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Routinely Sleeping Away from Home and the Association with Child Asthma Readmission

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Abstract

The increased prevalence of transitions between households may have implications for child asthma morbidity. We, therefore, sought to enumerate the prevalence of regularly spending nights sleeping away from home among children admitted to the hospital for asthma and to examine the relationship of nights away to asthma-related readmission. This was a population-based, prospective cohort of 774 children, aged 1–16 years, who were admitted with asthma or bronchodilator-responsive wheezing and enrolled in the Greater Cincinnati Asthma Risks Study. The study took place at Cincinnati Children's Hospital Medical Center, an urban, academic children's hospital in the Midwest. The primary exposure was regularly spending nights away from home. Selected covariates included caregiver marital status, shift work, child's race, income, psychological distress, and running out of/not having medications on hand. The primary outcome was asthma-related readmission within 12 months. A total of 19% were readmitted within 12 months. The 33% of children that spent 1 night away from home per week were significantly more likely to be readmitted than those who spent no nights away (25% vs. 16%, $p=0.002$). Spending nights away from home (adjusted relative risk (aRR) 1.5, 95% confidence interval (CI) 1.2–2.0) and lower income (aRR 2.6, 95% CI 1.1–6.4) were the strongest independent predictors of readmission after adjusting for child age, gender, and race, and caregiver marital status, shift

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work, risk of psychological distress, and running out of meds. Increased awareness of the multiple settings in which children with asthma live may help shape more comprehensive approaches to asthma care.

Keywords

Asthma; asthma exacerbation; family lifestyle; risk factor; pediatrics

For many children with asthma, care occurs primarily at home with regular surveillance by a primary care physician. However, for others, asthma care at home is inconsistent and the course is characterized by repeated emergency room (ER) visits and hospital admissions. Many have explained excess asthma-related morbidity and health service utilization by focusing on race and socioeconomic status. However, there is emerging evidence that family structure and functioning are key contributors to health outcomes.(1–3)

The composition of the American family is changing, with increased rates of non-marital childbirth, cohabitation, and maternal employment since the 1960's.(1) There is also increasing prevalence of joint physical custody in which a child spends at least one-third of his or her time with a non-resident parent. As many as 60% of these children experience overnight visits at least once weekly.(4) An increased prevalence of non-traditional families, working mothers, and transitions between households may have implications for chronic asthma care. Each day, parents must balance the demands of working and raising children, demands that may impede the development of routines around asthma care. Previous research has found that regular asthma medication administration routines are associated with improved adherence and reduced morbidity.(5, 6) However, in non-traditional families, this responsibility is often shared by multiple asthma caregivers and may be even more challenging if some of the caregivers do not live with the child.(7) Daily asthma care may be in the context of a child moving between homes and such transitions may disrupt routine care,(8) thereby putting children at risk for increased asthma-related morbidity. To our knowledge, however, no study has explored the potential effect of a child regularly spending nights away from home on asthma-related readmission.

Thus, among a cohort of children hospitalized for asthma, our study sought to enumerate the frequency with which children regularly spent nights away from home and to examine the relationship between spending nights away and asthma-related readmission. We hypothesized that children who routinely spend nights sleeping away from their primary homes are more likely to experience an asthma-related readmission in the subsequent year. The identification of children spending nights away may, therefore, alter care plans, targeting interventions to those whose daily asthma management routine is at risk of breaking down.

Methods

Study Design and Population

Data for this study were analyzed as part of the Greater Cincinnati Asthma Risks Study (GCARS), a population-based, prospective, observational cohort of children, aged 1 to 16

years, who were admitted to Cincinnati Children's Hospital Medical Center (CCHMC) with an admission diagnosis of asthma or bronchodilator-responsive wheezing. Children were recruited between August 11, 2010 and October 20, 2011, during their hospitalization. Eligible patients were identified by use of the evidence-based clinical pathway for acute asthma or bronchodilator-responsive wheezing by the admitting physician. This pathway includes standardized orders for systemic corticosteroids, nebulized bronchodilators, and weaning criteria. Children were excluded if they had comorbid cardiac or pulmonary disease (e.g., congenital heart disease or cystic fibrosis), if they were removed from the asthma pathway prior to discharge, if they resided outside of the 8-county primary service area, or if the primary caregiver did not understand written or spoken English (roughly 2% of those otherwise eligible). Study recruitment took place, on average, 7 days per week and 12 hours per day.

