Summer 8-25-2019

Identifying Pediatric Obesity in the Retail Health Setting and Implications for Quality

Jodie Nicole Guardi
DePaul University, joguardi@hotmail.com

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Improvement Measures

Jodie N. Guardi, DNP-S

DePaul University

Corresponding Author:

Jodie Guardi

1575 W. Wiesbrook Road

Wheaton, Illinois 60189

Abstract

Introduction. Pediatric obesity has reached an epidemic status. The purpose of this study was to examine the prevalence of overweight and obese patients, as well as how often and how accurately a diagnosis was coded. The population for this study included children ages 3-18. This cohort presented to retail health clinics in a large urban health system for school or sports physicals from June 1, 2017 to November 30, 2017. *Method.* A retrospective chart review was conducted. Statistical analysis was performed to determine if there was a relationship between obesity and age, ethnicity, race, and gender. *Results.* The study identified 15.9% of patients were overweight and 16.5% were obese. In practice, <1% of patients had a formal diagnosis of overweight or obese; <1% had screening measures reflecting nutrition and physical activity. *Conclusion.* Strategies are needed to improve efforts to diagnose and manage overweight and obese pediatric patients. Organizational recommendations for change are suggested based on guidelines for childhood obesity.

Keywords: body mass index percentage, overweight, obesity, pediatrics, retail health

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Improvement Measures

Childhood obesity is a major public health concern facing the United States, and it affects children at alarming rates. Centers for Disease Control and Prevention (CDC) (2018a) reports that 13.7 million children ages 2-19 are obese. Since the 1970s, the number of children with obesity has tripled (CDC, 2018b). Healthy People 2020 (HP2020), the national framework for a healthier population, addresses specific objectives for nutrition and weight status uniquely related to children as areas for improvement (Offices of Disease Prevention and Health Promotion [ODPHP], 2018). One of the objectives of HP2020 is to reduce the proportion of children who are obese. Sadly, despite setting the goal at a childhood obesity prevalence rate of 14.6%, the US has moved in the opposite direction. The baseline for this goal, established during the timeframe 2005-2008, was 16.1%, but it increased to 17.8% by 2016 (ODPHP, 2018). The surge in the proportion of children who are overweight begs the question of whether providers are managing overweight and obese children according to guidelines.

Prevention and early treatment are imperative for weight reduction and improvement in health outcomes for overweight and obese children. The CDC (2018a) defines children with a body mass index (BMI) percentile of 85-94% as overweight, and those with a BMI percentile above 95% as obese. It is well-established that, if not managed, overweight and obesity can lead to serious short- and long-term consequences, including increased glucose intolerance, insulin resistance, diabetes, cancer, hypertension, cholesterol, and psychosocial disorders in pediatric patients (CDC, 2016). Nonetheless, obesity is a preventable and treatable condition that can be managed through healthy diet and exercise (ODPHP, 2019).

The alarming prevalence of childhood obesity demonstrates the importance of all healthcare professionals' active engagement of children and parents in awareness and management of their risk. One avenue to approach this challenge is the retail health space. Exploring what can be done to address childhood obesity in retail health is important because these clinics are common settings for healthcare professionals to engage children and parents. The retail healthcare model is based on convenience for patients who are seeking care for low-severity acute illnesses and preventive services such as physicals and immunizations. While this model provides convenience, it lacks continuity of care, which could lead to inadequate diagnosis and management of overweight or obesity. It is important to understand how these conditions are currently identified and managed in the retail health setting. In order to address the childhood obesity crisis, every opportunity and setting of care must be leveraged to provide an accurate diagnosis and deliver evidence-based management strategies.

Currently, evidence-based literature aimed at diagnosis and management of childhood obesity in the retail health setting is lacking, despite the emerging impact of this setting and its role in health care delivery. Literature addressing childhood obesity focuses on provider behaviors in the pediatric and primary care settings; none is devoted to retail health. The purpose of this study was to better understand how often and how accurately an overweight or obesity diagnosis is made in a retail health setting, as well as if patients are being managed according to current guidelines. This information is utilized to assess how healthcare professionals manage overweight and obesity in pediatric populations in retail healthcare settings to determine if any further changes to practice should be recommended.

