

**Associations between Trust of Healthcare Provider and
Body Mass Index in Adolescents**

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Abstract

Adolescent obesity continues to be a serious concern around the world, placing young people at risk for chronic conditions and early death. Research has shown that social relationships are important in making health behavior changes, such as following healthcare recommendations for eating and physical activity. Specifically, trust of healthcare provider has been shown to be important in making health behavior change. Evidence suggests that obese young adults are less trusting of healthcare providers than their healthy weight peers, but it is not known if this also applies to obese adolescents. The purpose of this secondary analysis study was to determine relationships between trust of healthcare provider and body mass index percentile in adolescents. Participants were 224 adolescents aged 14-19 years attending a public high school in the Midwestern United States. The Wake Forest Physician Trust scale measured trust of healthcare provider. Height and weight were collected at a school screening; body mass index percentile categories were determined according to age- and sex-adjusted body mass index percentiles. One-way analysis of variance and post hoc Tukey tests showed trust scores varied significantly between body mass index percentile categories of girls. Results suggest it may be necessary for healthcare providers to make additional efforts to build trust with obese adolescent girls than with other groups of adolescents.

Key words: adolescent, trust, delivery of healthcare, body mass index, obesity, overweight

Introduction

Adolescent obesity continues to be a serious concern in the U.S., placing young people at risk for multiple chronic conditions such as coronary artery disease and diabetes mellitus (Kelsey, et al., 2014; Ogden et al., 2016). More than 25 million children and adolescents living in the U.S. are overweight or obese (Ogden, et al., 2014), with obesity and extreme obesity continuing to climb among adolescents. In adolescents aged 12 to 19 years, the national prevalence of obesity is 20.5% (Ogden et al., 2016).

Recent studies have tested prevention and intervention approaches for reducing child and adolescent obesity. Common approaches have focused on health education and skill-building, which have thus far had disappointing results (Barkin, et al, 2018; French, et al., 2018; Moore, et al., 2019). Research has suggested that social relationships—especially those with peers, parents/caregivers, and healthcare providers—are important to encourage adolescents to make changes in their health behaviors (Eisenberger, 2013). This aligns with existing public health priorities addressing the promotion of social connection and reduction of isolation to improve health outcomes (Holt-Lunstad, et al., 2017). Interpersonal trust is one component of social connection that may influence health behavior and health outcomes (Hardin et.al., 2018).

The reciprocal interactions that adolescents have with peers/friends, family, and environment influence their overall development process, including beliefs about and behaviors around health (Chuang, et al., 2018). The *social withdrawal syndrome hypothesis* suggests low trust of others leads to low levels of personal disclosures, which results in a high degree of loneliness and an unwillingness to seek out help (Rotenberg, et al., 2017). Therefore, adolescents are inextricably influenced by the social relationships and environments within which they are

embedded (Chuang, et al., 2018). Relationships with healthcare providers (HCP) are an example of such a social interaction.

Trust of a HCP affects patient outcomes such as health behavior, quality of life, and symptom severity (Birkhauer, et al., 2017). The patient-provider relationship has an inherent power asymmetry, which influences patient health behaviors (Brennan et al., 2013). Patients who lack trust in their HCPs are less likely to adhere to treatment (Bauer et al., 2014), such as weight loss recommendations. Level of trust of HCPs is associated with a variety of health behaviors among adolescents. In adolescents, trust is associated with a willingness to seek health care (Corry & Leavey, 2017), disclose sensitive information (Blake, et al., 2012), submit to treatment (Majumder, et al., 2015), and adhere to prescribed treatments (Rotenberg & Petrocchi, 2018). Research also indicates that adolescents' trust of HCPs influences their lifestyle behaviors (Hardin, et al., 2018), and lifestyle behaviors such as eating, physical activity, sleep, and stress management are associated with BMI (Franckle et al., 2017; Iannotti & Wang, 2013). Thus, while there is evidence that adolescents' trust of HCPs can influence health behaviors (Hardin, et al., 2018), that adolescents' health behaviors influence BMI (Laurson, et al., 2015), and that trust of close others is associated with BMI in young adults (Rotenberg, et al., 2017), there is gap in knowledge concerning the relationship between trust of HCP and BMI percentile in adolescents. The purpose of this secondary analysis study was to determine relationships between trust of healthcare provider (HCP) and body mass index (BMI) percentile in adolescents.

