

ADHERENCE

Minors' Attitudes toward Peers with Asthma: A Developmental Study

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Objective. Peers can play a critical role in asthma management, with attitudes toward friends with asthma hindering or supporting self-management. We explored minors' attitudes toward peers with asthma, testing if attitudes varied by grade, sex, asthma knowledge, and asthma status. **Methods.** Three hundred and eighty-one students in grades 5–11 (51% female; 51% White, non-Hispanic; 12% with asthma) read five vignettes about peers with asthma, and rated the characters on 10 adjective pairs (e.g., afraid/brave and sad/happy). Three vignettes portrayed an aspect of uncontrolled asthma (asthma-related school absence, asthma-related limited physical activity, and asthma-related school nurse visit). One vignette depicted controlled asthma; one described taking medication publically. We computed a total attitude score for each vignette and a mean attitude score across the three uncontrolled vignettes. Linear regression analyses tested the effect of each predictor (grade, sex, asthma knowledge, and asthma status) on attitudes, as well as the interaction of asthma status with the remaining three predictors. **Results.** Grade was the most robust predictor. Participants in higher grades tended to have more favorable attitudes toward peers with asthma, except for the controlled asthma vignette where participants in lower grades had more favorable attitudes. There were significant interactions between grade and asthma status for the stop-running-and-taking-medication-publically vignettes: among those with asthma, participants in higher grades had more favorable attitudes. Sex interacted with asthma status for the overall uncontrolled, absence, and stop-running vignettes; among those with asthma, girls had more favorable attitudes. **Conclusion.** With increased grade, minors have better attitudes toward peers with asthma. Living with asthma may normalize asthma. Clinicians can use grade-specific findings to counsel patients.

Keywords adolescents, children, peers, school, self-management, stigma

INTRODUCTION

Asthma affects approximately 9.5% of all individuals under the age of 18 years in the United States (1). When uncontrolled, asthma negatively impacts minors' quality of life (2, 3). Peers can impact minors' asthma self-management (4, 5). Specifically, the attitudes of peers toward asthma may serve as an environmental factor that facilitates or hinders asthma self-management.

Minors with asthma often feel embarrassed about their disease (6, 7), particularly when they need to take their medication in front of others (8). Adolescents who felt embarrassed about their asthma were less likely to carry their asthma medication with them and use their medication in front of friends (6). The most important factor associated with medication nonadherence among children and adolescents is the fear of stigmatization (9). Relative to girls, 10- to 14-year-old boys have been found to be more comfortable taking asthma medication in front of peers (10), and are more likely to take asthma medication preventively (10, 11) as a potential means of avoiding feeling embarrassed by asthma symptoms in front of peers.

Due to the important role of peers on minors' compliance to treatment regimens, it is important to understand minors' attitudes toward their peers with asthma. Yet, few studies have assessed this. To our knowledge, only two studies have explored minors' attitudes about asthma, and they both compared attitudes of minors with asthma to those without asthma (12, 13).

The role of peers changes from middle school to high school (i.e., from childhood to adolescence). During adolescence, close friendships become more important, peer networks broaden, and peer group affiliation increases in importance (14). Friendships among girls are grounded in cooperation and relationship building, while friendships are competitive among boys (15). Adolescents begin to rely less on their parents and more on their peers for social support and emotional adjustment, and peers begin to contribute to one another's identity formation and well-being (16). This differential and critical role of peers, therefore, has the potential to influence attitudes toward peers with asthma in distinct ways at different developmental periods. Despite this, no studies have investigated developmental differences in such attitudes.

To address these unmet needs, this study explored minors' attitudes toward peers with asthma in both children and adolescents with and without asthma. We tested if attitudes varied by grade, sex, asthma knowledge, and asthma status.

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METHODS

Data for this study come from a study initiated by the superintendent and staff from a suburban New Jersey school district. Measures were chosen by and/or written with consultation from the last two authors. The survey and procedures were approved by the school superintendent; the use of de-identified data for this study was approved by the New York University School of Medicine Institutional Review Board (NYU IRB). School nurses distributed and oversaw the completion of surveys during the school day.

