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Missed Work among Caregivers of Children with a High Body Mass Index: Child, Parent and Household Characteristics

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Abstract

An under-examined consequence of childhood obesity is caregivers' missed work attributed to child absence from school due to a health condition. This secondary analysis (N=123) reported the frequency of missed work among caregivers of children with a body mass index (BMI) at or above the 75th percentile and examined associations with select child, parent and household characteristics. Caregivers missed work 1.3 (SD 1.2) times in the past year with 41% reporting two or more times. A child visiting a healthcare provider two or more times in the past year and parent perception of their child's health as good/fair/poor were significantly associated with caregivers' missing work two or more times in a year, (OR=5.8 and OR=3.0, respectively). A significant association between children's physical and psychosocial well-being and caregivers' missed work emphasizes the school nurse role working with children with high BMI and families to address student absenteeism and caregivers' missed work.

Keywords

missed work; school absence; school nursing; BMI; elementary

One in three children is classified as overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014; Ogden et al., 2016), which is associated with an increased risk of physical comorbidities such as asthma, type 2 diabetes, hypertension, coronary heart diseases, and cancer (Park, Falconer, Viner, & Kinra, 2012). Childhood obesity may also affect psychological wellness, resulting in lower levels of perceived health and health-related quality of life (Halfon, Larson, & Slusser, 2013; Schwimmer, Burwinkle, & Varni, 2003; Williams, Wake, Hesketh, Maher, & Waters, 2005). These health-related consequences of childhood obesity lead to increased direct medical costs of $12,660 to $19,630 per child over a lifetime when compared to normal weight peers (Finkelstein, Graham, & Malhotra,

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2014). Additionally, there are non-healthcare costs associated with childhood obesity such as school absenteeism. Children who are overweight or obese are more likely to miss school days when compared to children with normal weight (An, Yan, Shi, & Yang, 2017; Li et al., 2012). School absenteeism negatively impacts students' academic performance and graduation rates, and may result in parents and/or other adult caregivers in the household (hereafter referred to collectively as caregivers) missing work to care for the child (Allen, Diamond-Myrsten, & Rollins, 2018).

Missed work among caregivers due to the health-related needs of a child is not unexpected. In 65% of families with school-aged children both parents are employed (United States of Department of Labor, 2017). Among employed mothers and fathers, 54% reported missing work in the past year to care for an ill child, with the average amount of missed work being 3.5 days (C.S. Mott Children's Hospital, 2012). When caregivers miss work to care for an ill child a reduction in family income and an increase in stress may occur (Hedov, Wikblad, & Annerén, 2006; Lindahl Norberg, Montgomery, Bottai, Heyman, & Hovén, 2017). Because overweight and obesity disproportionately impact minority and low-income populations (Ogden, Carroll, et al., 2018; Ogden, Fryar, et al., 2018), the potential impact of missed work on family well-being and by extension child well-being and school success may be even more pronounced. However, little is known about factors that may contribute to missed work among caregivers of children with a high body mass index (BMI), defined for the purpose of this study as a BMI at or above the 75th percentile. Therefore, the research questions addressed by the current exploratory study are 1) what is the frequency of missed work among a sample of caregivers of children with a high BMI?, and 2) what are select child, parent and household characteristics of caregivers associated with missed work? Independent variable selection was guided by a socio-ecological framework that recognizes factors that influence behavior choice occur at multiple levels, including child, parent and household levels (Bronfenbrenner, 1994).

Methods

Study Design

This secondary analysis used baseline data from the Students, Nurses and Parents Seeking Healthy Options Together (SNAPSHOT) study, a community-based randomized controlled trial (RCT) conducted in metropolitan Minnesota. The study tested a school-based, school nurse-led healthy weight management program that aimed to prevent excess weight gain among 8- to 12-year-old children with a BMI at or above the 75th percentile (Kubik et al., 2018). Research suggests that young school-aged children with a BMI in the top quartile of the growth chart have an increased risk for excess weight gain and interventions to prevent excess weight gain may be especially beneficial during this time (Datar, Shier, & Sturm, 2011; Nader et al., 2006).