Materials & Methods

Study Sample

This study was a secondary analysis of a cross-sectional, descriptive study assessing the extent to which individual characteristic variables predicted trust of healthcare provider, lifestyle

behaviors, and use of health services in adolescents (Hardin, 2018) that consisted of a convenience sample of 224 adolescents aged 14-19 years. School administrators requested offering all students in required 9th grade physical education class and 12th grade English class participation in the study in order to maintain the class schedule across sections of the courses. Two hundred and twenty-seven students were approached for participation and three individuals declined participation. No students were ineligible for participation.

Participant Recruitment

Inclusion criteria for the parent study were that the adolescent was: (1) aged 14-19 years old; (2) able to read, speak, and understand the English language; (3) able to complete a self-administered questionnaire; and (4) enrolled as a student at the public high school. Exclusion criteria were: (1) adolescent unwilling to participate, and (2) parent of an adolescent minor refused consent. School administrators requested a survey designed with passive consent/assent. The school administrators and a community advisory committee made up of parents, teachers, and adolescents approved the survey questionnaires and study advertisements.

This adolescent-centered informed assent/consent approach indicated that the adolescent participant was the primary focus of the research discussion and decision, with the parent serving in a passive role. Following university IRB approval, school administrator approval, and one week prior to data collection, the investigator provided school administrators with study advertisements to be posted in classrooms and passive consent letters addressed to the parents of potential participants. The passive consent letters included information about the study and an opportunity to contact the investigator to decline participation. In the absence of expressed dissent, parental consent was assumed.

On the day of data collection, the investigator explained the study's purpose, the anonymity guaranteed to study participants, and study procedures to the potential participants. The investigator discussed the definition of HCP with the youths, which in this study was the physician, nurse practitioner, or physician assistant that the adolescent regularly visited for health concerns, sick visits, or checkups. Adolescent participants included both minors (aged 14-17) and adolescent adults (aged 18-19). Minors received a survey packet including an informational cover sheet, while the adolescent adult participants received a survey packet including a passive consent letter. The investigator allowed participants an opportunity to ask questions about the study.

Data collection took place in a classroom setting at a public high school in the Midwestern United States. Paper surveys were distributed to all 9th and 12th graders during class time in the specified required courses at the school. A healthy snack bar was offered as an incentive for participation. Participants were allowed the remaining class time—approximately 30 minutes—to complete the surveys. Instructors were present to maintain order in the classroom, but they were advised to refrain from pacing around the room or positioning themselves in any way that would allow viewing participants' surveys. Participants were encouraged to use a cover sheet following survey completion to maintain privacy of survey responses. Any adolescents who refused consent/assent were given an alternative activity (e.g., a seek-and-find word puzzle) to complete during the data collection period. Individuals choosing to anonymously decline participation were instructed to retain the survey packet until the end of the data collection period, and then return the blank survey packet. When the students had completed the survey, the questionnaires were collected from each participant.

Measures

Trust of Healthcare Provider (HCP). Trust of HCP was measured using the Wake Forest Physician Trust scale. The Wake Forest Physician Trust scale contained 10 items measured on a 5-point Likert-like scale (range 0-50) developed to measure a patient's trust of his or her primary healthcare provider (Hall et al., 2002). Reliability of the Wake Forest Physician Trust scale has been demonstrated as good in this sample ($\alpha = .90$; Hardin, 2018) and in adults ($\alpha = .93$; Hall et al., 2002). Examples of Wake Forest Physician Trust scale items are "Your doctor only thinks about what is best for you," and "Your doctor will do whatever it takes to get you all the care you need." Although the name of this scale suggests it measures trust of physician, the scale was developed with all HCPs in mind and has been tested for use with a variety of HCPs, such as nurse practitioners and chiropractors.