Attitudes toward Asthma Scale

Participants read five vignettes about peers with asthma, and rated the vignette characters on 10 adjective pairs (e.g., afraid/brave and weak/strong) using a 6-point scale ranging from 1 to 6 (e.g., very afraid, afraid, a little afraid, a little brave, brave, and very brave), with higher scores indicating more favorable attitudes toward the characters in the vignettes. Figure 1 lists all the 10 adjective pairs and the five vignettes. Each of the three vignettes portrayed an aspect of uncontrolled asthma (school absences, stopping physical activity due to asthma, or leaving class to go to the nurse). One vignette depicted controlled asthma (attending school, staying in class, and having uninterrupted physical activity), and one described taking medication publically. To measure attitudes, a total score across the 10 adjective pairs was computed for each vignette, as well as an overall mean score for the three uncontrolled stories (i.e., a combined uncontrolled asthma vignette score).

The vignettes were written for the school by the last two authors using an iterative process. They first wrote the vignettes based on a review of the literature and

consultation with two pediatric pulmonologists. The vignettes were then read critically by the pediatric pulmonologists and two adult asthma patients who had asthma since childhood; revisions were made based on their feedback. The pulmonologists and adult patients agreed on the final vignettes. To develop the adjective pairs used to describe the vignette characters, undergraduate psychology students were asked to write down all adjectives, phrases, and descriptors that came to mind when (1) thinking of someone with asthma and then (2) someone who uses medication for asthma. Two research assistants independently coded the responses for themes. Differences were rectified through discussions with the last two authors until 100% agreement was achieved. Ten themes emerged, serving as the basis for the 10 adjective pairs. Internal consistency for the five vignettes ranged from 0.89 to 0.96.

Asthma Knowledge Index

Participants completed a 40-item index assessing knowledge of asthma triggers, consequences, treatment/management, and pathophysiology developed and used by the last two authors in prior research, which showed that the index had one factor (17, 18). Cronbach's alpha in this sample was 0.69.

Demographics

Demographic variables included grade, sex, and ethnicity. To determine asthma status, participants had to answer yes/no to the question: Do you have asthma?

Statistical Analyses

To test whether attitudes varied by grade, sex, asthma knowledge, and asthma status, we conducted two sets of

Adjective pairs

Poor–Rich
Afraid–Brave
Sad–Happy
Weak–Strong
Out of shape–Physically fit

Lazy–Hardworking
Unpopular–Popular
Unlucky–Lucky
Boring–Fun
Sick–Healthy

VignettesVignette #1: Absent*

John and Jennifer have asthma, which makes them miss school a lot.

Vignette #2: Stop running*

Andrew and Ann have asthma. They often have to stop running and playing sports because of their asthma.

Vignette #3: Leave class for nurse*

Mark and Melissa have to leave class a lot to go to the Nurse's office because they have asthma.

Vignette #4: Controlled asthma

Kevin and Kelly have asthma. They never miss school or leave class to go to the Nurse's office. They can run and play sports just like the other kids.

Vignette #5: Take medication in public

Thomas and Teresa have asthma and they have to take their asthma medicine in front of other kids in school.

* = Used to calculate the combined uncontrolled vignettes.

FIGURE 1.—Adjective pairs and vignettes.

linear regression analyses for each asthma vignette and for the combined uncontrolled asthma vignette score. SPSS software (version 20) was used for the analyses. We first tested the main effect of each of the four predictors—grade (5th and 7th grade versus 9th and 11th grade), sex, asthma knowledge, and asthma status—on attitudes. Next, we tested the interaction of asthma status with the remaining three predictors. We used grade as a predictor rather than age because students typically interact with classmates. While there may be a slight variability in age among peers within their grade, grade serves as a marker of social development.

RESULTS

Participants

Participants were 381 students in a suburban New Jersey school district in grades five [$n = 98$; mean age = 11.37 (0.51)], seven [$n = 85$; mean age = 13.19 (1.40)], nine [$n = 100$; mean age = 15.31 (0.51)], and eleven [$n = 98$; mean age = 17.24 (0.49)] who participated in a school-initiated asthma survey. Just over half (51%) were female. Participants self-identified as White, non-Hispanic (51%); African-American (15%); Hispanic (10%); bi-racial (11%); and other (13%), and 12% indicated that they had asthma.