Of the 1,312 patients admitted meeting eligibility criteria, 81 (6.2%) patients were admitted during times when research staff was not available. Research personnel were unable to complete the consent process with 109 (8.3%) patients. A total of 346 refused to participate in the study and 2 withdrew their participation during the study. Overall, 774 children were enrolled in the study. Altogether, research personnel enrolled 59.0% of those eligible and 62.9% of those eligible with staff available to recruit.

Once eligible children were enrolled in the study, the parent present in the hospital was interviewed in-person by trained clinical research coordinators. Survey data were captured using Research Electronic Data Capture (REDCap), a secure, web-based application.⁽⁹⁾ The CCHMC Institutional Review Board approved this study.

Outcome

The primary outcome was a repeat admission for asthma or bronchodilator-responsive wheezing within 12 months of the index admission. Readmission data were captured by International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) classification codes of primary or secondary discharge diagnoses (493.XX or 786.07 for asthma or wheeze, respectively) recorded in hospital billing data. Readmission events were validated by chart review to ensure the repeat admission met the same inclusion and exclusion criteria as the index admission. Occurrence of a readmission event was defined as a dichotomous (yes/no) variable. A follow-up telephone contact for a randomly selected 25% subset of enrolled children confirmed that at least 95% maintained residence in the 8-county primary service area; none of those reached reported having been admitted to hospitals other than CCHMC.

Predictors and Covariates

The primary predictor variable was spending nights away from home. Parents were asked "On average, how often does your child sleep away from home (e.g., at grandparents, cousins, etc.?)" and selected from categories "0 nights per week, 1–2 nights per week, 3 or more nights per week." Given a small sample that reported spending 3 or more nights away, this variable was dichotomized at 0 nights and 1 night away per week. Those spending 1 night away were considered to be the at-risk category.

Next, we analyzed covariates that were chosen *a priori* as potential sociodemographic characteristics of a child who might regularly spend nights away from his or her primary home. Single parenthood has been linked to an increase in asthma diagnosis, increased ER visits, and increased reutilization (return to ER or readmission) among asthmatic children. (10–13) Parental marital status in our cohort was assessed as part of the survey, and respondents self-categorized themselves as married, single, divorced, widowed, or separated. Non-traditional shiftwork was hypothesized to be associated with a child spending nights away from home. The responding parent reported their work schedule as predominantly day shift (6 a.m.–6 p.m.), evening shift (2 p.m.–midnight), night shift (9 p.m.–8 a.m.), variable shifts, or identified that they did not work outside the home.

Both minority race and low income have been previously linked to asthma-related readmissions.(14–16) Parents identified the race of their child as White, African American, multiracial, or other (includes Asian, Pacific Islander, Native American). Annual household income was also recorded, via self-report, and analyzed as a categorical variable (<\$15,000, \$15,000–29,999, \$30,000–59,999, \$60,000–89,999, and \$90,000). Initial analysis revealed that children from homes with annual household income \$60,000 had a significantly lower rate of readmission than those with income <\$60,000 with no other evidence of a dose-response relationship. Therefore, income was dichotomized above and below this value.

In addition to race and income, maternal depression has been associated with poor outcomes for children with asthma.(17, 18) We screened for parental risk of psychological distress using the Kessler 6 (K6), a short questionnaire designed to assess non-specific risk for any Diagnostic and Statistical Manual Fourth Edition (DSM-IV) diagnosis other than substance abuse, including major depression and anxiety disorders.(19, 20) The K6 asks whether the respondent, in the past 30 days, felt nervous, hopeless, restless or fidgety, depressed, that everything was an effort, or worthless. Parents responded to each question according to a 5-point Likert scale (ranging from none to all of the time). Responses were tallied and scored by defined K6 criteria. According to previously published optimal scaling rules, a score of 13 indicates increased risk for psychological distress.(21)

Finally, poor adherence to asthma medications has also been linked to increased morbidity. (22) Although we were not able to determine from available data whether children were truly adherent to prescribed medications, we did assess medication availability via parental report. To determine if children were less likely to have the appropriate medications available, parents were asked “Have you ever run out of medications for the patient’s asthma and not had any on-hand when he/she was having an attack?” (yes/no).

