronic comorbidities (Rubenstein, 2012).

Nurses encounter ethical challenges in regards to childhood obesity care. Ethical questions regarding an individual's choice to live an unhealthy lifestyle confront the nurse

and may influence healthcare provider's perceptions of individuals. Another ethical dilemma involves the government's right to intervene, through regulation or taxation, due to the financial cost placed upon communities (Penn & Kerr, 2014).

Biases against patients greatly influence care. The perception of obesity as a reversible and manageable disease has been shown to increase amongst nurses who care for obese patients. Pediatric nurses may behave differently toward obese patients due to weight (Garcia et al., 2016). Many nurses view obesity as a difficult subject to address when assessing and treating patients; therefore, discussions regarding obesity and lifestyle choices may remain ignored by healthcare workers (Lumley et al., 2015).

A socioeconomic status can negatively impact a person's health and risk of obesity. Patients with a low SES have a decreased chance of receiving adequate healthcare due to provider bias and decreased access to affordable care (Olah, Gaisano, & Hwang, 2013). Lower SES groups within the United States also show an increased accessibility to high caloric, high fat foods, predisposing families to the danger of becoming obese in comparison to higher SES groups who have access to healthier foods (Wang & Lim, 2012). A negative impact of low SES areas is fewer grocery stores and an increase in convenience meals, which can contribute to the intake of poor nourishment. Less outdoor recreational areas available in low SES community lead to an absence of exercise (Rogers et al., 2015).

Advocacy for health is often viewed as a key responsibility for a healthcare provider within a school (Turner, Owen, & Watson, 2015). Nurses are in a unique position to promote a healthy lifestyle through nutritious eating choices and PA in the school setting, on an individual basis, on school media platforms, and in various

community settings (Nabors, Burbage, Woodson, & Swoboda, 2015). School nurses state an ambition to be more engaged in increasing healthy weights within children. School attendance offers healthcare providers the means to influence overweight students (Turner et al., 2015). School nurses are closely related in the maintenance and improvement of physical weight in children. School nurses are able to provide services such as measuring BMIs, promoting healthy food options, collaborating with school employees to encourage student exercise, providing education for caretakers of children regarding healthy activity and behaviors, and encouraging participation of the community to further the achievement of maintaining and improving children's physical weight (Council on School Health, 2012).

Although advocacy for health is an important responsibility for healthcare providers within schools, school nurses feel inadequate to administer quality care as a result of decreased employment and a volume of other tasks needing to be completed. Feelings of inadequacy are also accompanied by an absence of childhood obesity education, distinct protocols, and a routine system (Turner et al., 2015). School nurses reported using skillful reasoning and individual experience to fulfill education and interventional needs for obese children rather than having professional training. The absence of areas for parents to be involved, low parent interest, and a deficit of precise protocols also create barriers to addressing the children's weights (Turner et al., 2015).

Community health organizations promoting nutritious eating habits and exercise can be a strong referral source for nurses caring for obese patients or patients at risk for becoming obese (Messiah et al., 2015). ASPs positively affect school attendance, academic outcomes, and the child's behavior (Evaluations Backgrounder, 2013). ASPs

utilizing parks can also be a valuable referral option for nurses when caring for patients of diverse backgrounds searching for affordable obesity treatment or prevention organizations. The role of community-based programs to prevent obesity is invaluable. The nurse, as a key referral resource, should advocate for the expansion and use of programs promoting healthy living (Messiah et al., 2015). Nurses have the ability to influence and form nutritional and physically active programs within afterschool settings to encourage health understanding in children. Opportunities to increase access to healthy eating education and physical education time in the school gymnasium are not utilized fully (Nabors et al., 2015).

Nurses can inspire families to implement healthy changes to their lives by providing care focused on the family, listening without judgement, and communicating clearly. Nurses advocate for patients by supporting government plans and voicing concerns of inadequate care. By being alert to the fundamental causes of obesity, nurses can give evidence based practice, advocacy, and guidance to patients and families (Penn & Kerr, 2014). The valuable tools of compassion and continuing education provide nurses with a unique opportunity to impact the problem of childhood obesity within the community setting on multiple levels. Nurses can impact the levels of childhood obesity within lower SES families through practical interventions and by providing guidance to afterschool and community programs.

### **Problem and Purpose Statement**

Obesity continues to be a problem in childhood populations. Within the United States, one in six children is considered to be obese (Childhood Overweight, 2015 & Nutrition, O&I, HealthyPeople.gov, 2017). Obesity in children causes many chronic

diseases and increases health risks in adulthood (Nutrition, LS&D, HealthyPeople.gov, 2017; Nutrition, O&I, HealthyPeople.gov, 2017; NHLBI, 2013). ASPs are vital resources within the community to promote healthy habits among children and their families (Changes in YMCA, 2016; Yamashiro & Rinehart, 2014). Nurses can play an active role in forming and implementing interventions within ASPs to affect the health of children (Nabors et al., 2015). The purpose of this systematic research review was to search current literature regarding the benefits of ASPs towards decreasing the risk of childhood obesity. The question this systematic research review sought to answer was, "What are nursing interventions within ASPs that decrease the risk of obesity in children in the United States of America?"