Methods

Study Design/Sample. This study utilized secondary data analysis. The researcher sought to answer research questions by examining provider behaviors. Data collection was accomplished through a retrospective chart review utilizing the electronic health records (EHR) of patients that presented to Chicago-area retail health clinics from June 1, 2017 through November 30, 2017. Inclusion criteria for the project were that children needed to be 3-18 years old at the time of their encounter, presenting to the clinic for school or sport physicals. Any subjects outside of the age range and those who presented for reasons other than school and sports physicals were excluded.

Setting. The geographical setting for this project was retail health clinics that are part of a large healthcare system located in Chicago and its suburbs. There are 56 clinics and approximately 120 providers, not including the float resource pool. Dependent on clinic volume, clinics are staffed by one to two nurse practitioners and a medical assistant. Clinics are open regular business hours as well as weekends. Services include low-severity acute care visits, immunizations, and physicals.

Ethical Considerations. This project was approved by the Institutional Review Boards at DePaul University and at the healthcare system where the data collection was performed. To protect the identity of the pediatric patients in the retrospective chart review, data collection was conducted by a data abstractor from the healthcare system. No patient identifiers or identifying information were collected or provided to the primary investigator. The data that were held on the primary investigator's password-protected laptop will be retained and kept secure.

Data Collection Procedures. A data abstractor was assigned to this project by the healthcare system where this study was conducted. The abstractor collected the information

requested, including age, weight, height, BMI percentile, gender, race and ethnicity. The EHR

was equipped with a function that auto-populated BMI percentile after height and weight

measurements were entered in the vitals section. If data revealed a BMI percentile over 85%,

then the patient encounter was further evaluated for the following components: nutrition screen,

physical activity screen, and a formal diagnosis of overweight or obesity. This information was

also collected by the abstractor. Diagnoses are represented by the ICD-10 code of E66 for

overweight and obesity, which can be found in the problems and charges sections of the EHR.

The data were provided to the primary investigator in a Microsoft Excel spreadsheet.

For this project, the variables, including BMI percentile, age, race, and ethnicity, were

measured. Additionally, provider behaviors were also considered, including whether a formal

diagnosis was given and whether physical activity and nutrition screening measures were

performed. All clinics were equipped with the same measurement tool for height and weight, as

well as the same EHR for inputting data and charting patient diagnoses and management. It is

uncertain whether the measurement tools are routinely calibrated, which could potentially skew

results.

Reliability and validity of data in patient charts can be inconsistent due to factors

influencing the measurement of the height and weight, including patient cooperation, correct data

entry, and staff members' use of proper technique to measure patients. Additionally, providers

vary as to whether they chart patients' diagnosis and management. Providers may discuss weight

status or management with a patient and caregiver without charting accordingly.

Data Analytic Procedures. Data collected from the retrospective chart review were

collected in a Microsoft Excel spreadsheet, which was imported into Statistical Package for the

Social Sciences (SPSS) software, version 25, for organization and statistical analysis. Descriptive

statistics, chi squares and logistic regression were used to analyze the data.

Results

Of potential participants, 2,570 subjects met the criteria for the study. Of these subjects,

62.9% (n = 1683) were between the 5th and 84th BMI percentile, 2.0% (n=53) were under the 5th

BMI percentile. The remaining 31% of subjects had a BMI greater than or equal to 85%, with

15.3% (n=409) overweight and an overall obesity rate of 15.9% (n=425). Characteristics of the

sample are presented in Table 1. Female subjects of this study represented a weight status of

16.9% overweight and 13.7% obese; male subjects represented a weight status of 15.0%

overweight and 18.9% obese (Table 2). Of those ages 12-18, 18.2% of males and 12.9% of

females were obese. Most of the sample (86.7%) were between 12 and18 years old, and over half

(63.6%) were non-Hispanic white children. Of the 834 subjects found to have a BMI percentile

representing an overweight or obese status, over 99% were missing physical activity and

nutrition screening in their charts. Similarly, 99% (n=8) of overweight or obese subjects did not

have a formal diagnosis of the ICD-10-CM Code E66: Overweight and obesity. Notably, all the

patients who received a formal diagnosis were in the 99th BMI percentile.

