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Draycen D. DeCator
DePaul University, ddecator@gmail.com

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Depression in Youth with Asthma: Asthma Severity, Exposure to Violence and Poverty
Asthma, much like other chronic illnesses, increases the overall stress a child experiences. As a result of this extra stress, youth suffering with asthma are more susceptible to developing depression (Gillapsy, Hoff, Mullins, Van Pelt, & Chaney, 2002). Understanding the relationship between asthma and depression can help with the creation of more effective treatment methods.

Previous research regarding internalizing symptoms in youth with asthma has been mixed. For example, studies have found that children with asthma are more likely to have internalizing disorders than youth without asthma (Bussing, Burket, & Kelleher, 1996; Katon et al., 2007), but others have not found this effect (e.g., Mitchell, Murdock, & Berz, 2004; Wamboldt, Fritz, Mansell, McQuaid, & Klein, 1998). Given that asthma is more prevalent in low-income populations, it is important to examine whether income status as well as specific contextual features such as exposure to violence (Wright et al., 2004), or disease factors such as severity, differentially impact the relationship between poverty and depressive symptoms. Additionally, previous research suggests that depressive symptoms may increase the severity of asthma symptoms (Wood et al., 2006; Lim, Wood, & Miller, 2008). This is believed to happen by way of emotional triggering since asthma is considered a stress-sensitive disorder. Incorporating these variables could account for the discrepancy between the previous studies.

To better understand how depressive symptoms develop in youth with asthma, the current study has three objectives: (1) to examine if poverty predicts depressive symptoms in adolescents with asthma and whether asthma severity and exposure to violence moderate this relationship, (2) to examine if poverty moderates the relationship between depressive symptoms and asthma severity, and (3) to examine if exposure to violence moderates the relationship between depressive symptoms and asthma severity.

* Faculty Advisor: Jocelyn Smith Carter, Department of Psychology
Author contact: ddecat@gmail.com
relationship, (2) to determine if depressive symptoms, asthma severity, and poverty directly predict one another, and (3) to test for mediator effects between poverty and depressive symptoms when predicting asthma severity, and between asthma severity and poverty when predicting depressive symptoms.

METHOD

PARTICIPANTS
Participants in the current study consist of a subset of youth from the National Longitudinal Study of Adolescent Health (Add Health, 1994-1995) who endorsed having asthma \( (n = 665) \). At the time of data collection, these participants ranged from grades 7-12 in school, and the number of children in each grade was relatively equal, ranging from 84-124 \( (M = 108.33, SD = 16.03) \). In addition, there were 15 who were either not in school (12) or did not go to a school with grade levels (3). The sample was also split relatively equally between sexes, with 321 (48%) being female and 344 (52%) being male. Out of the entire sample, 448 (67%) identified as White, 178 (27%) as African American, 36 (5%) as American Indian/Native American, 17 (3%) as Asian/Pacific Islander, and 43 (7%) as Other. When the 49 (7%) who identified with multiple races were asked to choose a primary race they most identified with, 21 (43%) identified as White, 20 (41%) as African American, 4 (8%) as American Indian/Native American, 1 (2%) as Asian/Pacific Islander, and 3 (6%) as Other. Additionally, 65 (10%) of the entire sample identified as being of Hispanic origin. More information on the Add Health study as a whole and access to publicly-available data can be found at the project’s website (cpc.unc.edu/projects/addhealth).

MEASURES
Depressive symptoms were assessed through the 19-item Center for Epidemiological Study – Depression (CES-D) measure. Asthma severity was assessed through a composite of three self-report variables including; (1) frequency of missed school days due to an illness or emotional problem; (2) frequency of missed social activities due to an illness or emotional problem; (3) and a rating of their general health. Poverty was measured through a parent report on whether the participants’ households had enough money for bills, whether they had received food stamps in the past month, and whether the parent had been unemployed in the past month. Exposure to violence was measured using the participants’ self-responses to whether or not they had seen someone shot or stabbed in the past year.