### **Definition of Variables**

This systematic research review evaluated nursing interventions within ASPs that decrease the risk of childhood obesity in the United States of America. The independent variable of this study is nursing interventions. Nursing interventions are defined as any activity performed by the nurse based on evidenced based practice to promote patient health (Craven, 2013). Health promotion inspires patients to live healthy lives and prevent common illnesses. The nurse focuses on encouraging patients to adopt healthy lifestyles and habits (Pellico, 2013). Risk of obesity is defined as any activity that increases a person's likelihood of developing obesity in the future (NGC, 2013; Wong & Lim, 2012). Obesity is the dependent variable. Obesity in children is defined as equal to or above the ninety-fifth percentile for the developmental growth stage, putting the child at increased risk for disease (Apovian, 2016; Defining Childhood Obesity, 2015; National Guidelines Clearinghouse (NGC), 2013; Why does childhood, WHO, 2017).

Two terms that need to be defined are ASPs and children. Afterschool programs (ASPs), as defined in this review, encompass a wide range of activities for children during both the school year and in the summer within a group setting, providing opportunities for education and self-improvement, including increased PA, decreased obesity, and improved nutrition (Beets, Weaver, Turner-McGrievy et al., 2014; Behrens, Miller, Schuna, & Liebert, 2015; Evaluations Backgrounder, 2013; London & Gurantz, 2013; Wofford, Froeber, Clinton, & Ruchman, 2013). For the purpose of this study, children is defined as individuals ages 2 to 19 (Nutrition, LD, Healthypeople.gov, 2017; Ogden et al., 2015).

### **Methodology**

This systematic research review was conducted from January 2017 to August 2017. The databases searched included CINAHL Plus with Full Text, Academic Search Complete, Health Source: Nursing/Academic Edition, Medline, Medline with Full Text, AHFS Consumer Medication Information, Google Scholar Search, and ScienceDirect. The time frame and the incorporated databases offered the widest range of available literature on the topic. The searches were initiated using the following key terms: "afterschool," "programs," "after school programs," "nursing," "childhood obesity," "intervention," "nurs\*," "play," "community," "childhood," "obesity," "prevention of obesity," "afterschool programs prevent obesity", "how much time children spend in after school programs," and "physical activity of children attending afterschool programs." The terms were used singly and in combination to provide the greatest number of hits possible that could potentially answer the research question. Librarian services were utilized to expand the pool of articles available when searching. The combination of searches

yielded over 17,000 hits. The articles resulting from the searches were first scanned by title. If the titles appeared promising, the abstracts were scanned. Articles that appeared to offer information that would answer the research question were then scanned in full. Articles that met the above criteria were then critiqued for quality and rigor and the ability to answer the research question. Other inclusion criteria were a date range of 2012-2017, a population of children ages 2-19, English, full text available or able to borrow from another library, peer reviewed, and evidence based reports. The total number of articles that appeared to answer the research question and were deemed adequate to be part of the sample was thirty-six.

### **Findings**

This systematic research review sample includes thirty-six articles. The dates for the included studies were 2012-2017. These dates represented the most current research evidence available in the literature. The majority (30 studies) of the articles were quantitative (Ajja et al., 2014; Annesi, Walsh, Greenwood, Mareno, & Unruh-Rewkowski, 2017; Beets, Huberty, & Beighle, 2012; Beets, Weaver, Moore et al., 2014; Beets, Weaver, Turner-McGrievy et al., 2014; Beets et al., 2016; Behrens et al., 2015; Cadzow, Chambers, & Sandell, 2015; Crouter et al., 2015; Gatto, Martinez, Spuruijt-Metz, & Davis, 2017; Gatto, Ventura, Cook, Gyllenhammer, & Davis, 2012; Gesell et al., 2013; Gesell, Tesdahl, & Ruchman, 2012; Gortmaker et al., 2012; Isoldi, & Dolar, 2016; Kenney et al., 2014; Ling, Robbins, McCarthy, & Speck, 2015; London & Gurantz, 2013; McCall, 2016; Messiah et al., 2017; Pbert et al., 2016; Schuna Jr, Lauersdorf, Behrens, Liguori, & Liebert, 2013; Slusser et al., 2013; Weaver et al., 2016; Werner, Teufel, Holtgrave, & Brown, 2012; Wiecha, Hannon, & Meyer, 2013; Wofford et al., 2013;

Wong et al., 2016; Yin, Moore, Johnson, Vernon, & Gutin, 2012; Zarrett, Sorensen, & Cook, 2015), three were qualitative studies (Berge et al., 2016; Hastmann, Bopp, Fallon, Rosenkranz, & Dzewaltowski, 2013; Weaver et al., 2015), one was a systematic review (Temple, 2014), and two were mixed methods studies (Zhang, Shoham, Tesdahl, & Gesell, 2015; Zarrett, & Bell, 2014).

Table 1 provides basic demographic information for each study, including authors, year published, type of study, level of evidence, and interventions.