Logistic regression analysis was completed to assess the relationship of gender, ethnicity,

race, and age groups in order to predict the odds of a patient having a BMI percentile over 85%.

The model included dummy variables for (1) the race of 'others' contrasted against the majority

White race group, (2) the age group of participants between 12 and 18, who represent the largest

number of subjects contrasted against 'other' age groups, and (3) Hispanic ethnicity contrasted

against 'other' ethnicities. This model excluded subjects who were missing ethnicity

information. No statistically significant relationships were observed between ethnicity and BMI

percentile (p<.258). Gender and BMI percentile are nearly significantly related to the odds of

having a BMI percentile over 85% (p<.057). Finally, race (p<.001) and age group (p<.015) were

significantly associated with BMI percentile.

Discussion

The purpose of this study was to better understand how often and how accurately an

overweight or obesity diagnosis is made, as well as if children are being screened for nutritional

and physical activity habits during school and sports physicals. An additional purpose was to

suggest changes to practice using current guidelines. Key findings showed that the rate of obesity

in the study sample was 15.9%, which is higher than the HP2020 goal of 14.6%. Despite a high

rate of BMI percentile documentation in the chart (96.1%), 99% of subjects did not receive a

formal obesity diagnosis, and 99% were missing screening measures.

The study showed that 96.1% of participants had a BMI percentile documented in the

chart. The EHR auto-populated BMI percentile when height and weight were recorded. It is

likely that the auto-population function drove the high rate of documentation of BMI percentile,

not deliberate action by the healthcare professional. The 3.9% of subjects that did not have a

BMI percentile in their chart were missing the required weight and/or height vital sign entry,

which prevented the EHR from calculating the BMI percentile. Despite the BMI percentile being

readily available through the auto-populate function, 99% of subjects did not receive a formal

obesity diagnosis. A finding of note in this study was that all subjects who were formally

diagnosed were in the 99th BMI percentile. This categorizes them at the highest level of obesity.

Conceivably, providers visually recognized these patients to be obese and felt compelled to give

a formal diagnosis and discuss the issue with the patients and caregivers.

This study also found that 99% of overweight and obese subjects were missing physical activity screening and nutrition screening in their charts. The rate of screening measures and formal diagnosis is significantly lower than results found elsewhere in the literature. In a similar study, Reyes (2015) sought to determine if providers were accurately identifying overweight and obese children and managing them according to the American Academy of Pediatrics guidelines. Of the 255 charts reviewed, only 34% of patients were accurately diagnosed as overweight or obese, and only 11% and 26% respectively were managed with lifestyle modification recommendations (Reyes, 2015). While Reyes reported higher rates of documentation than observed here, both studies show that practitioners can improve on diagnosis and management of overweight and obese children.

Formal diagnoses and screenings are imperative to help patients and their families identify areas where changes could be made and to support them in setting goals for healthier lifestyles. Improving provider behaviors could help bring us closer to achieving the goals set in HP2020. Studies suggest that more education in advanced practice nursing curricula is needed to increase comfort level in managing obesity. Fruh et al. (2019) found that only half of advanced practice nursing students felt that their programs prepared them at a moderate or high level to manage obesity confidently. Providing educational programs designed to improve providers' assurance in obesity management could be a good strategy to improve diagnosis and management of overweight and obese patients. Future studies designed to identify provider barriers to physical activity and nutrition screenings would likely be valuable as well.