Participants

Parent-child dyads were recruited from one urban and one suburban school district. Recruitment strategies included flyers, school and district website announcements, in-person presentations at school events and general mailings. Interested parents were instructed to call

study staff to determine eligibility that included child BMI ≥75th percentile, English literacy, participation of a parent/guardian with whom the participating child lived most of the time, no plans to move outside of the district within the next 12 months, no food allergies, no physical limitations or medical conditions that would limit child's ability to participate in physical activity and no emotional health conditions that would limit the child's ability to participate in group activities with other children. A total of 132 parent-child dyads were enrolled in the SNAPSHOT study.

Data Collection

A team of two trained research staff collected baseline data in the summers of 2014 through 2017, prior to randomization and implementation of the intervention. All parents provided written informed consent for self and child and children provided written assent before baseline data collection. Parent and child each completed a paper and pencil survey and had height and weight measured using standardized procedures that included collection of two or three measures to inform an averaged value (Lohman, Roche, & Martorell, 1988). Children also completed two 24-hour dietary recall interviews and wore an accelerometer as part of baseline data collection; however, these measures were not used in the present analyses. Details about measurement protocols are published elsewhere (Kubik et al., 2018). The parent and child received a $75 and a $50 retail gift card, respectively, for their participation in data collection. The Institutional Review Boards of the University of Minnesota and Temple University approved the study protocols.

Measures

A subset of measures was used in the current study that included anthropometry data and select items from the parent and child surveys.

Dependent Variable

Missed Work.—Parents answered the following question developed by the study investigators: "In the past year, how many times did you or any other adult in your home miss work because your child was unable to attend school due to a doctor's appointment, an illness or any other health condition?" Response options were never (0), one time (1), two times (2), and more than two times (3). These responses were dichotomized for analysis (< 2 times vs. ≥ 2 times) based on the distribution of the responses in the sample.

Independent Variables

Child-Level Characteristics.

Child demographics.: Parents provided their child's date of birth (age calculated), sex (female vs. male), race (white, black, American Indian, Asian and other) and ethnicity (Hispanic and non-Hispanic). Due to the small sample size, race/ethnicity was dichotomized as white versus non-white, which included all racial/ethnic backgrounds except for non-Hispanic white.

Child weight status.: Child BMI (kg/m^2) was calculated using measured height and weight. Child weight status was classified as obese (BMI ≥ 95th percentile) versus non-obese (BMI

< 95th percentile) based on the BMI percentiles calculated using the 2000 Centers for Disease Control and Prevention (CDC) growth charts (Kuczmarski et al., 2002).

Child diagnosed health conditions.: Parent reported whether their child had any diagnosed health conditions such as asthma, depression and sleep problems (yes vs. no).

Number of visits to a health care provider for an illness or health condition.: Parents reported number of times their child was seen by a health care provider in the past year for an illness or health conditions, such as an ankle sprain, a cold or a checkup for asthma (< 2 times per year vs. ≥ 2 times per year).

Child-reported health-related quality of life.: Children completed the 23-item Pediatric Quality of Life Inventory (Peds QL™) Version 4.0 Generic Core Scales designed for children 8 to 12 years of age (Varni, Seid, & Kurtin, 2001). The scale consisted of physical functioning (8 items), emotional functioning (5 items), social functioning (5 items) and school functioning (5 items) with a 5-point response option, including never (1), almost never (2), sometimes (3), often (4) and almost always (5). Following the scoring protocol (Varni et al., 2001), responses were reversed scored and transformed to a 0 to 100 scale (0, 25, 50, 75, 100) which were then used to calculate a total health-related quality of life summary score (mean of all 23 items), physical health summary score (mean of 8 physical functioning items) and psychosocial health summary score (mean of 15 emotional, social and school functioning items). A higher score indicated better health-related quality of life. Cronbach's alpha ranged from 0.69–0.89 in the current study.