Table 1

Summarized findings

Author, Year	Type of Study/Level of Evidence	Sample Size	Interventions
Ajja, R. et al (2014)	Quantitative, (IV)	20 ASPs	-Assessment of PA & size of activity space (indoor & outdoor) or type of activity (free-play or organized) to ↑ MVPA
Annesi, J.J. et al. (2017)	Quantitative, (III)	114 children	-12 wk segments x 2 showed a ↓ BMI, ↑ MVPA, & exercise self-efficacy (cognitive behavior)
Beets, M.W. et al. (2012)	Quantitative, (IV)	25 ASPs	-Assessed average steps/min of PA to meet recommended guidelines via program leaders, counselors, & PA predictors
Beets, M.W. et al. (2014)	Quantitative, (III)	895 children	-Professional development of staff, online booster training
Beets, Weaver, Turner-McGrievy et al. (2014)	Quantitative, (II)	20 ASPs 1800 children	-To improve PA/ 30 min/day -Comparison of 1 yr/2 yr program, nutritional snacks/PA, training of staff, STEPS, HEPA, booster sessions, LET US Play. -Used three programs STEPS, HEPA, and LET US PLAY proving that the policies were cost effective.
Beets, M.W. et al. (2016)	Quantitative, (II)	20 ASPs 1800 children	-3 <sup>rd</sup> yr of study, 30 min MVPA/STEPS only intervention
Behrens, T.K. et al. (2015)	Quantitative, (IV)	5 schools 104 children	-Assess PA levels in relation to program leader interaction/lesson activity (management activities or game place) in low SES 3 <sup>rd</sup> -5 <sup>th</sup> graders in KIM program to ↑ LPA to MVPA/VPA
Berge, J.M. et al. (2016)	Qualitative, (III)	50 families	-6 wk parent/child community program of mild-moderate PA
Cadzow, R.B. et al. (2015)	Quantitative, (III)	2,259 students	-New PE curriculum & equipment to ↑PA, improvement of snack nutrition,



Author, Year	Type of Study/Level of Evidence	Sample Size	Interventions
Crouter, S.E. et al. (2015)	Quantitative, (III)	36 children	low SES -30 min wkly group nutritional education vs. 30 min wkly group nutritional education & GoKids Boston PA program to ↑PA.
Gatto, N. et al. (2017)	Quantitative, (II)	4 ASPs 172 children	-Teaching children 1x/wk for 12 wks gardening, nutritional value, & cooking intervention on dietary intake to ↓obesity/metabolic risk in Hispanic/Latino children
Gatto, N. et al. (2012)	Quantitative, (III)	34 intervention children, 70 control children	-Teaching children 1x/wk for 12 wks gardening, nutrition value, & cooking to ↑children's preference for fruits & vegetables/self-efficacy
Gesell, S. et al. (2013)	Quantitative, (III)	82 children	-Community ASPs have an ↑PA directed by parks dept.
Gesell, S.B. et al. (2012)	Quantitative, (III)	81 children	-Assessment of friendship's influence on PA levels in children
Gortmaker, S. et al. (2012)	Quantitative, (III)	32 sites	-Educating staff using the "Food & Fun After School" program to change the program's PA/>30 min/day
Hastmann, T. et al. (2013)	Qualitative (IV)	17 ASPs	-Continued education on how to keep kids active & eating health -Organized PA for the children with adult participation
Isoldi, K., & Dolar, V. (2016)	Quantitative, (III)	56 children	-Evaluate Cooking Up Energy effectiveness to ↓BMI, daily calorie & fruit & vegetable intake, & meal prep at home for Latino children
Kenney, E. et al. (2014)	Quantitative, (II)	20 ASPs	-Educate staff on how to write policy meeting the OSNAP requirements of 30 min/day of PA, not serving sugar sweetened beverages, offer water, & a fruit/vegetable at snack time
Ling, J. et al. (2015)	Quantitative, (III)	10 ASPs	-Observing how self-efficacy, parental influence, enjoyment, & environment ↑or↓PA in ASPs
London, R.A. et al. (2013)	Quantitative (III)	1,105 students	-PA focused program vs. enrichment program to ↑youth fitness & ↓obesity.
McCall, S. (2016)	Quantitative, (III)	9 children	-Cooking classes 1x/wk for 4 wks with 3 <sup>rd</sup> grade students to ↑nutritional knowledge
Messiah, S.E. et al. (2017)	Quantitative, (II)	34 parks	-Fit-2-Play (park-based ASP, children 6-14 yr) =60 min of PA & 20-30 min of education to ↑ cardiovascular & fitness health, & behaviors/knowledge outcomes & ↓ BMI/wt
Pbert, L. et al. (2016)	Quantitative, (II)	8 schools, 24 different sessions	-School-nurse cognitive-behavioral counseling + PA vs. wt management, diet, activity, & BMI in overweight & obese 9-12 <sup>th</sup> graders, CANFIT, F.I.T.T.
Schuna Jr, J.M et al. (2013)	Quantitative, (III)	4 schools 116 children	-Structured & unstructured PA of 3 <sup>rd</sup> -5 <sup>th</sup> graders in KIM program (two PA sessions/wk in low SES area) to assess ↑