The study sample was compared to recent Illinois and national reports for childhood obesity prevalence, and all were found to have similar results. The Illinois Department of Public Health (IDPH) (2016) reports that over one-third (33.6%) of Illinois children ages 10 to 17 are

overweight or obese. Similarly, results from the 2015-2016 National Health and Nutrition

Examination Survey (NHANES) estimated the overweight and obesity rate to be 35.1% among

U.S. children ages 2-19 (Fryar, Carroll & Ogden, 2018). The obesity rate found in this study is

slightly below the U.S. and Illinois average, at 31.2%.

When looking at obese subjects separately from overweight subjects, both the study

sample and the NHANES data sample show that the HP2020 objective of reducing the

prevalence of obesity to less than 14.6% is not being met. The obese subjects in this study

represented an overall obesity rate of 15.6%. Males in this study were found to be more obese

than females and had a higher obesity rate than the HP2020 goal of 14.6% (Table 2). However,

the male and female obesity rates are lower than the reported NHANES national data both for

all ages grouped together (Figure 1) and for subjects over 12 years old (Figure 2). Hispanic

subjects in the study sample also had a lower obesity rate than the NHANES national data for

Hispanic males and females (Figure 3).

One reason for these differences in obesity rate could be that children examined in this

study were seen for sports physicals as well as school physicals. Since physical activity leads to

a healthier weight status, study participants could be of a lower weight status due to the physical

activity from sports participation. Another reason for these differences might be race and

ethnicity: a majority of patients seen at the clinics were of white race and non-Hispanic

ethnicity. One final reason could be that subjects for the study sample ranged in age from 3 to

18, while the NHANES subjects ranged in age from 2 to 19. However, the NHANES data offer

a good basis for comparison, even if its inclusion criteria were slightly different.

The retail health setting focuses on treating acute illnesses and providing preventive

services, such as vaccines and physicals. Although retail health providers generally do not

manage overweight and obese patients, every patient encounter could serve as an opportunity to actively engage at-risk children and their families. The results of this study revealed a high prevalence of overweight and obese pediatric patients in the retail health setting. These results represent a need for change in order to improve the quality of care delivered to overweight and obese patients. Although the retail health setting is not the ideal location to treat overweight and obesity in children, making the diagnosis, screening for lifestyle factors, suggesting lifestyle modifications, and discussing appropriate follow-up with a primary care provider should be components of every appointment with patients identified as overweight or obese.

Strengths and Limitations

There were several strengths to this study. The data of all subjects that met inclusion criteria were used in this study, eliminating the chance of cherry-picking and selection bias. This project focused on how often and how accurately an overweight or obese diagnosis is made in the retail health setting. The study results demonstrated a wealth of information from this unique setting. The results also identified a need for future quality-improvement projects and additional research related to overweight and obesity in the pediatric patient population.

Many subjects did not declare race (17.1%) and/or ethnicity (12.1%) demographics on their paperwork at the time of the visit. This could be due to undocumented status, language barriers, or disinterest in completing the paperwork. A majority (63.6%) of the subjects were non-Hispanic white children. Therefore, the study results may not be an accurate representation of a diverse population. Additionally, obesity is more prevalent in lower-income areas. This study encompassed a range of geographical regions in Chicago and its suburbs. Socio-economic status varies widely across the Chicagoland area. The geographic regions and their socio-economic statuses were unavailable for this study, and therefore they were not examined

separately. Additional research is recommended to include all demographic data and more information about the different regions of the Chicagoland area for a better understanding of the prevalence of obesity in each region.

Another limitation is that data regarding documentation and screenings were solely collected through a review of the electronic health record. There is a possibility that providers verbally diagnosed overweight or obese patients, initiated a discussion, and provided follow-up recommendations without documenting this in the electronic health record.

Future research is needed to find out why documentation and management are lacking. One strategy is to conduct qualitative research using provider focus groups to determine why diagnosis and management are not being charted. Another option is to conduct larger-scale studies and more extensive testing interventions to show if specific interventions lead to an overall improvement in diet and exercise or a reduction of BMI percentile. This could provide a strong foundation for the use of specific interventions, which would be especially valuable for use in quality improvement in the retail health setting.