Demographic survey. An investigator-developed demographic survey was used to obtain age, sex, race, ethnicity, usual source of health care, and presence or not of an overweight or obesity diagnosis by the HCP.

Body mass index (BMI). BMI was calculated from weight and height collected during a school screening. Height and weight, which were measured in inches and pounds respectively, were collected using a standardized protocol (Nihiser, et al., 2007) with a calibrated digital scale and a stadiometer. Height was measured to the nearest 1/8 inch, while weight was measured to the nearest 0.2 pound. Height and weight were measured in duplicate and averaged. BMI was calculated from height and weight. BMI percentile categories were determined using age- and sex-adjusted BMI percentiles (Kuczmarski et al., 2002). Using the growth chart system of BMI classification, percentile ranges determined the weight category of adolescents. A BMI \geq 95th percentile was considered obese, a BMI of the 85th percentile $>$ 95th percentile was considered

overweight, a BMI percentile from the 5th percentile > 85th percentile was considered healthy weight, and a BMI < 5th percentile was considered underweight.

Data Analysis

SPSS Statistics Version 25 software (IBM Corporation, 2018) was used to analyze the data. Data were entered into SPSS. One hundred and ninety participants had complete data for sex, height, weight, and trust of HCP. Missing data were managed using pairwise deletion. The sample was described using frequencies and means. The relationship between trust of HCP and BMI was assessed using Pearson product moment correlation. Differences in trust of HCP between BMI percentile categories were evaluated using analysis of variance with a coefficient alpha of .05 and post hoc Tukey tests assessed the categories in which those differences occurred.

Results

Demographic and individual characteristics of the sample are reported in Table 1. The sample consisted of predominantly non-Hispanic white girls. Both the boys and girls mean ages were approximately 16.5 years, with dual modes (15 and 18 years old). Most of the boys and girls reported an HCP or health clinic as the usual source of health care, rather than an urgent care clinic or the emergency room. Fewer boys and girls reported an overweight diagnosis by a HCP than was identified by study BMI measurements. In this sample, more than half of boys and girls whose measurements indicated an overweight or obese BMI percentile did not report an overweight or obesity diagnosis by the HCP.

Pearson product moment correlations were used to evaluate associations between trust of HCP and BMI. Overall, trust of the HCP had a small, inverse correlation with BMI. Additional

analyses revealed that trust of HCP had a medium, inverse correlation with BMI in girls and no significant linear relationship in boys (see Table 2).

To further explore the association between trust of HCP and BMI, one-way analysis of variance was used to evaluate differences in trust of HCP by BMI percentile category. One-way analysis of variance demonstrated significant differences in trust of HCP scores according to girls' BMI percentile category ($p = .007$) with a large effect size ($\eta^2 = .12$). Post hoc Tukey test comparisons indicated the mean trust scores were significantly different between the healthy BMI percentile category and obese BMI percentile category of girls, with girls in the obese BMI percentile category reporting lower trust of HCP than the healthy BMI percentile category of girls. Although only two girls were in the underweight BMI percentile category, it is interesting that both reported low trust of HCP levels, similar to that of the obese girls (see Figure 1 and Table 2).

Discussion

This study showed two important findings: (1) a discrepancy between the adolescents BMI percentile category and self-reported HCP diagnosis of overweight or obesity, and (2) an inverse relationship between interpersonal trust of HCP and girls' BMI variables, but no significant relationship between trust of HCP and boys' BMI variables. Both boys and girls reported fewer diagnoses of overweight or obesity than indicated by study BMI measurements. Additionally, girls in the obese BMI percentile category reported significantly lower trust of their HCPs than girls in the healthy BMI percentile category.