Author, Year	Type of Study/Level of Evidence	Sample Size	Interventions
Slusser, W.M. et al. (2013)	Quantitative, (III)	8 sites (4 intervention sites and 4 control)	PA levels of different sexes & weight statuses on PA levels -Assess relationship between Catch Kids Club & ↑ in PA/nutrition choices & ↓ BMI of 3 <sup>rd</sup> -5 <sup>th</sup> grade children in a low SES area
Temple, M. et al. (2014)	Systematic research review (IV)	238 preschool children	-Cognitive/behavior--goal setting, monitoring progress, & acknowledgement of achievement, ↑ VPA & MVPA in 92% African American children.
Weaver, R. et al. (2016)	Quantitative, (III)	4 ASPs 500 children	-Consistent training of ASPs staff on how to eat healthy to set an example, & promoting PA by staff scheduling, encouraging, & participation
Weaver, R. et al. (2015)	Qualitative, (IV)	20 ASPs	-Staff organized physical games ↑PA instead of free play
Werner, D. et al. (2012)	Quantitative, (II)	760 children	-Active Generations program ↑ child fruit & vegetable consumption, nutrition knowledge, PA characteristics, & ability to sustain healthy behaviors
Wiecha, J. et al. (2013)	Quantitative, (II)	10 program sites	-Educating the ASP staff on promoting a healthy eating & PA 30 min/day
Wofford, L. et al. (2013)	Quantitative, (III)	46 children	-Tracking sedentary time, #hrs in HR ↑PA, & # sugar-sweetened drinks consumed daily -CASTLES, Nutrition & PA education -↑ health behaviors of African American youth.
Wong, W.W. et al. (2016)	Quantitative, (II)	877 children	-Healthy Kids Houston program for Hispanic & African American children 9-12 yr to promote healthy BMI, dietary habits, self-esteem, & MPA/VPA
Yin, Z. et al. (2012)	Quantitative, (II)	574 children	-Evaluate FitKid program – a volunteer, no-fee, afterschool obesity prevention program; to ↓% body fat & ↑ cardiorespiratory fitness
Zarrett, N. & Bell, B. A. (2014)	Mixed Methods, (III)	650 youth	-Evaluate LT effects of after school activities on BMI by surveys over 4yrs
Zarrett, N. et al. (2015)	Quantitative, (III)	7 ASPs	-Assessing what ↑PA & social motivation of minority & low SES youth in ASPs
Zhang, J. (2015)	Mixed methods, (IV)	2 ASPs	-Utilizing social network mapping & agent-based models to target specific children groups & ↑MVPA of children in low SES areas

The three most common intervention categories were nutritional education, physical activity, and staff training. Many articles reported on the use of nutritional

education to help prevent obesity in children (Beets, Weaver, Turner-McGrievy et al., 2014; Crouter et al., 2015; Gatto et al., 2012; Gatto et al., 2017; Isoldi & Dolar, 2016; McCall, 2016; Messiah et al., 2017; Slusser et al., 2013; Werner et al., 2012; Wofford et al., 2013; Wong et al., 2016). One study used dietetic interns to improve the nutrition benefits of the food served (Cadzow, Chambers, & Sandell, 2015).

Several studies implemented new PA programs to decrease the risk of childhood obesity and measured their effectiveness (Annesi et al., 2017; Beets, Weaver, Turner-McGrievy et al., 2014; Beets et al., 2016; Berge et al., 2016, Crouter et al., 2015; Slusser et al., 2013; Temple et al., 2014; Wong et al., 2016; Yin et al., 2012). Other studies measured PA in preexisting ASPs and the influencing factors, such as types of activity, activity environment, leader participation, parental influences, and enjoyment (Ajja et al., 2014; Beets, Huberty, & Beighle, 2012; Beets, Weaver, Turner-McGrievy et al., 2014, Beets, Weaver, Moore et al., 2014; Behrens et al., 2015; Gortmaker et al., 2012; Ling et al., 2015; Schuna et al., 2013). The importance of PA in preventing/lowering obesity was assessed in one study (London & Gurantz, 2013), and ASPs implemented in parks were used to monitor PA in children to decrease obesity risk in two other studies (Gesell et al., 2013; Messiah et al., 2017).

Some studies assessed the effect of social interactions and cognitive behaviors on PA (Gesell, Tesdahl, & Ruchman, 2012; Weaver et al., 2015; Zarrett, Sorensen, & Cook, 2015; Zhang et al., 2015). Other studies implemented health promotion teaching to improve overall health choices (Pbert et al., 2016; Werner et al., 2012; Wofford et al., 2013; Wong et al., 2016). One study showed the importance of consistent sports involvement in ASPs to decrease the risk for obesity (Zarrett & Bell, 2014). Staff

education was also used to prepare the ASP staff for new programs and interventions and improve outcomes of interventions (Beets, Weaver, Moore et al., 2014; Beets, Weaver, Turner-McGrievy et al., 2014; Gortmaker et al., 2012; Hastmann et al., 2013; Kenney et al., 2014; Slusser et al., 2013; Weaver et al., 2016; Wiecha, Hannon, & Meyer, 2013).

## **Discussion**

### **Nutritional Education**

ASPs are teaching nutritional education due to the prevalence of childhood obesity. Some studies found a hands-on teaching approach was the best way to improve children's retention (Gatto et al., 2017; Gatto et al., 2012; McCall 2016; Slusser et al., 2013 Werner et al., 2012). The LA Sprouts ASP, which targeted Hispanic and Latino children, sought to use gardening, nutritional classes, and cooking lessons once a week for twelve sessions. To decrease obesity and metabolic risk factors, the study emphasized children's self-efficacy in their personal preference for fruits and vegetables. Children chose an increase in vegetables instead of fruit, and 54% of the participants stated that garden vegetables tasted better than store bought vegetables (Gatto et al., 2012). Children's self-efficacy, specifically how positive "attitudes, preferences, and motivations," affected an increase in eating fruits and vegetables (p. 917). A later study of the same ASP showed a decrease in BMI z-score and waist circumference and an increase in fiber and whole grain consumption (Gatto et al., 2017).

Four studies focused on improving nutritional education in children in ASPs (McCall, 2016; Slusser et al., 2013; Werner et al., 2012; Beets, Weaver, Turner-McGrievy et al., 2014). McCall (2016) reported an increase in children's nutritional knowledge during a four-week study that implemented a different theme each week,

focusing on choosing colorful fruits and vegetables, selecting low sugar drinks, preparing nutritious snacks, and selecting whole grains. Another study implemented the Catch Kids Club program to improve nutritional knowledge and hands-on skills for children to make good nutritional choices, lowering the consumption of non-nutritious foods, and improving overall nutrition knowledge. The results of fruit and vegetable consumption did not meet the recommended servings per day, and an increase in juice consumption was noted. However, the study did show a lesser percentage of juice consumption in the children participating in the Catch Kids Club compared to non-participants (Slusser et al., 2013).