Parent-Level Characteristics.

Parent demographics.: Parents provided their own date of birth (age calculated), sex (female vs. male), race (white, black, American Indian, Asian and other) and ethnicity (Hispanic and non-Hispanic). Similar to child race/ethnicity, parent race/ethnicity was dichotomized as white versus non-white. Parents also reported their marital status (married/partnered vs. single which included never married, separated, divorced and spouse deceased), and employment status (employed vs. not employed).

Parent weight status.: Parent BMI (kg/m^2) was calculated using measured height and weight.

Parent concern about their child's weight.: It was dichotomized as "yes" (concerned and very concerned) or "no" (not concerned or a little concerned) (Arcan et al., 2012).

Parent perception of their child's health.: It was assessed using five response options, including excellent, very good, good, fair and poor (Zahner & Daskalakis, 1997). The response options were categorized as excellent or very good versus good, fair or poor.

Parent-reported child health-related quality of life.: Parents completed the parent-proxy version of the Peds QL™, which is identical to the child version of the scale except for the use of developmentally appropriate language or first- or third-person tense (Varni et al., 2001). Cronbach's alpha ranged from 0.84–0.93 in the current study.

Household-Level Characteristics.

Receipt of public assistance.: Parents reported receipt of free or reduced priced lunch, Supplemental Nutrition Assistance Program, and Electronic Benefits Transfer (no vs. yes if any).

Number of adults and children.: Parents provided the number of adults (one adult, two adults, or ≥ three adults) and children (one child vs. ≥ two children) in the household.

Household food insecurity.: The six-item short from of the U. S. Household Food Security Survey was used. A household was classified as food insecure if parent reported two or more affirmative responses to any of the six items (Blumberg, Bialostosky, Hamiltonm, & Briefel, 1999).

Statistical Analysis

Of the 132 children enrolled in the SNAPSHOT study, nine children with a BMI less than the 75th percentile at baseline measurement were excluded from analysis, which resulted in an analytic sample size of 123. Descriptive statistics were used to describe variables assessed as child, parent and household-level characteristics. Bivariate analyses were used to inform the selection of independent variables to include in the regression model using a less conservative $p \leq 0.1$ criterion given the small sample size and exploratory design of the study (Wasserstein & Lazar, 2016). Multivariate logistic regression was used to examine associations between the selected independent variables and caregivers' missed work at $p < 0.05$. Analyses were performed using SAS software version 9.3 (SAS Institute Inc., Cary, NC, USA).

Results

Child mean age was nine years old, 49% were girls, 63% were non-white and 51% were obese. Among parents, 59% reported the receipt of public assistance and 32% of households were classified as food insecure (Table 1). On average, parents reported that a caregiver missed work 1.3 (SD 1.2) times in the past year, with 22% reporting missed work one time in the past year, 20% reporting two times and 22% reporting three or more times. In bivariate analyses shown in Table 1, the following variables were associated with missed work among caregivers at $p \leq 0.1$ and thus included in the multivariate logistic regression model: children who were diagnosed with asthma, children who had a history of visiting a health care provider two or more times in the past year, parents who were concerned about their child's weight, parents who perceived their child's health as less than very good, parents who rated their child's overall health-related quality of life lower, and households that had only one child. Multivariate logistic regression analyses (Table 2) indicated that parents whose child visited a health care provider two times or more in the past year for an illness or health condition were almost six times more likely to report a caregiver in the household missing work than parents whose child visited a health care provider fewer than two times. Parents who reported their child had good, fair or poor health were three times more likely to report a caregiver missing work than parents who reported their child's health as very good or excellent.