Practice Implications

The results of this project suggest that providers in the retail health setting need to improve the way they provide care to the overweight and obese pediatric population. Integrating clinical guidelines, such as those set forth by the National Association of Pediatric Nurse Practitioners (NAPNP), into practice is one way to improve management for overweight and obese children. Prioritizing early identification of at-risk children, utilizing a family-centered lifestyle modification approach, emphasizing healthy nutrition habits and increased physical activity, and encouraging continuity of care is the recommended approach to preventing and treating obesity in children (NAPNP, 2015). It should be noted that the retail health setting is

often limited in resources and is not the ideal setting to fully manage overweight and obese children. However, providers who see at-risk children in any setting need to do their part to initiate diagnosis, begin management, and create a time frame for follow-up with a primary care provider.

The application of innovative measures to improve identification, diagnosis, and basic management in the retail health setting, utilizing the guidelines set forth by NAPNP, is crucial. Also important is charting the diagnosis and management plan discussed with patients and caregivers. Decision support tools are integrated in the EHR, which could help guide providers when used properly. Additionally, providers can also use the auto-populated BMI percentile function to identify and make an accurate diagnosis for overweight or obese children. Providers can then assess behaviors by screening for physical activity, nutrition, and screen time (NAPNP, 2015). Subsequently, a formal discussion of behavior modifications focusing on healthy lifestyles, not weight, should be completed with patients and caregivers (NAPNP, 2015). Finally, providers can provide printed patient instructions including to educate patients and caregivers and to emphasize the importance of a follow-up with a primary care provider for any diagnostic testing and/or obesity management programs as appropriate.

Conclusion

Childhood obesity rates continue to trend upwards, despite the call to action in HP2020. In this study, the EHR auto-populated the BMI percentile for each patient, yet there was still a significant lack of nutrition and physical activity screening noted in the EHR. There was also a critical deficiency in diagnosis for overweight and obese children. To meet the overarching goal of reducing the prevalence of overweight and obesity, it is imperative to find out why diagnosis and management of at-risk children are deficient in this setting. Therefore, further research is

recommended to identify provider barriers. Additionally, it is recommended to use the electronic medical record to its full potential to assist providers with diagnosis and management. Providers in every setting, including retail health, can positively impact the health of the pediatric patient population through improved efforts in diagnosis and management.

Providers along the healthcare spectrum must be diligent in diagnosing and managing this patient population not only to meet the HP2020 target, but also to be proficient providers, as well as to empower patients and their caregivers to make informed decisions leading to a healthier weight. Every patient encounter poses an opportunity to diagnose, discuss, and educate patients and caregivers about weight status and healthy lifestyle behaviors. This study revealed that providers in the retail health setting are not addressing overweight and obesity in their patients. Therefore, to promote a healthier patient population, retail health clinic providers could be better equipped to diagnose and manage patients through guidelines published by the NAPNP and by utilizing other evidence-based interventions.

This project served as an opportunity to identify areas for improvement in diagnosis and management of overweight and obese children, and then to offer strategies from current guidelines to improve health care delivery in the retail health setting. Moreover, due to the profound gap in literature focused on retail health and obesity, it serves as a starting point for further research studies.

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Table 1. Sample Demographics.

Table 1. Sample Demographics (n=2570)		
Characteristics	*f*	%
Body Mass Index Classification		
Underweight	53	2.1
Healthy Weight	1683	65.5
Overweight	409	15.9
Obese	425	16.5
Gender		
Female	1187	46.2
Male	1383	53.8
Race		
White	1436	55.9
Black	586	22.8
Asian	81	3.2
American Indian	22	0.9
Pacific Islander	5	0.2
Unknown	440	17.1
Ethnicity		
Non-Hispanic	1931	75.1
Hispanic	329	12.8
Unknown	310	12.1
Age Group (Years)		
Under 6	46	1.8
6-11	297	11.6
12-18	2227	86.7