The Active Generations program implemented 10 lessons of approximately 60 minutes of nutrition education and activities per lesson. Lesson content included reading food labels, ways to include fruits and vegetables into meals, basic health literacy, and making healthy snacks. The results stated increased fruit and vegetable intake, and children reported reading food labels more often, knowing of which foods to eat less, and understanding how nutrition relates to disease (Werner et al., 2012). The STEPS-HE program focused on interventions, such as increasing fruit and vegetables served for snack, offering water only, serving unflavored grains, and decreasing sugar based foods. The program showed that nutritional education in ASPs can be cost effective; therefore, providing value in increasing nutritional programs for children (Beets, Weaver, Turner-McGrievy et al., 2014).

While not all of the learning outcomes were improved, the program interventions affected an increase in nutritional learning for children in ASPs. Programs used lecture based nutritional education to instruct the children (Isoldi & Dolar, 2016; Messiah et al.,

2017; Pbert et al., 2016). The Cooking Up Energy program taught cooking and nutrition lessons to Latino children. The significance of the study stated a decrease in daily calorie intake, a decrease in BMI, and healthy food can taste delicious. The fruit and vegetable intake remained the same in the participants (Isoldi & Dolar, 2016). The Fit-2-Play™ park-based ASP improved health and nutrition knowledge in all participants, shown in pre- and post-program test scores, by implementing 20-60 minutes of nutrition education per week (Messiah et al., 2017).

Through a school nurse delivered interventional program, specific nutritional education was given regarding eating adequate amounts of fruits and vegetables, avoiding sugar-filled beverages, consuming three meals a day, eating breakfast, stopping when hunger is satisfied, and choosing correct portion sizes. The weekly nurse-student sessions lasted 30 minutes for six weeks. Results found that the students did report an increase in breakfast consumption, and no change in other targeted behaviors (Pbert et al., 2016).

The Healthy Kids-Houston program implemented two 30-minute nutrition education sessions per week yet generated no positive changes in diet (Wong et al., 2016). The CASTLES program aimed to enhance health knowledge, PA, and healthy behaviors with particular interventions such as homework assistance, daily health lectures reinforced with additional nutrition information, team building, and PA. Lectures focused on increasing water intake, decreasing sugar-sweetened beverage consumption, increasing fruits and vegetable intake, and promoting PA through a healthy meal plan. Results of the study found that the CASTLES program increased health information attained by the students and decreased sugar-sweetened beverages consumed from a mean of 3.8 drinks a day to 1.2 drinks a day (Wofford et al., 2013).

## **Physical Activity**

Physical activity (PA) is one of the most common interventions that ASPs use to decrease the prevalence and risk of obesity in children (Annesi et al., 2017; Beets, Weaver, Turner-McGrievy et al., 2014; Beets et al., 2016; Berge et al., 2016; Yin et al., 2012; Zarrett & Bell, 2014). The evaluation of the FitKid program, a free, voluntary ASP to prevent obesity by targeting children's body fat percentage and cardiorespiratory fitness, reported that children's participation for at least two days a week decreased percentage of body fat and waist circumference and increased cardiorespiratory fitness. The benefits were lost over the three months of summer when the program was not in session. The study defined BMI as an inadequate measure of a child's weight status and may result in misleading findings due to increased fat-free mass and bone mass from vigorous physical activity (VPA) (Yin et al., 2012).

Another study demonstrated how the choice of after school activity can affect risk for obesity over a three-year period. The study researched multiple activities, at least two years in non-sports organized activity, at least two years in a sports-dominant activity, at least two years in low physical activity (LPA), and one year in organized activities or sports teams. The results showed only the adolescents who participated in a sports-dominant activity for two or more years had a decreased risk of obesity (Zarrett & Bell, 2014).

Benefits of park based ASPs were noted. The intervention of placing children in a community park based ASP resulted in an increase of the children's total PA by 6% contrary to school-based ASP where a decrease of 6.8% of total PA was recorded (Gesell et al., 2013). Total PA includes moderate to vigorous physical activity (MVPA). The Fit-

2-Play™ park based ASP decreased the BMI of the obese and overweight participants; increased endurance and muscle strength in all groups of participants; and decreased blood pressure, rates of pre-hypertension, and rates of hypertension, particularly among overweight and obese participants (Messiah et al., 2017).

These studies reported increase in MVPA among children. Beets, Weaver, Turner-McGrievy et al. (2014) reported on three programs, LET US Play, STEPS-PA, and Healthy Eating Physical Activity (HEPA), for two years using 30 minutes of MVPA daily. Results proved that using structure within the policies produced cost effectiveness for ASPs. Beets (2016) continued the study for a third year. The interventions of all three programs reported 11.1% of the participants increased to 30 minutes of MVPA daily. Temple et al. (2014) implemented behaviors of goal setting, monitoring progress, and acknowledgement of achievement and produced an increase in VPA and MVPA in preschool children. A quantitative study of 114 children showed the correlation of a 3.65% decrease in BMI to increase exercise self-efficacy by implementing 30 minutes per day of MVPA for all children (Annesi et al., 2017).