Discussion

Missed work among caregivers of children with a high BMI is an under-examined consequence of childhood obesity. In this sample of 8- to 12-year-old children with a BMI ≥75th percentile, 64% of caregivers missed work one or more times during the past year because their child was unable to attend school due to a doctor's appointment, illness or other health condition. More than one in five missed work three or more times. To the best of our knowledge, this is one of the first studies to report caregivers' missed work by child weight status.

Two or more child visits to a health care provider for an illness or health condition was significantly associated with caregivers' missing work in the multivariate model after controlling for the effects of child-, parent-and household-level characteristics on the dependent variable of caregivers' missed work, which included child asthma diagnosis, parent concern about child's weight, parent perceptions of their child's health, parent-reported child health-related quality of life, and number of children in the household. A previous study suggested that children who are obese have an increase number of sick-child visits and use of mental health resources but fewer well-child visits compared to children who are overweight (Estabrooks & Shetterly, 2007). Our findings suggest that among 8- to 12-year-old children with a high BMI, two or more absences from school may be a prompt for school nurses to initiate a family assessment and determine whether referral to school and community preventive and social services may be indicated. School nurses have contributed to lowering school absenteeism among elementary students with asthma from 6 days to 4 days by providing asthma screening and case management services (Moricca et al., 2013). A similar approach may be useful when addressing school absenteeism among children with a high BMI.

Not surprisingly, parental perceptions of their child's health as poor, fair or good was also associated with a caregivers' missed work. This finding is consistent with the bivariate analyses results indicating the parent-reported psychosocial health summary score was significantly lower among children with a caregiver who missed work two times or more in the past year, compared to those who missed work less than two times. This difference provides insights into factors, such as emotional, social and school functioning, that may contribute to parental perceptions of a child's health status. Previous research has reported that children with high BMIs report psychosocial health scores that are typically lower than the physical health scores (Schwimmer et al., 2003; Williams et al., 2005). Children with a high BMI are also at risk of being bullied, which is associated with increased school absenteeism (Grinshteyn & Yang, 2017). These findings emphasize the importance of engaging parents when repeated school absences become a concern. Incorporating a holistic, compassionate approach informed by an awareness of the psychosocial challenges faced by some children who are overweight or obese, may lead to early interventions with the child and family and improvement in overall health and wellbeing, including improved child attendance at school and less missed work among caregivers.

It is interesting to note that we did not find any difference in caregivers' missed work by child obesity status (obese versus non-obese) in the current study. This may be a result of

our sample size and focus on children with a BMI at or above the 75th percentile rather than the full range of BMI. Our approach is different from previous research that compared children with overweight or obesity to children with normal weight and showed a significant difference in school absenteeism between the two groups (An et al., 2017; Li et al., 2012). Future studies with a larger sample might examine whether caregivers' missed work differs by child weight status, comparing across normal weight, overweight and obese categories.

The study has several strengths. This is one of the first studies to examine child, parent and household characteristics associated with missed work among caregivers of children with a BMI at or above the 75th percentile. The sample had economic and racial/ethnic diversity. Parent and child BMI were assessed using measured height and weight, and validated measures such as PedsQL™ and U.S. Household Food Security Survey were used. However, the generalizability is limited because of our convenience sampling and small sample size. Furthermore, the current study was cross-sectional, and the findings do not indicate causality.

Implications for School Nurses

School nurses are well positioned to address student absenteeism among children with a high BMI, which may indirectly reduce missed work among caregivers. The interplay between student absenteeism and caregivers' missed work suggests the importance of providing student-centered and family-focused school nursing care that is consistent with the Framework for 21st Century School Nursing Practice (National Assocation of School Nurses, 2016). For example, the framework principles of care coordination and leadership are represented by an approach whereby the school nurse initiates a comprehensive assessment of student health and parent concern about their child's health when multiple absences are noted, such as two or more as demonstrated in the current study. In the role of advocate and liason for the child and family, the school nurse initiates referrals that support problem solving of family situations that may contribute to student absenteeism and parent missed work that might include food insecurity, unreliable transportation and housing instability (Allen et al., 2018). Within the broader school community and consistent with the principle of community/public health, school nurses are positioned to lead community-wide school campaigns that emphasize the link between student and family health, school attendance and student success. The principle of quality improvement is served by careful documentation of all actions taken in support of students and families and evaluation of outcomes, such as a decrease in absenteeism. In total, such efforts by school nurses will contribute to establishing an evidence-base that exemplifies the unique contributions of school nurses to child and family health delivered in the school setting.