Statistical Analysis

Descriptive statistics were used to assess the distribution of nights away from home along with key demographic variables and selected covariates (parental marital status, shift work, child race, income, parent risk of psychological distress, and running out of/not having medications on hand) within our cohort. Bivariate associations between these factors and readmission were assessed using Chi-square statistics. Logistic regression then assessed the likelihood of readmission for a child who regularly spent 1 night away from home. Stepwise selection procedures within logistic regression determined which patient- and

family-level characteristics and covariates, in addition to nights spent away from home, were most strongly associated with readmission. An adjusted relative risk (aRR) was estimated using log binomial regression. In a secondary analysis, we assessed bivariate associations between each of the selected covariates and spending nights away from home using Chi-square statistics. Analyses were performed using Statistical Analysis System (SAS) software (version 9.3. Cary, NC, USA).

Results

Of the 774 patients enrolled in GCARS, the mean age was 6.2 (standard deviation [SD] 4.0) years. The majority were male, African American, publicly-insured, and reported annual household income <\$30,000 (Table 1). Nearly two-thirds of responding parents self-identified as single. One-third of enrolled children were reported to spend at least one night away from home per week. Compared to enrolled children, those who were eligible but not enrolled did not differ with respect to age, gender, or readmission rate at 12 months. Enrolled children were, however, more likely to be African American and publicly insured.

Table 2 shows that 19% of children enrolled in the GCARS cohort were readmitted for asthma or bronchodilator-responsive wheezing within 12 months of the index admission. Children who spent 1 night away from home per week were significantly more likely to be readmitted than those who spent no nights away (25% vs. 16%, $p=0.002$). Additional characteristics significantly associated with readmission included age <12 years, African American race, income <\$60,000, and having a single parent.

Adjusted for age and gender, children who regularly spent 1 night away from home per week had a 1.6 times (95% confidence interval [CI] 1.2–2.1) greater risk of readmission to the hospital for asthma within one year of the index admission than those that spent no nights away (Table 3, Model 1). After inclusion of a broad set of potential covariates, spending 1 night away from home per week and income <\$60,000 remained strong, significant predictors of repeat hospital admission for asthma when all demographic characteristics were considered (Table 3, Model 2).

We further explored selected covariates that might be associated with a child regularly spending nights away from home (Table 4). Single, divorced, widowed or separated marital statuses and working evening or nightshift were associated with spending nights away from home. In addition, race, income, and increased psychological distress (K6 score 13) were each significantly associated with a child spending nights away from home.

Discussion

Many children admitted for asthma routinely spend nights away from home. In fact, one-third of children in our hospitalized cohort spent one or more nights away from home each week. Children who routinely spent nights away from home had a 1.5 times greater risk of being readmitted for asthma within one year. Parental marital status, work shifts and parental mental health were associated with the likelihood of a child spending nights away from home.

We found a striking prevalence of children who routinely spend nights away from their primary home and a strong association with readmission even after adjusting for key covariates. We found no prior literature that has directly addressed this issue. Family structure is gaining attention as a critical determinant of child health. Prior literature has documented worse health and increased asthma prevalence in children who have unstable maternal residential partnerships.(23) In addition, children from homes with single parents are not only more likely to have a diagnosis of asthma, but are also more likely to experience an ER visit or repeat ER visit or hospitalization for asthma than children with married parents.(11–13) The Childhood Asthma Management Program (CAMP) reported that participants with single parents were more likely to miss or reschedule study visits, and were less likely to complete daily symptom diaries.(10) While these studies clarified the importance of family structure, none explicitly examined its implications for children moving between homes.

We could not identify precisely why spending nights away from home was associated with readmission. Failing to have asthma medication on hand did not appear to explain the association. However, adherence based on parental report is problematic, and we had no way to ascertain adherence in the second home. The relationship between nights away and readmission was robust to adjustment to multiple other covariates. It is plausible that the association results from the added complexity of family functioning and nontraditional routines when children must make multiple care transitions. In fact, in the National Cooperative Inner-City Asthma Study (NCICAS), a cohort with 76% single mothers, reported an average of 3.4 asthma caregivers per child.(7) If these care transitions are characterized by poor communication, unclear division of responsibility, and lack of adequate adult supervision of child medication administration, this kin-care may result in disruption to routine care for a child with asthma.(8) This may, in turn, lead to exacerbation of symptoms and healthcare utilization. Prior work has shown that simply having routines around asthma medication administration improves medication adherence and attendance at preventative doctor visits, and decreases ER visits.(3, 5)