The Play It Forward! intervention program incorporated large neighborhood events, "break-out events, and organic/small group" events for the community to encourage and incorporate PA (Berge et al., 2016, p. 23). Results show a high practicability and satisfaction with the Play It Forward! childhood obesity prevention community-based participatory research intervention. The program was highly attended; however, there is no specific evidence that childhood obesity was prevented or decreased (Berge et al., 2016).



One study found that supervision, staff participation in PA, staff led PA, transportable equipment, and friend participation through PA motivated youth in ASPs to begin or increase participation (Zarrett, Sorensen, & Cook, 2015). Another study's research found that free play is not a useful way for all kids to participate in PA while in an ASP. During organized PA the staff was more likely to verbally encourage PA, play along, and make equipment available which increased the children's PA level (Weaver et al., 2015).

An ASP offered in a low-income school district used new physical education equipment such as strength training equipment, sport walls, and cardio equipment; implemented new curriculum; composed nutritious snacks with the help of dietetic interns; and eliminated sugar-filled caffeinated beverages to help students lose weight. Over the three years that these interventions were implemented there was a reduction in BMI, and the mean percentile of overweight students decreased (Cadzow, Chambers, & Sandell, 2015).

Crouter et al., (2015) reported forty-two children were assigned to either a weekly nutrition education group or to a weekly nutrition education plus PA group. The nutrition only group consisted of a weekly 30-minute group nutrition education of 15-minute lecture followed by 15 minutes of interactive activities and a healthy eating and motivational advisement pamphlet. In the nutrition plus PA group the children were given nutritional education identical to the nutrition only group but also received a 60 minutes PA program at GoKids Boston, using cardio machines, weights and strength resistant machines, and exergaming. The nutrition plus PA group achieved 25 more minutes of MVPA daily compared to the nutrition only group whereas the nutrition only

group demonstrated prolonged periods of sedentary behaviors. BMI and other cardiovascular risk factors were not heavily affected in this study (Crouter et al., 2015).

Studies revealed teacher interaction, productivity of time, structured programs, and gender were characteristics that influenced an increase from LPA to VPA. Participants of the KIM program in an ASP participated in more than 20 minutes of MVPA, though most of the 45 to 60 minute program time was spent standing or walking (Schuna et al., 2013). Another study of the same program revealed an average 37 minutes spent in PA though 17 of those minutes were spent in LPA. Teacher interaction and promotion of PA was positively associated with MVPA and negatively associated with sedentary activity levels. Time that was managed and controlled by the program was associated with the same findings. Playing games increased LPA but decreased MVPA which was contrary to previous study findings (Behrens et al., 2015). One study revealed that children only participate in 26 minutes of PA in the 125 minutes spent in an ASP per day, with boys and healthy weight children generating more steps and active minutes than girls and obese children, respectively (Beets, Huberty, & Beighle, 2012). Another study that observed PA within ASPs recorded an average 24 minutes and 18 minutes of PA for boys and girls, respectively. The study found that the available area for activities did not significantly influence the amount of PA; however, the type of activities and the context did significantly influence PA. Outdoor free-play was linked with more PA whereas indoor free-play was linked with increased sedentary activity (Ajja et al., 2014).

A social networking study revealed that targeting opinion leaders in children social groups was more effective in increasing overall PA than targeting random or the most sedentary children. Targeting low-activity children showed the greatest increase in

PA within this group; however, targeting more popular children increased PA more overall (Zhang et al., 2015). The study found that self-efficacy affected PA and pedometer steps, parental guidance affected only pedometer steps, and enjoyment only affected the self-report of PA, not the activity (Ling et al., 2015). In addition, another study sought to find if friendship had an influence on PA levels. Results found that children did not create or lose friendships based on PA levels. Friendships that were already established were heavily altered by the child's level of PA. A child's MVPA level in an ASP was greatly affected by the activity level of the child's closest friends as seen by children making changes in activity levels with a mean of 10% to match activity levels of their friends (Gesell, Tesdahl, & Ruchman, 2012).

Wofford et al., (2013) stated that the CASTLES program tracked the amount of time spent in sedentary activity, and the staff taught children a daily health lesson with a goal towards increasing PA. As a result, children minimized time spent watching TV, increased health information attainment, and increased PA from 30.3% to 54.5% of children exercising 60 minutes or more per day (Wofford et al., 2013). Participants of the Active Generations ASP reported decreased daily screen time and increased confidence in PA ability, though no significant increase in PA engagement was reported (Werner et al., 2012). The Healthy Kids-Houston program led to improvements in the perception of needed PA to counteract fast food meals; however, no BMI or improvements in weight or PA levels were noted despite 90 minutes of structured PA twice a week (Wong et al., 2016).

London & Gurantz (2013) sought to determine if ASPs directed towards increasing opportunity for PA would decrease obesity rates and enhance physical fitness.

One program of the study was an enrichment program with no specific PA component. Another program created was specific towards PA and included activities such as basketball, dance, and yoga. Female overweight status did not decrease as significantly as males. Involvement in a PA ASP resulted in a 10% increase in the likelihood of succeeding in the physical fitness exam at the end of two years. Children involved in the PA program for two years increased physical fitness compared to children involved in a one-year program (London & Gurantz, 2013).