Attitudes toward Peers with Asthma

Table 1 presents the means and standard deviations for each vignette, as well as the combined uncontrolled vignette score, for the overall sample as well as by grade, sex, and asthma status. Overall, attitudes toward uncontrolled asthma and taking medication publically were generally neutral; on a six point scale (1–6), the vignette means ranged from 3.12 to 3.49. In contrast, the controlled asthma vignette was viewed significantly more positive ($p < .001$) for all paired t -tests testing comparisons between the controlled vignettes and the uncontrolled

vignettes and the taking medication in public vignette. Correlations among three uncontrolled vignettes were high ($r = 0.43$ – 0.54).

Factors Associated with Attitudes of Peers with Uncontrolled Asthma

Table 2 presents the results of the regression analyses and Figures 2–4 illustrate the significant interactions with asthma status. When the uncontrolled asthma vignettes were combined, there was a significant interaction between asthma status and sex, such that among those with asthma, girls had more favorable attitudes toward peers with asthma (Figure 2a). There was also a significant main effect of grade: participants in higher grades had more favorable attitudes than participants in lower grades.

With respect to the three individual uncontrolled stories, there was a significant interaction between asthma status and sex for the vignette regarding school absences. For those with asthma, girls had better attitudes toward their peers who were absent due to asthma (Figure 2b). There was also a significant main effect for grade with participants in higher grades having more favorable attitudes toward peers with asthma than participants in lower grades. For the vignette about needing to stop running, asthma status significantly interacted with sex, grade, and asthma knowledge (Figures 2c, 3a, and 4, respectively). For those with asthma, participants in higher grades, girls, and those with less asthma knowledge had significantly better attitudes toward their peers who needed to stop running or playing. For the vignette about leaving class to see the school nurse, there was a main effect for asthma status, such that those with asthma had better attitudes than those without asthma.

Factors Associated with Attitudes of Peers with Controlled Asthma

Grade and knowledge significantly predicted attitudes toward peers with controlled asthma (Table 2). Younger

TABLE 1.—Means and standard deviation for vignettes and asthma knowledge for the full sample and by grade, sex and asthma status.

	Vignettes						
	Uncontrolled asthma						
	Combined Uncontrolled Vignettes M (SD)	Vignette #1 Absent M (SD)	Vignette #2 Stop Running M (SD)	Vignette #3 Leave Class For Nurse M (SD)	Vignette #4 Controlled Asthma M (SD)	Vignette #5 Take Medication in Public M (SD)	Asthma Knowledge M (SD)
Full Sample	3.32 (0.69)	3.12 (0.84)	3.49 (0.89)	3.35 (0.80)	4.58 (1.05)	3.48 (0.92)	27.98 (4.02)
Grade							
5 and 7	3.21 (0.57)	2.96 (0.65)	3.38 (0.82)	3.28 (0.63)	5.00 (0.73)	3.28 (0.85)	27.89 (3.77)
9 and 11	3.43 (0.78)	3.27 (0.96)	3.60 (0.94)	3.42 (0.93)	4.17 (1.14)	3.67 (0.95)	28.07 (4.24)
Sex							
Male	3.27 (0.67)	3.03 (0.85)	3.29 (0.90)	3.29 (0.82)	4.52 (1.14)	3.49 (0.95)	27.25 (4.12)
Female	3.38 (0.71)	3.22 (0.83)	3.50 (0.89)	3.42 (0.79)	4.62 (0.95)	3.47 (0.91)	28.67 (3.84)
Has Asthma							
No	3.29 (0.64)	3.09 (0.78)	3.47 (0.87)	3.31 (0.74)	4.60 (1.05)	3.41 (0.88)	27.98 (3.96)
Yes	3.55 (0.96)	3.36 (1.19)	3.66 (1.01)	3.63 (1.13)	4.46 (1.09)	3.96 (1.09)	27.81 (4.38)

TABLE 2.—Predictors of attitudes by asthma vignette.