Table 2. Prevalence of the Sample - Weight Status by Gender and Age Group 12-18

Male			Female		
	All Ages	12-18 years		All Ages	12-18 years
Overweight	208 (15.0%)	179 (14.9%)	Overweight	201 (16.9%)	172 (16.7%)
Obese	262 (18.9%)	219 (18.2%)	Obese	163 (13.7%)	133 (12.9%)

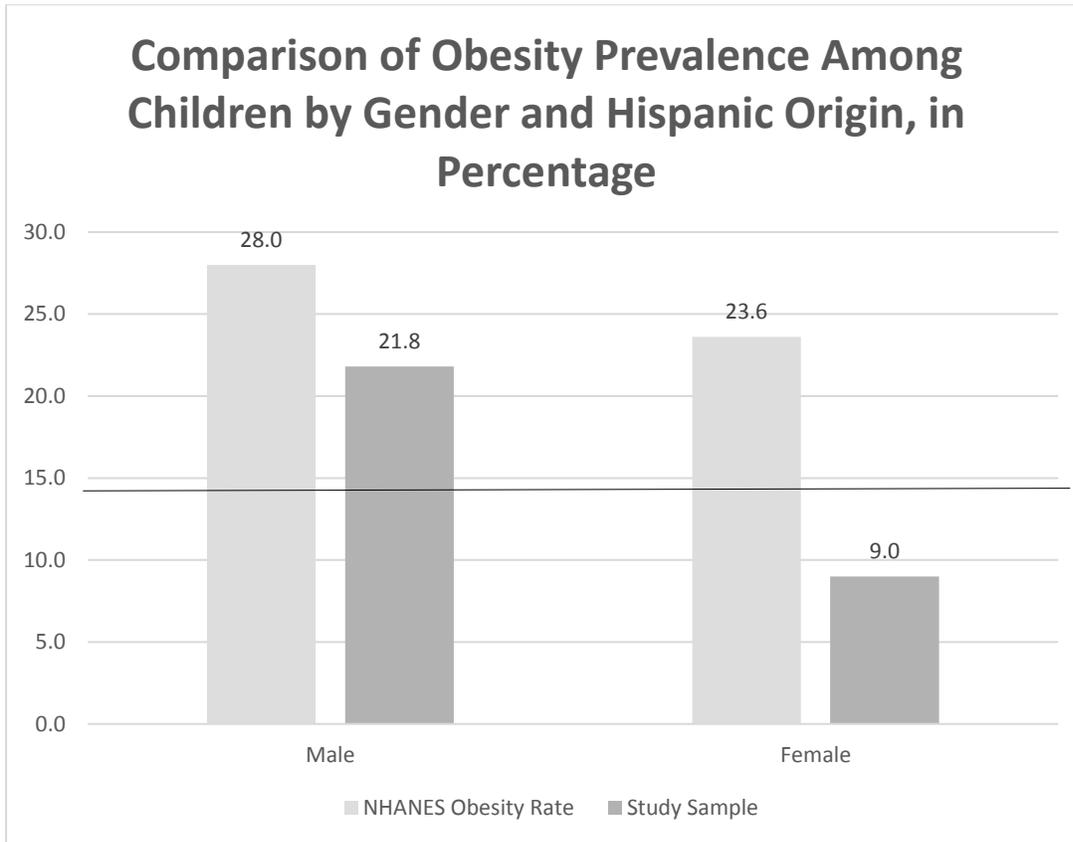*Figure 1.* Comparison of obesity prevalence among children by gender