A school-based PA program entailed three afterschool sessions per week for eight months with the goal to increase exercise gratification. Intervention sessions were modeled by the CANFIT program and were delivered by school nurses, physical education teachers, and other school staff members. The CANFIT program includes group sports, games, and dance, with the goal of increased enjoyment of exercise for the students. Students were educated regarding the F.I.T.T. principles. Each session included a warm-up, instructions, MVPA, and a cool-down. The results found that there was not a difference in BMI, percent body fat, or waist circumference in the intervention group. The mean number of days per week that the students reported exercising was 4.53 days for the intervention group and 3.64 for the control group. Recent findings suggest that high intensity exercise is necessary for notable change in weight loss (Pbert et al., 2016). Another study that showed no positive PA results was The Catch Kids Club. The Catch Kids Club revealed no noted differences between the intervention and control group in regards to PA, though the rate of obesity did decrease by 3.1% in the intervention group compared to a 2% decrease in the control group which only implemented activities that were not well-defined or monitored (Slusser et al., 2013).

## **Staff Training**

Staff training was another intervention that allowed ASPs to be implemented and sustained (Beets, Weaver, Moore et al., 2014; Beets, Weaver, Turner-McGrievy et al., 2014; Gortmaker et al., 2012; Kenney et al., 2014; Slusser et al., 2013; Weaver et al., 2016; Wiecha, Hannon, & Meyer, 2013). One study utilized the A+ Quality Improvement Toolkit to educate staff on how to meet the health promotion standards. The 11 programs being studied set healthy eating and PA goals of which 6 ASPs fully met, 1 ASP showed improvement, 3 ASPs were unaffected, and 1 ASP declined to answer concerning results. The A+ Toolkit assisted ASPs in meeting the health promotion standards related to obesity prevention (Wiecha, Hannon, & Meyer, 2013).

A study using the Food and Fun After School program educated ASP staff concerning the 30 minutes a day of PA minimum through lessons, handouts, and emails, resulting in 10 minutes per day more MVPA in the intervention group (Gortmaker et al., 2012). One 6-hour training and 36 booster sessions per semester were used to train ASP staff on LET US PLAY which improved PA to 30 minutes a day. The results of the 2-year study showed that 49.6% of boys and 29.3% of girls met the 30 minutes a day recommendation and an increase of PA of 21.6% for boys and 16% for girls from baseline was noted (Beets, Weaver, Moore et al., 2014).

The Weaver et al. (2016) study educated staff concerning healthy eating and PA standards with a 3-hour PA and 2-hour nutrition training. The research demonstrated that ongoing healthy lifestyle training for ASP staff improves the health environment of the ASP, and staff education increased healthy eating and PA. Positive results were found despite the high turnover of staff that the ASPs experienced (Weaver et al., 2016).

The Catch Kids Club intervention sites implemented two days of staff training in the areas of nutrition, PA, curriculum, and mentoring or assistance visits. The results were decreased consumption of non-nutritious food, increase consumption of juice, and a greater decrease of obesity compared to children in the control ASPs. However, no differences in PA levels were noted, and fruit and vegetable intake remained below recommended amounts (Slusser et al., 2013).

Programs were created that emphasized nutritional education for ASP staff members. Weekly nutritional education to staff was implemented, and the staff was also educated regarding the importance of abstaining from consuming unhealthy foods during the program session, and to educate the children of healthy eating habits during snack time once a week. To ensure adequate nutritional education was consistently delivered, the staff was required to attend booster sessions throughout the program. However, this intervention did not generate specific results in the study (Beets, Weaver, Turner-McGrievy et al., 2014).

One study had negative results in staff training. This study implemented the HOP’N program to educate the staff in order to increase child activity minutes to the 30 active minutes a day standard. Staff reported feelings of success due to increased child PA opportunities; however, the goal was not met. The HOP’N program guidelines on providing fruits and vegetables at each daily snack time were taught to staff but not met in this study (Hastmann et al., 2013).

Teaching the staff to write policies related to the Out of School Nutrition and PA was successful. The intervention group wrote 31 new policy documents compared to the 13 made by the control group (Kenney et al., 2014).

## **Implications**

### **Education**

The main implications of our findings are community education done by nurses concerning childhood obesity and the impact that ASPs have on childhood obesity. Based on the findings, the combination of PA, nutrition education, and adequate staff training within ASPs results in a decrease in childhood obesity. By integrating these interventions within ASPs, community ASPs can change the upward trend of childhood obesity.

This study impacts nursing education by showing both basic and complex nursing interventions that can be implemented with limited resources and basic knowledge concerning childhood obesity and ASPs. Nursing students would benefit from education on the importance of ASPs in the sphere of community health to decrease childhood obesity. Education for nursing students can also be affected by including more information on nutritional education for children and their families to improve food choices. Nursing students would gain knowledge on the importance of PA to decrease a child's BMI while also improving fitness levels. Nursing students would benefit from understanding the differences between levels of PA and knowing MVPA-VPA was most beneficial to children's health. Nursing students need to realize the importance of education within the community and the continuing effect that leader or staff education can have on whole communities of children and adults by supporting the continuation of ASPs.

### **Practice**

Community nursing practice is strengthened by these findings by increasing resources and information available to nurses regarding interventions available to reduce

childhood obesity. By knowing that hands-on nutritional education resulted in the greatest retention, MVPA and VPA resulted in the largest decrease in BMI, and staff training in ASPs resulted in increased benefits of the programs towards reducing childhood obesity, nurses will be able to positively impact the community. Nurses provide insight and recommendations to ASPs, community programs, and school programs concerning specific interventions that ASPs can implement to accomplish the most change in childhood obesity. Potential barriers of nursing practice could be a lack of nurses involved in ASPs and their structuring, the cost of implementing and training for a new program, limited resources available to the ASP program, a high turnover of ASP staff requiring continual training, and the education level of the staff being able to implement the interventions.