	Uncontrolled asthma vignettes											
	Combined		Vignette #1		Vignette #2		Vignette #3		Vignette #4		Vignette #5	
	Uncontrolled		Absent		Stop Running		Leave Class For		Controlled Asthma		Take Medication in	
	Vignettes		M (SD)		M (SD)		Nurse		M (SD)		Public	
	M (SD)		M (SD)		M (SD)		M (SD)		M (SD)		M (SD)	
	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>
Grade ^{a,c}	0.10 (0.04)	.004	0.15 (0.04)	<.001	0.11 (0.05)	.024	0.06 (0.04)	.175	−0.42 (0.05)	<.001	0.18 (0.05)	<.001
Sex ^{a,c}	−0.06 (0.04)	.127	−0.11 (0.04)	.015	−0.01 (0.05)	.919	−0.07 (0.04)	.113	−0.01 (0.05)	.858	−0.01 (0.05)	.867
Knowledge ^{a,d}	0.01 (0.01)	.326	0.002 (0.01)	.859	0.01 (0.01)	.281	0.01 (0.01)	.203	0.03 (0.01)	.039	0.01 (0.01)	.675
Asthma status ^{a,c}	0.12 (0.05)	.024	0.12 (0.07)	.068	0.08 (0.07)	.281	0.16 (0.06)	.013	0.01 (0.08)	.939	0.25 (0.07)	.001
Asthma status × grade ^{b,c}	0.10 (0.06)	.066	0.09 (0.07)	.207	0.15 (0.07)	.044	0.09 (0.07)	.153	0.02 (0.08)	.825	0.16 (0.07)	.031
Asthma status × sex ^{b,c}	−0.12 (0.05)	.032	−0.15 (0.07)	.025	−0.18 (0.07)	.014	−0.06 (0.06)	.366	0.02 (0.08)	.772	−0.01 (0.07)	.854
Asthma status × knowledge ^{b,d}	−0.02 (0.01)	.116	−0.02 (0.02)	.364	−0.05 (0.02)	.009	−0.02 (0.02)	.167	−0.01 (0.02)	.623	−0.01 (0.02)	.587

Note: ^aEstimates from the main effect models.

^bAnalyses for the interaction effect models included main effect predictors and three interaction terms. Only estimates for interaction terms are shown here.

^cGrade, sex, knowledge, and asthma are dichotomized variables and are effect coded as follows; grade: grades 9 and 11 = −1, grades 5 and 7 = 1; sex: male = 1, female = −1; asthma status: yes = 1, no = −1.

^dAsthma knowledge was centered at mean.

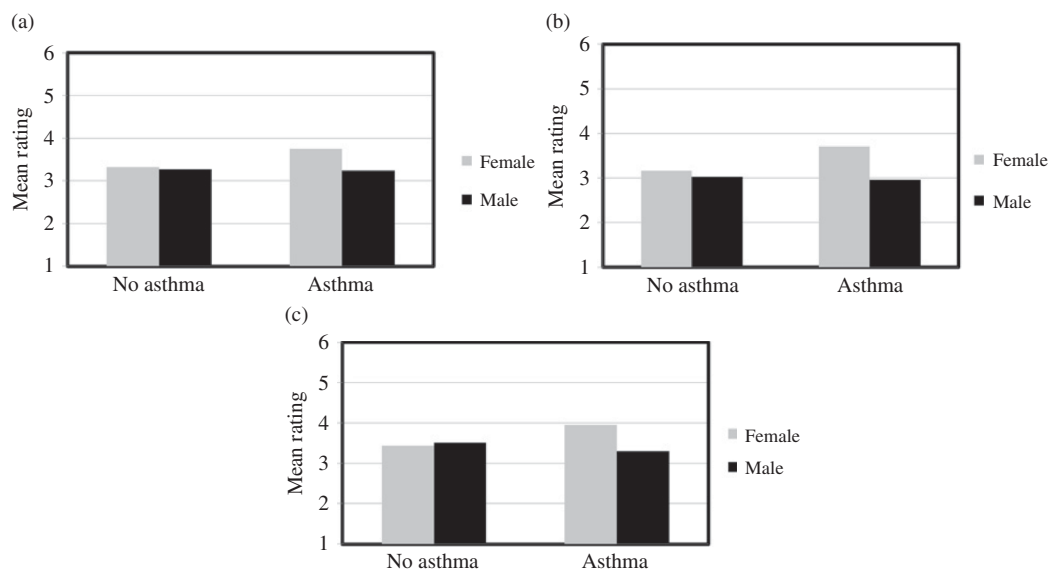


FIGURE 2.—Asthma status by sex interactions for vignette ratings. (a) Combined uncontrolled. (b) absent, and (c) stop running.