In addition to identifying routinely spending nights away from home as a risk factor for hospital admission in children with asthma, our study sought to “phenotype” children who regularly spent nights away from home by exploring a range of covariates. Children of single parents and of parents that worked the night shift were significantly more likely to spend nights away from home than children whose parents were married and worked the traditional day shift, respectively. Children whose parents scored highest on a measure of risk of psychological distress were also more likely to regularly spend nights away from home. Clearly, there may be complex, adaptive reasons for a child to regularly move between homes. Such movement may result in positive impacts for child well-being in some cases while resulting in adverse effects on child asthma morbidity for others.

Potential Implications

Knowing that children with asthma frequently spend nights away from home and that nights away from home is related to readmission has important implications for healthcare providers who craft care plans for a mobile population. Spending nights away from home

naturally involves transitions between parents or caregivers. New strategies may need to be developed to allow successful incorporation of asthma management across multiple residences. If daily asthma management is embedded into existing family structures and routines, then the practice of regularly spending nights away may begin to be minimized as a risk factor for readmission.

Our data suggests that routinely spending nights away from home is the norm for many hospitalized children with asthma, a factor that increases the risk for repeat hospital admission. In light of this data, practitioners should consider asking about spending nights away from home and work with families to craft discharge plans, follow up plans, and asthma care plans that place minimal strain on existing family structures.(24) To date, clinical care has not been shaped by issues surrounding family structure, functioning, and the day-to-day routines of children with asthma.

Limitations

Our study introduces “spending nights away from home” as a significant factor in the lives of children with asthma. This study is not without limitations, however. First, we did not have an objective measure of adherence to compare between children who spent nights away from home and those who did not. Parents of children who spent nights away from home were no more likely to admit to having no medications available during an attack. Still, we likely encountered reporting bias with this item; therefore, it would have been valuable to have a more complete assessment of adherence. In addition, it is possible that additional exposures, such as allergens or environmental tobacco smoke may have differed between the two groups. We were unable, from the data available, to determine environmental exposures at all sites frequented by enrolled children. Given that many in-home exposures that affect asthma (e.g., cockroaches) disproportionately impact impoverished communities,(25) we expect that this limitation is mitigated, in part, through our adjustment for income. Finally, our cohort involved only children hospitalized with asthma from a single medical center, a cohort marked by a relatively high proportion of African American children and children with low income. Thus, our findings may not be generalizable to other regions or populations.

Determining what factors are on the pathway between nights away from home and readmission is beyond the scope of this study. Certainly we cannot assume that sleeping away from home causes worsened asthma control, as it may be true that children with worse asthma control tend to spend nights away to enlist other caregivers to help with management. Indeed, to fully understand the effect on asthma morbidity, further work should explore the physiologic impact of spending nights away from home.

Conclusions

Regularly spending nights away from home is common among children hospitalized with asthma and is independently associated with asthma-related readmission. Screening related to a child’s routines and shifts in caretaking, as well as awareness of a parent’s marital status, work schedules, and level of psychological distress may help providers identify

children at risk for breakdown in chronic asthma care. Integration of asthma care plans into existing routines is potentially a key target for reducing asthma morbidity.

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Abbreviations

aRR	Adjusted relative risk
CI	Confidence interval
ER	Emergency Room
GCARS	Greater Cincinnati Asthma Risk Study
CCHMC	Cincinnati Children's Hospital Medical Center
ICD-9CM	International Classification of Diseases, 9 th Edition, Clinical Modification
K6	Kessler 6
DSM-IV	Diagnostic and Statistical Manual Fourth Edition
SD	Standard deviation
CAMP	Childhood Asthma Management Program
NCICAS	National Cooperative Inner-City Asthma Study