Most adolescents in the study with a BMI greater than the 85th percentile did not report a HCP diagnosis of overweight or obesity. Evidence suggests this is likely due to both parental and HCP factors. Since the 1990s, approximately 85-90% of overweight adolescents remain under-

diagnosed (Lydecker & Grilo, 2017). Parental misperception of the adolescent's weight is a primary barrier to seeking timely and appropriate intervention for overweight or obesity diagnoses (Lee, et al., 2016). Patient visit time constraints, reductions in well-child visits with increasing adolescent age, and inadequate training for nutritional, weight, and physical activity advice, have all been identified as HCP barriers to identifying, counseling, and treating overweight adolescents (Farran, et al., 2013; Lee et al., 2016; Lydecker & Grilo, 2017). HCPs also report concern about heightened risk of eating disorder development when diagnosing individuals as overweight; however, evidence shows this concern is unfounded (Kass et al., 2015). It is possible that if HCPs develop and maintain the adolescents' trust, it will promote a safe environment to have difficult—and necessary—conversations about weight.

Trust of HCP may be related to BMI percentile due to associations between prosocial behaviors and healthy lifestyle behaviors. Rew, et al. (2013) suggested that adolescents with strong social bonds, such as those trusting their HCPs, might also engage in healthy eating and physical activity behaviors due to a sense of responsibility to others and adherence to prosocial guidelines. The relationship between prosocial behaviors and healthy lifestyle behaviors has been replicated in other studies with adolescents (Hardy, et al., 2015; Padilla-Walker, et al., 2016).

In this study, adolescent girls in the obese BMI percentile category had significantly lower trust scores than girls with a healthy BMI percentile category. There is preliminary evidence that obese girls have lower trust in many key relationships, including those with mother, father, friends (Rotenberg, et al., 2017). It is likely that the same social factors that influence the relationships obese girls have with their parents and peers also affects their relationship with a HCP. The low trust of HCP found in obese girls may be related to the social weight stigma associated with obesity. Evidence suggests that weight stigma results in the

patient's perceived negative judgment and lower trust of HCP (Gudzune, et al., 2014; Papadopoulos & Brennan, 2015), which may influence obese girls' trust of HCP.

The low trust scores found in obese girls may be related to sex differences associated with obese girls' hormones. Obesity influences puberty and endocrine levels in girls (Elizondo-Montemayor, et al., 2017) and it is possible these changes influence trust of others (Boksem, et al., 2013). While this study did not assess pubertal status or endocrine biomarkers, it is possible that sex differences contributed to the lower trust of HCP among obese girls and is worthy of further investigation.

Findings of Rotenberg, et al. (2017) showed that obese undergraduate students had lower trust scores of mothers, fathers, and friends than healthy weight undergraduate students. These authors suggested that obese youths' lack of trust may be a symptom of *social withdrawal syndrome*, a combination of low trust, low disclosure of personal information, and high loneliness. Social withdrawal syndrome has also been noted in underweight, obese, and bulimic youths (Rotenberg, et al., 2013; Rotenberg, et al., 2017; Rotenberg & Sangha, 2015). The social withdrawal syndrome hypothesis suggests low trust of others leads to low levels of personal disclosures, which results in a high degree of loneliness and an unwillingness to seek out help. Our findings, coupled with this previous literature, suggests obese adolescents may be particularly vulnerable to weakened social relationship factors and, therefore, it may be necessary for HCPs to make additional efforts to build trust with obese adolescent girls.

This study highlights important areas for future research. Specifically, future studies should examine whether (1) the associations found in this study can be replicated with other diverse groups of girls and boys, (2) the association between trust of HCP and underweight adolescents is supported, and (3) efforts to improve trusting relationships with HCPs may affect

BMI or adherence to HCP recommended health behaviors, such as eating and physical activity. This sample of adolescents included mostly white, non-Hispanic American adolescents. It is unknown if the relationship between trust of HCP and BMI percentile exist in other samples. While girls in the underweight BMI percentile category in this study reported similarly low trust of HCP as the obese girls, there were too few in the underweight BMI percentile category ($n = 2$) to analyze. Additional research is necessary to evaluate the trust of HCPs among underweight girls. Further, since trust of HCP is known to influence adherence to medical recommendations (Rotenberg & Petrocchi, 2018) and other health behaviors (Birkhauer, et al., 2017; Hardin, et al., 2018), future studies may evaluate efforts to improve trusting relationships with HCPs and its effect on health behaviors.