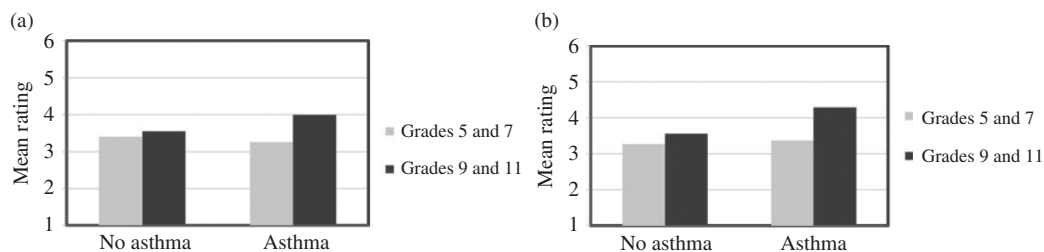


FIGURE 3.—Asthma status by grade interactions for vignette ratings. (a) Stop running and (b) take medication in public.

participants had significantly more favorable attitudes toward peers with controlled asthma, and better asthma knowledge was also associated with more favorable attitudes toward peers with controlled asthma.

Factors Associated with Perceptions of Peers Who Take Medication Publically

There was a significant interaction between grade and asthma status (Table 2 and Figure 3b). Among those with asthma,

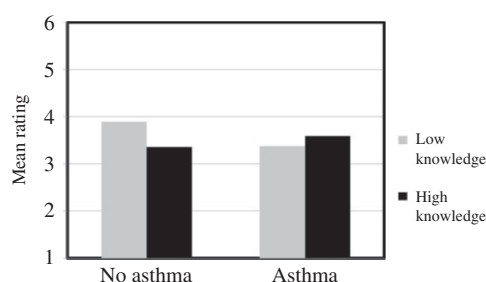


FIGURE 4.—Asthma status by knowledge interaction for the stop running vignette.

participants in higher grades had more favorable attitudes toward peers who take medication in front of other participants.

DISCUSSION

In a sample of participants in grades 5 through 11, we assessed the effect of grade, sex, asthma knowledge, and having asthma in predicting attitudes toward peers with asthma. We found that attitudes toward peers with asthma were generally positive, consistent with the findings of Gibson et al. (12). Grade level was the most robust predictor of attitudes toward asthma. Participants in higher grades generally had more favorable attitudes toward peers with uncontrolled asthma than their younger counterparts. This finding was consistent with that of Brook and Kishon (13), who found that tolerant attitudes toward peers with asthma increased with age among Israeli high-school students. These differences might be explained by the fact that relative to elementary and middle-school students, high-school students may have a more advanced knowledge of the body, illnesses, and science. This, in turn, may help them to be more tolerant and accepting of their peers with uncontrolled asthma.

Compared to participants in higher grades, participants in lower grades had more favorable attitudes toward peers with controlled asthma. Potter and Roberts (19) found that the more observable an illness was (i.e., more symptoms), the less attractive young children viewed the person with this illness. Participants in lower grades in our study, therefore, may have viewed uncontrolled asthma as less attractive, and thus were less tolerant, because uncontrolled asthma is observable. That is, they can see their peers leave class to go to the nurse or watch them sit out from physical activities. In addition, participants in lower grades may confound the development of illness with personal responsibility, such as being responsible for “catching” the illness (20). In contrast, students in higher grades may separate the two concepts, and recognize that caring for asthma is a necessary, positive step in maintaining well-being.