References

1. Bass LE, Warehime MN. Family Structure and Child Health Outcomes in the United States. *Sociologic Inquiry*. 2011; 81(4):527–548.
2. Gorman BK, Braverman J. Family structure differences in health care utilization among U.S. children. *Social Science & Medicine*. 2008; 67(11):1766–1775. [PubMed: 18938007]
3. Fiese BH, Wamboldt FS. Tales of pediatric asthma management: family-based strategies related to medical adherence and health care utilization. *Journal of Pediatrics*. 2003; 143(4):457–462. [PubMed: 14571219]
4. Kelly JB. Children's Living Arrangements Following Separation and Divorce: Insights From Empirical and Clinical Research. *Family Process*. 2007; 46(1):35–52. [PubMed: 17375727]
5. Fiese BH, Wamboldt FS, Anbar RD. Family asthma management routines: Connections to medical adherence and quality of life. *Journal of Pediatrics*. 2005; 146(2):171–176. [PubMed: 15689901]
6. Peterson-Sweeney K, Halterman JS, Conn K, Yoos HL. The Effect of Family Routines on Care for Inner City Children with Asthma. *Journal of Pediatric Nursing*. 2010; 25(5):344–351. [PubMed: 20816556]
7. Wade S, Weil C, Holden G, et al. Psychosocial characteristics of inner-city children with asthma: A description of the NCICAS psychosocial protocol. *Pediatric Pulmonology*. 1997; 24(4):263–276. [PubMed: 9368260]

8. Klinnert MD, Kaugars AS, Strand M, Silveira L. Family Psychological Factors in Relation to Children's Asthma Status and Behavioral Adjustment at Age 4. *Family Process*. 2008; 47(1):41–61. [PubMed: 18411829]
9. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*. 2009; 42(2):377–381. [PubMed: 18929686]
10. Spicher M, Bollers N, Chinn T, et al. Adherence in single-parent households in a long-term asthma clinical trial. *Pediatric Nursing*. 2012; 38(4):207–213. 238. [PubMed: 22973604]
11. Midodzi WK, Rowe BH, Majaesic CM, Saunders LD, Senthilselvan A. Early Life Factors Associated with Incidence of Physician-Diagnosed Asthma in Preschool Children: Results from the Canadian Early Childhood Development Cohort Study. *Journal of Asthma*. 2010; 47(1):7–13. [PubMed: 20100014]
12. Klinnert MD, Price MR, Liu AH, Robinson JL. Morbidity Patterns Among Low- Income Wheezing Infants. *Pediatrics*. 2003; 112(1):49–57. [PubMed: 12837867]
13. Moncrief T, Beck AF, Simmons JM, Huang B, Kahn RS. Single Parent Households and Increased Child Asthma Morbidity. *Journal of Asthma*. in press.
14. Centers for Disease Control and Prevention. Summary of health statistics for US children: National health interview survey. 2011; 10(254):17.
15. Miller JE. The effects of race/ethnicity and income on early childhood asthma prevalence and health care use. *American Journal of Public Health*. 2000; 90(3):428–430. [PubMed: 10705865]
16. Robinson LD, Jr, Calmes DP, Bazargan M. The Impact of Literacy Enhancement on Asthma-Related Outcomes Among Underserved Children. *Journal of the National Medical Association*. 2008; 100(8):892–896. [PubMed: 18717138]
17. Feldman JM, Acosta Perez E, Canino G, McQuaid EL, Goodwin RD, Ortega AN. The role of caregiver major depression in the relationship between anxiety disorders and asthma attacks in island Puerto Rican youth and young adults. *The Journal of Nervous and Mental Disease*. 2011; 199(5):313–318. [PubMed: 21543950]
18. Ortega AN, Goodwin RD, McQuaid EL, Canino G. Parental Mental Health, Childhood Psychiatric Disorders, and Asthma Attacks in Island Puerto Rican Youth. *Ambulatory Pediatrics*. 2004; 4(4): 308–315. [PubMed: 15264963]
19. Kessler RC, Barker PR, Colpe LJ, et al. Screening for Serious Mental Illness in the General Population. *Archives of General Psychiatry*. 2003; 60(2):184–189. [PubMed: 12578436]
20. Kessler RC, Andrews G, Colpe LJ, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*. 2002; 32(6):959–976. [PubMed: 12214795]
21. Kessler RC, Green JG, Gruber MJ, et al. Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) survey initiative. *International Journal of Methods in Psychiatric Research*. 2010; 19(Suppl 1):4–22. [PubMed: 20527002]
22. Milgrom H, Bender B, Ackerson L, Bowry P, Smith B, Rand C. Noncompliance and treatment failure in children with asthma. *The Journal of Allergy and Clinical Immunology*. 1996; 98(6 Pt 1):1051–1057. [PubMed: 8977504]
23. Bzostek SH, Beck AN. Familial instability and young children's physical health. *Social Science & Medicine*. 2011; 73(2):282–292. [PubMed: 21684646]
24. Drotar D, Bonner MS. Influences on Adherence to Pediatric Asthma Treatment: A Review of Correlates and Predictors. *Journal of Developmental and Behavioral Pediatrics*. 2009; 30(6):574–582. [PubMed: 19996903]
25. Gruchalla RS, Pongratic J, Plaut M, et al. Inner City Asthma Study: relationships among sensitivity, allergen exposure, and asthma morbidity. *The Journal of Allergy and Clinical Immunology*. 2005; 115(3):478–485. [PubMed: 15753892]