Limitations. This secondary analysis study's non-random, homogenous sample limits the generalizability of the study's findings. To offset these limitations, the principal investigator offered participation to all adolescents in the 9th and 12th grades by collecting data in required courses, which enrolled all students within each grade level.

Implications. Nurse practitioner and nurse approaches to overweight and obese adolescents can influence both adolescent trust of the HCP and adolescent health outcomes. Evidence suggests overweight and obese adolescents are underdiagnosed and undertreated (Lydecker & Grilo, 2017). HCPs should treat overweight in adolescents, even if adolescents do not have weight-related comorbidities, such as diabetes and hypertension (Kirschenbaum & Gierut, 2013). Studies support this approach since overweight children have detectable cardiovascular biomarkers and risks as young as 2 years of age (Shashaj et al., 2014). Furthermore, reducing the BMI standard deviation score by 0.25 provided a significant reduction in cardiovascular risk biomarkers in a study of 1,388 overweight children (Reinehr et al., 2016). Overweight

adolescents who undergo successful weight management treatment experience similar health benefits as their obese peers experience (Rijks et al., 2015). To promote positive relationships with overweight or obese adolescents and reduce the effects of the social withdrawal syndrome, nurses and nurse practitioners should use behaviors that promote adolescent-HCP trust (Hall et al., 2002; Lydecker et al., 2016; Rotenberg, 2010), and focus counseling on healthy lifestyle behaviors (Golden, et al., 2016). Behaviors that promote trust of HCP among adolescents include discussing confidentiality and privacy, directing the discussion to adolescent rather than the parent, showing respect for the adolescent's opinion; and making a genuine effort to listen and show empathy (Hardin, 2014).

There are several behaviors HCPs can perform to facilitate trusting relationships with adolescent patients. First, HCPs should examine their own biases concerning age, gender, and weight in order to make a genuine effort to overcome them (Phelan, et al., 2015). Both parents and adolescents may assume all content of the adolescent's healthcare visit will be discussed with parents (Duncan, et al., 2011); therefore, both parents and adolescents could benefit from a discussion concerning adolescent confidentiality and privacy in the healthcare setting. Healthcare practices should consider implementing a privacy and confidentiality protocol to educate both parents and adolescents about confidentiality and give adolescents some private time with the HCP, which will facilitate the adolescent's transition to adult healthcare (Pampati, et al., 2019). Healthcare providers should take care to describe any mandatory reporting guidelines prior to asking the adolescent any sensitive questions (e.g. abuse, suicidal ideation) (Ford, et al., 2016). When discussing the adolescent's health when a parent or guardian is present, the HCP should direct the discussion to the adolescent, with the parent serving in a supportive role. When an adolescent share's their opinion or concerns, the HCP should make a genuine effort to listen,

show respect for the adolescent's opinion, and demonstrate empathy for the adolescent's concerns (Breland-Noble, et al., 2010). Evidence suggests these communication skills can go a long way in strengthening trust with the adolescent patient.

Conclusion

In this sample, overweight and obesity were underdiagnosed as reported by participants, and obese adolescent girls reported lower levels of trust of HCP than adolescent girls in the healthy BMI percentile category. The difference in levels of trust may be related to prosocial beliefs and behaviors or the social withdrawal syndrome. Results of this study suggest that HCPs should discuss diagnosis of overweight and obesity in adolescent girls, while taking care to promote and protect trust of these patients. Future research is needed to replicate the relationship between trust and BMI percentile in adolescents.