Our finding that asthma knowledge played a minor role in attitudes toward peers with asthma is noteworthy. This

suggests that it may not be asthma-specific knowledge that affects attitudes, but rather knowledge of science and physiology in general, which generally increases with age. While a positive relationship has been found between disease or disability-specific knowledge and attitudes toward those with the disease/disability (21), this relationship is not absolute. While some have found that providing information about developmental disabilities has increased tolerant attitudes among youth (22), others have found that providing youth information regarding epilepsy and diabetes had the reverse effect (19). Further research is needed to understand the role of disease-specific knowledge in attitudes.

Consistent with prior literature (12, 13), we also found that participants with asthma generally had more favorable attitudes about asthma than participants without asthma. While we would have anticipated this was due to better asthma knowledge, our findings regarding knowledge do not support this interpretation. Instead, the experience of living with asthma may normalize asthma. Thus, the experience of having asthma reduces the stigma, and improves attitudes toward peers with the disease.

Among participants with asthma, girls had more positive attitudes toward their peers with asthma than boys. This is consistent with research assessing attitudes toward peers with learning, behavioral, and physical disabilities (22, 23). One possible explanation for this sex difference is that adolescent females have higher levels of sympathy and perspective taking, or empathy, than their male counterparts (24). That is, females may not only feel more sympathy toward a peer with asthma and thus have more positive attitudes, but they may also be able to better take the perspective of their peers and understand how difficult it is to manage asthma. Of interest is our finding that this sex difference was present only in the group of participants with asthma. Perhaps the experience of living with asthma enhances any learned or innate empathic tendencies that exist between genders. This finding deserves further exploration.

Limitations

Data were collected in one suburban New Jersey school district. Therefore, results may not be generalizable to other geographic regions. In addition, all of the vignettes took place in school settings, perhaps limiting the generalizability of these results to nonschool settings, such as summer camp or extracurricular activities. In addition, the vignettes asked about the hypothetical situations instead of recalling real-life experiences. Hypothetical situations do not always capture real-life realities (25). Instead, real-world situations often involve stressors and other factors which may come into play and affect behavior and attitudes; thus, responses may have been different if our measures asked about real-life situations. We also relied solely on self-report data, which are potentially subject to reporting bias. Future research should consider

applying the method of peer nominations to provide additional insight into attitudes toward peers with asthma.

Implications for Clinicians

Despite these limitations, our findings have important clinical implications to help health-care providers, such as physicians, school nurses, and other allied health professionals, who care for children and/or adolescents with asthma improve adherence to treatment regimens. Because participants in lower grades viewed controlled asthma particularly positively, it may be especially important for providers working with elementary and middle-school aged patients to emphasize that taking medication helps control symptoms, which may in turn lead to their peers viewing them and their asthma more positively. While providers should acknowledge their teenage patients' self-consciousness regarding having asthma symptoms and taking medication in public, providers may also want to consider counseling adolescent patients that their peers do not think that asthma, in general, and specifically, taking medication in public, is negative. Our results regarding sex differences suggest that this is particularly relevant for female high-school participants. Also, because peers do not view going to visit the nurse as a negative activity, students with asthma could be advised to work closely with the nurse as a means of helping to control their asthma.

Our results also suggest that including peers without asthma in an asthma intervention may be beneficial to foster asthma management in youth with the illness. Allowing peers without asthma to express their nonnegative feelings and attitudes regarding their peers with asthma may help those with asthma see that having the illness is not as stigmatizing or embarrassing as they may think. If youth with asthma were to apply correct norms, they may correct the cognitive errors they are making, which may in turn foster better asthma management, including adherence to treatment regimens, and asthma control.

Currently, there is a paucity of tools to help clinicians and health educators assess how those with and without asthma feel. The vignettes developed in this study could be used as a basis for developing innovative patient education curricula for children and adolescents. For example, in an intervention including peers without asthma, the vignettes might be used to guide discussions. Clinicians might also use the vignettes as a starting point to open discussions with their patients and help to correct maladaptive beliefs that their peers view them and their asthma negatively.

CONCLUSION

The importance of minors' attitudes toward their peers with asthma should not be understated. We found that students in higher grades had more favorable attitudes toward their peers with asthma than those in lower grades. Sex and asthma status also impacted attitudes toward peers with asthma,

depending on the situation. These attitudes should be taken into consideration in both clinical and school-based interventions for asthma management.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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