Table 1

Sample demographic characteristics (N=774)

<i>Characteristic</i>	N	%*
Age (years)		
<12	693	89.5
12	81	10.5
Sex		
Male	503	65.0
Female	271	35.0
Insurance		
Public	562	73.9
Private	171	22.5
Self-pay	27	3.5
Race		
Black/African American	441	57.2
White/Caucasian	254	32.9
Multiracial	68	8.8
Other	8	1.0
Annual household income (\$)		
<15,000	261	34.3
15,000–29,999	212	27.9
30,000–59,999	154	20.3
60,000–89,999	78	10.3
90,000	55	7.2
Marital status		
Married	209	27.1
Single	484	62.9
Divorced/Widowed/Separated	77	10.0
Nights away from home (weekly)		
0	514	67.0
1–2	188	24.5
3	65	8.5

* May add to more or less than 100 based on rounding

Table 2

Bivariate associations between sample demographic characteristics and readmission within 12 months of an index admission (N=774)

<i>Characteristic</i>	% with Readmission	P*
All	19	
Age (years)		
<12	20	0.03
12	10	
Sex		
Male	19	0.6
Female	18	
Race		
Black/African American	23	0.001
White/Caucasian	11	
Multiracial	18	
Other	25	
Annual household income (\$)		
<15,000	21	<0.001
15,000–29,999	20	
30,000–59,999	22	
60,000–89,999	10	
90,000	4	
Marital status		
Married	13	0.02
Single	22	
Divorced/Widowed/Separated	16	
Nights away from home (weekly)		
0	16	0.002
1–2	24	
3	28	

* P-value calculated from Chi-square statistics

Table 3

Adjusted risk of readmission within 12 months

Variable	Adjusted Relative Risk (95% Confidence Interval)**	
	Model 1*	Model 2†
Nights away from home		
1	1.6 (1.2–2.1)	1.5 (1.2–2.0)
Income		
<\$60,000	-	2.6 (1.1–6.4)

* Adjusted for child age and gender.

† Stepwise selection in Model 2 included nights away from home, child age, gender, and race, and income, marital status, shift work, psychological distress (K6), and running out of meds/not having any on hand. All covariates except nights away and income were found to be non-significant.

** Adjusted relative risk estimated using log binomial model

Table 4

Selected characteristics of children who spend nights away from home

	Nights away from home N (%)		P*
	0	1	
Marital Status			
Married	182 (87.5%)	26 (12.5%)	<0.001
Single	289 (59.8%)	194 (40.2%)	
Divorced/Widowed/Separated	43 (56.6%)	33 (43.4%)	
Shift Work			
Day	237 (69.9%)	102 (30.1%)	0.008
Evening	24 (58.5%)	17 (41.5%)	
Night	14 (41.2%)	20 (58.8%)	
Variable	83 (64.8%)	45 (35.2%)	
Does not work	156 (69.3%)	69 (30.7%)	
Race			
African American	270 (61.6%)	168 (38.4%)	<0.001
White	190 (75.1%)	63 (24.9%)	
Multiracial	46 (67.7%)	22 (32.4%)	
Other	8 (100.0%)	0 (0.0%)	
Income (\$)			
< 60,000	392 (62.7%)	233 (37.3%)	<0.001
60,000	115 (86.5%)	18 (13.5%)	
K6 Score			
<13	483 (68.5%)	222 (31.5%)	0.003
13	31 (50.0%)	31 (50.0%)	
Run out/No meds			
No	270 (66.5%)	136 (33.5%)	0.5
Yes	134 (63.8%)	76 (36.2%)	

* P-value calculated from Chi-square statistics