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Table 1. Demographic and individual characteristics of the sample (N = 224)

	M (SD) or n (%)		
	All (N = 224)	Boys (n = 100)	Girls (n = 121)
<i>Age</i>	16.4 (1.47)	16.5 (1.5)	16.4 (1.5)
<i>Race</i>			
American Indian	8 (3.6%)	3 (3%)	3 (2.5%)
Asian	7 (3.2%)	1 (1%)	4 (3.3%)
Black	5 (2.3%)	3 (3%)	1 (0.8%)
White	210 (95.0%)	92 (92%)	113 (93.4%)
<i>Ethnicity</i>			
Hispanic	13 (5.8%)	3 (3%)	10 (8.3%)
<i>Usual Source of Health Care</i>			
HCP/clinic	180 (80.4%)	81 (81%)	97 (80.2%)
ER/urgent care	21 (9.4%)	9 (8%)	12 (9.9%)
None/don't know	19 (6.7%)	10 (10%)	9 (7.4%)
<i>Trust of Healthcare Provider</i>	38.7 (7.5)	38.9 (7.0)	38.5 (7.9)
<i>Diagnosis</i>			
Overweight	24 (10.7%)	9 (9.0%)	15 (12.4%)
Obesity	13 (5.8%)	5 (5.0%)	8 (6.6%)
<i>Body Mass Index (BMI)</i>	26.3 (5.4)	25.9 (5.7)	26.6 (5.0)
<i>BMI percentile category</i>			
Underweight	3 (1.3%)	1 (1.0%)	2 (1.7%)
Healthy	102 (45.5%)	52 (52.0%)	50 (41.3%)
Overweight	55 (24.6%)	24 (24.0%)	31 (25.6%)
Obese	39 (17.4%)	15 (15.0%)	24 (19.8%)
Missing	25 (11.2%)	8 (8.0%)	14 (11.6%)

Note. Data reflect participant responses, including nonresponse or multiple responses, and therefore, may not equal 100%.

Table 2. One-way analysis of variance of trust of healthcare provider by body mass index variables in adolescents

	Trust of healthcare provider		
	M (SD)	r	ANOVA
<i>Body Mass Index (BMI)</i>		-.17*	
Boys		.01	
Girls		-.30**	
<i>BMI percentile category</i>			$F(3, 194) = 4.7^*$
Underweight	37.3 (9.0)		
Healthy	40.6 (7.1)		***
Overweight	37.3 (6.7)		
Obese	36.6 (7.9)		***
<i>Boys BMI percentile category</i>			$F(3, 86) = 0.59$
Underweight	39.0 (0.0)		
Healthy	39.8 (6.6)		
Overweight	37.5 (6.9)		
Obese	38.9 (7.6)		
<i>Girls BMI percentile category</i>			$F(3, 99) = 4.3^{**}$
Underweight	36.5 (13.4)		
Healthy	41.5 (7.6)		***
Overweight	37.1 (6.6)		
Obese	35.2 (8.1)		***

Note. * $p < .05$; ** $p < .01$; *** significant difference between groups

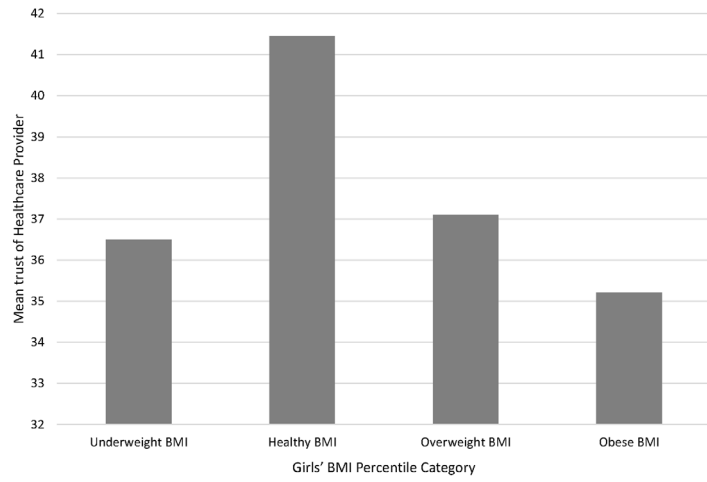


Figure 1. Adolescent girls' mean trust of HCP score by BMI percentile group