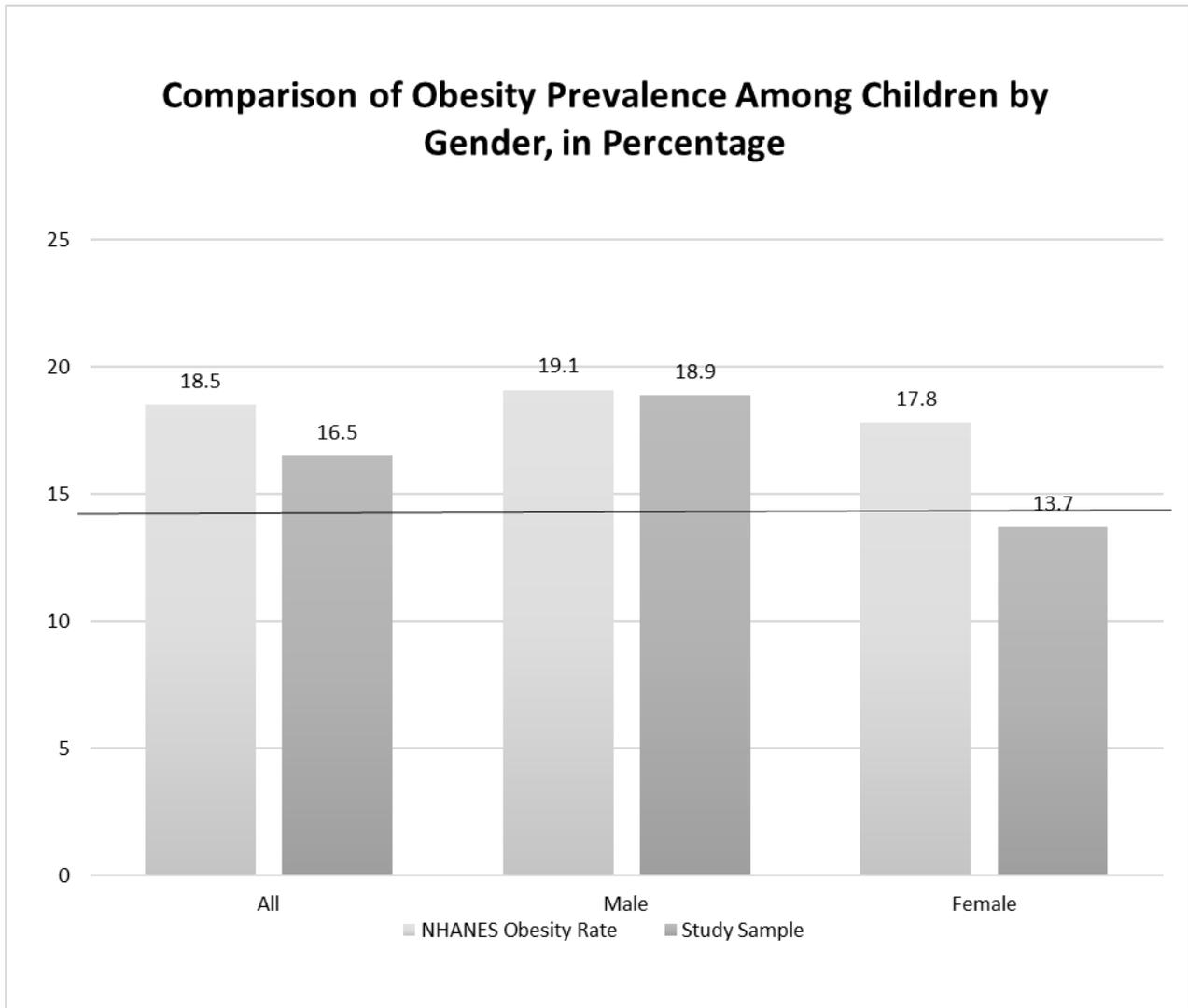
Note: Dark horizontal line represents Healthy People 2020 goal of 14.6% obesity prevalence rate. The study sample represents an age range of 2-18-year-olds. The National Health and Nutrition Examination Study (NHANES) represents an age range of 2-19-year-olds.