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Table 1.

Bivariate Analyses: Child-, Parent- and Household-Level Characteristics by Missed Work among Caregivers of Children with Body Mass Index at or above the 75th Percentile, Minnesota, 2013–2017 (N=123)

	Total (n=123)	Missed work among caregivers		p-value[a]
		< 2 times/year (n=72, 59%)	≥2 times/year (n=51, 41%)	
Child-Level Characteristics				
Child demographics				
Child age	9.3±0.9	9.4±0.9	9.3±0.8	0.90
Child sex				0.25
Girls	60 (49%)	32 (44%)	28 (55%)	
Boys	63 (51%)	40 (56%)	23 (45%)	
Child race/ethnicity				0.14
Non-white[b]	77 (63%)	49 (68%)	28 (55%)	
White	46 (38%)	23 (32%)	23 (45%)	
Child weight status[c]				0.24
Non-obese	56 (49%)	36 (50%)	20 (39%)	
Obese	67 (51%)	36 (50%)	31 (61%)	
Child diagnosed health conditions				
Asthma	20 (16%)	7 (10%)	13 (25%)	**0.02**
Depression[d]	9 (7%)	6 (8%)	3 (6%)	0.73
Sleep problems[d]	12 (10%)	5 (7%)	7 (14%)	0.23
Number of visits to a health care provider for an illness or health condition				**<0.0001**
<2 times per year	68 (55%)	53 (74%)	15 (29%)	
≥2 times per year	55 (45%)	19 (26%)	36 (71%)	
Child-reported health-related quality of life[e]				
Total summary score	71.8±16.0	72.3±15.4	71.1±16.9	0.67
Physical health score	73.9±18.5	74.0±18.8	73.9±18.3	0.99
Psychosocial health score	70.7±17.3	71.5±16.5	69.6±18.6	0.55
Emotional functioning	66.5±22.2	65.6±21.5	67.8±23.2	0.57
Social functioning	73.5±21.8	75.0±20.9	71.5±23.0	0.38
School functioning	72.0±18.9	73.9±17.4	69.4±20.7	0.20
Parent-Level Characteristics				
Parent demographics				
Parent age	39.3±7.1	38.7±7.4	40.1±6.7	0.30
Parent sex[d]				0.40
Female	117 (95%)	67 (94%)	50 (98%)	
Male	6 (5%)	5 (7%)	1 (2%)	
Parent race/ethnicity				0.16