RESULTS
Multiple regression was used to examine poverty as a predictor of depressive symptoms in youth with asthma. The effect of poverty was significant \( (ß = .08, p < .05) \), indicating that higher levels of poverty predicted more depressive symptoms. Asthma severity and exposure to violence were examined as moderators of the effects of poverty on depressive symptoms using a hierarchical multiple regression. The poverty x asthma severity interaction showed a trend towards significance \( (ß = .06, p = .09) \). Post-hoc probing of this interaction effect was conducted through simple slopes analyses. At high levels of asthma severity, poverty was a significant predictor of symptoms \( (ß = .13, p < .01) \) while at low levels of asthma severity, poverty was not significant (see Figure 2). The poverty x exposure to violence interaction was also not significant.

Additional analyses were run to determine whether more complex relationships between depressive symptoms, poverty, and asthma severity were present. Depressive symptoms significantly predicted asthma severity \( (ß = .36, p < .001) \) and asthma severity significantly predicted depressive symptoms \( (ß = .35, p < .001) \) showing a bi-directional relationship. A non-significant relationship was found for poverty as a predictor of asthma severity and asthma severity as a predictor of poverty. These findings are summarized in Figure 1.

Finally, formal tests of mediation were conducted as described by Baron and Kenny (1986) and Holmbeck (2002). Previous analyses showed that poverty predicted depressive symptoms and depressive symptoms
predicted asthma severity. When both poverty and depressive symptoms were entered as predictors of asthma severity, the effects of each variable remained unchanged, suggesting that there is no mediation effect present. Additionally, previous analyses showed that asthma severity and poverty both significantly predicted depressive symptoms independently. When poverty and asthma severity were entered together as predictors of depressive symptoms, their effects did not change, suggesting that there is no mediation effect present here either.

**DISCUSSION**

The findings support the idea that the relationships between asthma and depressive symptoms are complex and bidirectional. Although the results do suggest there is a strong direct relationship between asthma severity and depressive symptoms, which is consistent with what previous studies have found (Richardson et al., 2007; Wood et al., 2006), there was also a bi-directional relationship between the two. Additionally, poverty, which is a disproportionately common variable in the lives of children with asthma, was found to increase depressive symptoms, and the relation with these internalizing symptoms is moderated by the severity of asthma symptoms. The current study found no evidence that depressive symptoms mediate the relationship between poverty and asthma severity or that a mediator relationship exists between poverty and asthma severity in relation to depressive symptoms. Although there was no direct connection between poverty and asthma severity, and exposure to violence was not found to interact with the effect poverty has on depressive symptoms, there is still evidence for a complex interaction model at work in this population.

The findings support the use of comprehensive treatment plans to assist youth with asthma. Currently, asthma is mostly treated with medication, usually in the form of an inhaler. Unfortunately, this treatment does not take into account potential internalizing symptoms (e.g., depression) or contextual influences (e.g., poverty, exposure to violence). Doctors becoming more cognizant of the factors contributing to depressive symptoms in youth with asthma can help ensure that the youth who need psychological aid are noticed. Once these children are identified, they can be given treatment (via medication and/or therapy) for their depressive symptoms, which can (in conjunction with the asthma medication) decrease the severity of asthma symptoms. This could potentially create a positive feedback loop where depressive symptoms continue to decrease while asthma severity also diminishes.

There are several limitations to the findings of this study. First, the data used was from another study which was not specifically designed for the current research goals. Consequently, three of the variables used (exposure to violence, poverty, and asthma severity) were indirectly determined by methods which have no previous empirical support, but were conceptually similar to previous operationalizations of these terms. Second, there are many other potentially relevant variables that were not assessed. For example, family support and structure could significantly affect depressive symptoms, which in turn could raise or lower the severity of asthma symptoms. Finally, the current study was cross-sectional in nature, which limited the ability to determine the direction of effects. To address these limitations, further research should focus on following the same groups of children longitudinally so that prospective risk and protective factors can be better assessed. Future studies should also utilize empirically-supported measures to more accurately determine asthma severity and poverty level. Additionally, other contributing variables such as days of school missed, reduced sleep at night due to symptoms, peer and family support, and stressors could also be implicated in playing causal roles in the relations among poverty, depressive symptoms, and asthma severity.
REFERENCES