Figure 2. Comparison of obesity prevalence among children over 12 years old and gender
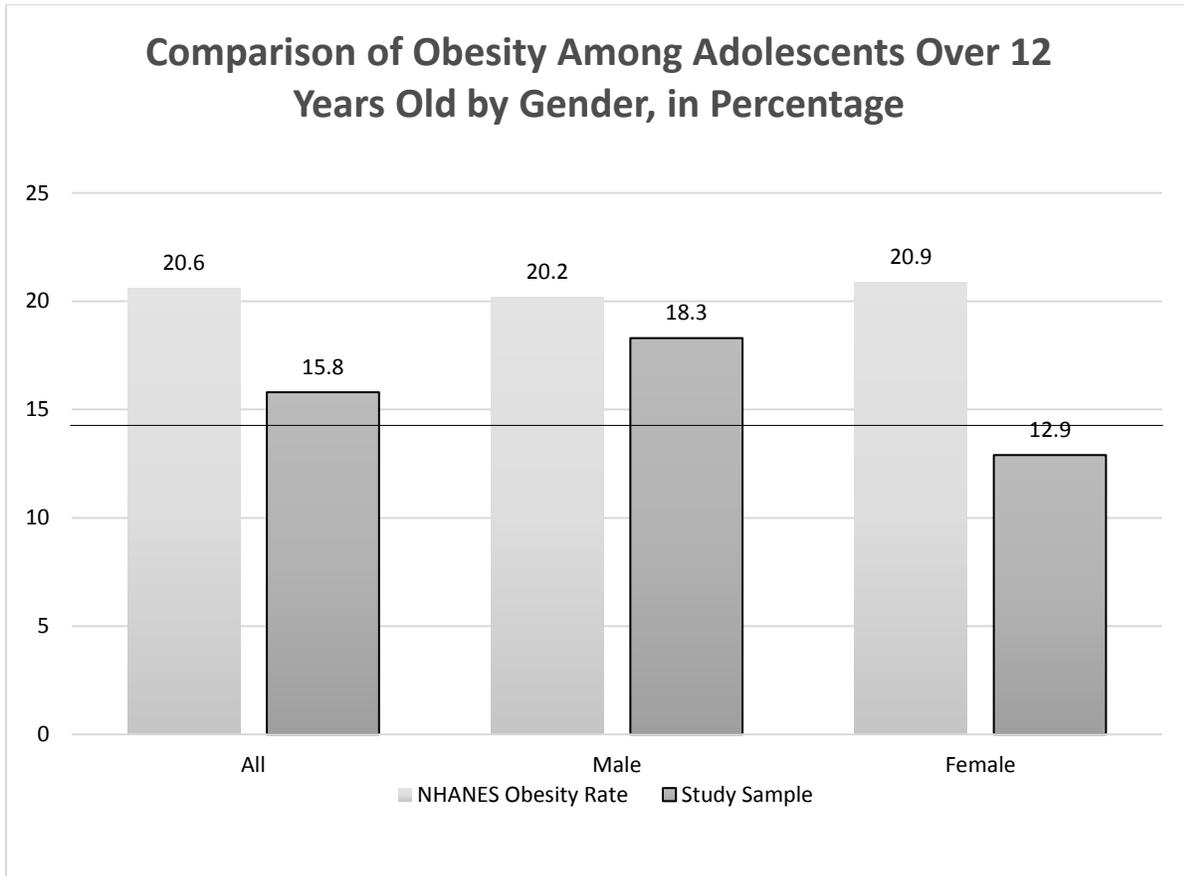
Note: Dark horizontal line represents Healthy People 2020 goal of 14.6% obesity prevalence rate. Also, the study sample represents an age range of 12-18-year-olds. National Health and Nutrition Examination Study (NHANES) represents an age range of 12-19-year-olds.

Figure 3. Comparison of obesity prevalence among children by gender and Hispanic origin

Note: Dark horizontal line represents Healthy People 2020 goal of 14.6% obesity prevalence rate. The study sample represents an age range of 3-18-year-olds. National Health and Nutrition Examination Study (NHANES) represents an age range of 2-19-year-olds.