The effects of ASPs on childhood obesity can significantly reduce the prevalence of comorbidities and future illnesses related to obesity. The educational interventions of ASPs will enhance children's health literacy related to nutrition and PA. During an inpatient stay, the nurse will focus more on the immediate health status of the child and review the importance of a healthy lifestyle at discharge instructions. Staff education allows nurses to delegate the responsibility of nutritional education and physical activity within ASPs, enabling the nurse to better evaluate the effectiveness of the interventions aimed at decreasing obesity in the children. The ASP staff were able to be role models for the children and produce more positive results to the interventions after receiving education on structured programs to decrease the risk of childhood obesity. The interdisciplinary team in ASPs functions together to provide the best program possible. The nurse and staff plan the activities together before the staff implements them with the



children. The nurse will then review the program and activities to ensure goals are being met.

### **Future Research**

Future research could be enhanced by researching ways ASPs can educate the family on decreasing childhood obesity in the home. Researchers can develop steps that ASP staff can motivate children to participate in PA. Staff training was a common intervention, performed many different ways. Types of staff training included training only at the beginning of the program or training at the beginning with additional training throughout the duration of the program. Further research could discover which method of staff training is most successful in producing positive results within ASPs. Future research could review more longitudinal studies to better understand the lasting effects that ASPs can have to decrease obesity versus short term results. There is a lack of research regarding the effect of the summer months, during which some ASPs are not in session, on the retention of positive results. The specific aspects and results of nutritional education should be better documented in future research, as well as the monitoring of calorie consumption and snacks served in an ASP. Areas for future research also include the long-term results of a child involved in an ASP and the influence of developing positive healthy habits through adulthood.

### **Strengths and Limitations**

Strengths of this research review include a large amount of literature, weekly lectures to enhance and strengthen research knowledge, and ten months to complete the research process. Interest for this topic stemmed from the researchers' collective passion in pediatric nursing, community involvement in nursing, and the desire to make a lasting

impact in the lives of patients. The four BSN student researchers were advised by Mrs. Corie VanArsdale, RN, MSN, a faculty member for Oral Roberts University who has extensive experience in nursing research.

Limitations include multiple responsibilities concurrently while working on the research, time constraints to focus on writing the paper, and nursing students' inexperience in the research process. Other limitations include a limited availability of current research on the topic due to use of full text, English articles only, and inclusion of articles pertaining to the United States only.

There is a potential for sample bias due to limitation of databases available to the researchers and some databases being more difficult to use than others. Researcher bias may have focused or slanted research findings towards a certain result unintentionally. Researchers may have experienced bias towards articles featuring VPA believing it is the best way to decrease childhood obesity. Researches may also have had a bias towards different ethnic groups being more at risk of obesity or low SES. Any of these biases may have affected how the research study was conducted or findings were interpreted.

### **Recommendations**

Recommendations for further study include more information in clinical guidelines concerning ASPs and community programs. The National Guidelines Clearing House stated that practitioners should encourage the use of ASPs (NGC, 2013). More guidelines need to be created in terms of the use of ASPs in obesity prevention. Time spent in school can also be targeted for obesity prevention as urban school students have been shown to have a lower BMI than rural students (Miyazaki & Stack, 2015). Further research should include the effects of government school meal programs on lowering

BMI. Guidelines could also be created to uniform the interventions implemented by the ASPs to decrease childhood obesity.

Recommendations to further strengthen and improve this study would be to spend more time researching and compiling information, to use more extensive databases, to reduce extended breaks in the research process and extraneous distractions, and to utilize a larger research team to expand sample size and decrease workload. Broadening the limiters to include more aspects of community care, pediatric care, and childhood obesity would result in a more comprehensive view of the effects of ASPs. Including articles from outside of the United States would have allowed this study to broaden its research base to include articles focused on implementing ASPs globally. A study implemented in a low SES area in Australia demonstrated how a highly enjoyable ASP was easy to implement in low SES areas. Activities focusing on practical skills and self-efficacy were relevant to the population and contributed to the enjoyment of the ASP. (Burrows, Bray, Morgan, & Collins, 2013). An article from South Korea showed decreased waist circumference and arterial thickness as well as increased oxygen in obese children through the implementation of a combined aerobic and resistance training ASP (Park et al., 2012). The reliability and validity of this systematic research review will be verified through future research on the same identified health need and confirming results from multiple studies included in this review.

### **Conclusion**

Childhood obesity has come to the forefront of pediatric health concerns. The purpose of this systematic research review was to determine the nursing interventions that decrease the risk of childhood obesity in ASPs. The results of this study indicate that a

combination of PA and nutritional education produces the most significant results in decreasing the risk and prevalence of childhood obesity. MVPA and VPA were found to be most beneficial in decreasing the prevalence and risk of obesity out of the different levels of PA. Hands-on nutritional educations showed the greatest rate of retention in the children. Staff training with additional booster sessions throughout the program was the most beneficial. The large sample size was highly representative of the available literature, rendering the results more accurate. The results of the study answered the research question, and the interventions may be implemented within school programs, within the adult population, and internationally. ASPs are effective means to reduce childhood obesity through the implementation of healthy interventions, such as PA, which may be neglected in schools due to lack of available time. Nurses are in an ideal position to impact childhood obesity by creating healthy programs that encompass the whole family. Nurses actively involved in ASPs positively impact the development of the nutrition, PA, and staff training, resulting in improved outcomes for the participants.

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