	Total (n=123)	Missed work among caregivers		p-value[a]
		< 2 times/year (n=72, 59%)	≥2 times/year (n=51, 41%)	
Non-white[b]	50 (41%)	33 (46%)	17(33%)	
White	73 (59%)	39 (54%)	34 (67%)	
Parent marital status				0.20
Single[f]	45 (37%)	23 (32%)	22 (43%)	
Married/partnered	78 (63%)	49 (68%)	29 (57%)	
Parent employment				0.43
Not employed	31 (25%)	20 (28%)	11 (22%)	
Employed	92 (75%)	52 (72%)	40 (78%)	
Parent weight status				
Parent body mass index	31.2±8.5	31.0±8.2	31.3±8.9	0.86
Parent concern about child's weight[g]				**0.06**
No	68 (55%)	45 (63%)	23 (45%)	
Yes	55 (45%)	27 (38%)	28 (55%)	
Parent perceptions of their child's health[h]				**0.001**
≤ Good	49 (40%)	20 (28%)	29 (57%)	
≥ Very good	74 (60%)	52 (72%)	22 (43%)	
Parent-reported child health-related quality of life[e]				
Total summary score	74.0±17.9	76.5±18.6	70.6±16.4	**0.07**
Physical health score	72.7±24.2	71.8±26.4	74.0±20.9	0.63
Psychosocial health score	74.8±17.8	79.0±17.2	68.8±17.0	**0.0014**
Emotional functioning	73.0±19.4	76.7±18.8	67.8±19.1	**0.01**
Social functioning	76.0±23.0	79.9±22.5	70.6±22.8	**0.03**
School functioning	75.2±19.6	80.4±18.4	67.9±19.0	**0.0004**
Household-Level Characteristics				
Receipt of public assistance				0.22
No	50 (41%)	26 (36%)	24 (47%)	
Yes	73 (59%)	46 (64%)	27 (53%)	
Number of adults in the household				0.98
One adult	37 (30%)	22 (31%)	15 (29%)	
Two adults	71 (58%)	41 (57%)	30 (59%)	
≥ Three adults	15 (12%)	9 (13%)	6 (12%)	
Number of children in the household				**0.06**
One child	28 (23%)	12 (17%)	16 (31%)	
≥ Two children	95 (77%)	60 (83%)	35 (69%)	
Food insecurity[i]				0.74
Food-secure	84 (68%)	50 (69%)	34 (67%)	

	Total (n=123)	Missed work among caregivers		p-value[a]
		< 2 times/year (n=72, 59%)	≥2 times/year (n=51, 41%)	
Food-insecure	39 (32%)	22 (31%)	17 (33%)	

a: Bivariate associations evaluated for inclusion in further analyses using $p < 0.10$.

b: Non-white included Hispanic, black, American Indian, Asian, and mixed races.

c: Non-obese = 75th ≤body mass index (BMI) percentile <95th; Obese = BMI percentile ≥ 95th

d: Fisher's Exact test was used due to small sample size

e: Pediatric Quality of Life Inventory (Peds QL™) Version 4.0 Generic Core Scales were used.

f: Single includes never married, separated, divorced, and spouse deceased

g: No = not concerned and a little concerned; Yes = concerned and very concerned

h: ≤ Good included good, fair and poor; ≥ Very good included very good and excellent

i: The six-item short from of the U. S. Household Food Security Survey was used. Food insecure = Two or more affirmative responses to any of the six items.

Table 2.

Multivariate logistic regressions: Child-, parent- and household-level characteristics associated with missed work ≥ two times in the past year among caregivers of children with a body mass index at the 75th percentile or above, Minnesota, 2013–2017 (N=123)

	Missed work among caregivers: ≥2 times/year	
	OR (95% CI)	**p-value**
Child-Level Characteristics		
Asthma diagnosis		
Yes (Reference: No)	1.70 (0.54–5.35)	0.37
Number of visits to a health care provider for an illness or health condition		
≥2 times per year (Reference: <2 times per year)	5.80 (2.44–13.76)	**<0.0001**
Parent-Level Characteristics		
Parent concern about child's weight[a]		
Yes (Reference: No)	1.15 (0.44–3.03)	0.78
Parent perceptions of their child's health[b]		
≤ Good (Reference: ≥ Very good)	3.00 (1.15–7.87)	**0.03**
Parent-reported child health-related quality of life[c]		
Total summary score	0.99 (0.97–1.03)	0.93
Household-Level Characteristics		
Number of children in the household		
≥ 2 children (Reference: One child)	0.76 (0.28–2.09)	0.60

OR = odds ratio; 95% CI = 95% confidence interval

a: No = not concerned and a little concerned; Yes = concerned and very concerned

b: ≤ Good includes good, fair and poor; ≥ Very good includes very good and excellent

c: Variable was modeled as a continuous variable