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The Impact of Parents' Medication Beliefs on Asthma Management

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Abstract

BACKGROUND—Previous studies suggest a relationship between parental beliefs about asthma medications and medication adherence. It is not clear how parents' positive and negative feelings about medications interact to influence medication adherence.

OBJECTIVES—The objectives of this study were to describe parents' perceived need for and concerns about their child's asthma medications and to assess the weighted impact of these positive and negative beliefs on parent-reported adherence.

METHODS—We conducted a cross-sectional survey of parents of children with asthma in southeast Michigan; response rate was 71%. Children with reported use of a preventive asthma medication were included ($n = 622$). We used a validated Beliefs About Medications Questionnaire (2 subscales: necessity and concern) to assess parents' positive and negative attitudes about their child's medications. To measure how parents weigh these beliefs, we also calculated a necessity-concern differential score (difference between necessity and concern subscales). We used a 4-item parent-report scale to measure medication adherence.

RESULTS—The majority of children were nonminority. Overall, 72% of parents felt that their child's asthma medications were necessary, and 30% had strong concerns about the medications. For 77% of parents, necessity scores were higher than concern scores, and for 17%, concern exceeded necessity. Nonminority parents were more likely to have necessity scores exceed concern scores compared with minority parents (79% vs 68%). Mean adherence scores increased as the necessity-concern differential increased. In a multivariate mixed-model regression, a greater necessity-concern differential score and being nonminority predicted better adherence.

CONCLUSIONS—These findings confirm a relationship between medication beliefs and adherence among parents of children with asthma. A better understanding of parents' medication

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beliefs and their impact on adherence may help clinicians counsel effectively to promote adherence.

Keywords

beliefs about medications; asthma; minority parents; adherence

Nearly 10 million children in the United States have asthma,¹ and many of these children may be suffering from avoidable symptoms.² For children with persistent asthma, symptoms can be reduced with daily use of preventive medications, as recommended by national guidelines^{3–5}; however, substandard adherence remains a significant problem. Studies suggest that only ~50% of prescribed preventive asthma medications are taken daily as directed.^{6–8}

Young children depend on a parent or caregiver to make decisions regarding their health. Caregivers determine whether to bring the child for acute care, as well as preventive care appointments. Furthermore, parents or caregivers bear the responsibility of following through with treatment plans, including obtaining and administering medications. Because health beliefs are known to influence personal health care decisions,^{9–11} it is important to understand how parents' beliefs about asthma medications influence their adherence to their child's prescribed therapy.

Previous studies have suggested a relationship between parental beliefs about their child's asthma medications and medication adherence.^{12–16} These beliefs include both negative feelings (concerns about adverse effects or dependency on medications) and positive feelings (feeling that the medications are necessary to maintain health). In a previous study of urban children with asthma, we found that strong parental concerns about their child's medications were independently associated with poor medication adherence. However, this sample was limited to a relatively small number of families residing in urban Rochester.¹²

This study was designed to better understand how parents weigh their beliefs about their child's medications and how these beliefs affect adherence. The objectives of this study were to describe parental beliefs regarding the necessity for and concern about their child's asthma medications and to assess the weighted impact of parents' positive and negative medication beliefs on medication adherence among a diverse population of parents of children with asthma.

METHODS

Study Population

We conducted a cross-sectional survey of parents of children with asthma between April 2004 and February 2005. Parents from rural, suburban, and urban areas of southeast Michigan were selected from 40 primary care pediatric offices and completed a telephone survey as part of a larger intervention.¹⁷ Parents or guardians of 1322 of the 1858 eligible patients agreed to participate, yielding a response rate of 71.2%.

For this study, we included data for all of the children whose parents reported the use of 1 preventive asthma medication at the time of the survey and had complete data for the beliefs about medication and adherence questionnaires ($n = 622$). The University of Michigan research subjects review board approved the study protocol.

Beliefs About Medications

We were primarily interested in the relationship between the measured difference of parents' beliefs about medications (necessity-concern) and parent-reported medication adherence. We used a previously validated Beliefs About Medications Questionnaire¹⁸ and Medication Adherence Scale¹⁸ to assess this relationship. These scales have been developed and used in previous studies of adults with chronic illnesses^{15,19} and in parents of children with asthma.¹²

The 10-item Beliefs About Medications Questionnaire is based on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) and is composed of two 5-item subscales: necessity, which relates how to much a parent feels a medication is necessary to maintain their child's health, and concern, which includes concerns about dependency and adverse effects. Parents were instructed to consider their child's preventive asthma medications (defined as medications that are used daily to prevent asthma, such as inhaled steroids) when answering the items. Each subscale on the measure is summed, and possible scores range from 5 to 25. We dichotomized each of the subscales at the midpoint (based on the development and use of the scale by Horne and Weinman).¹⁵ Scores that fell above the midpoint (16) indicated strong beliefs in the concept represented by that scale. To measure how parents balance or weigh these beliefs, we also calculated a necessity-concern differential score,¹⁵ which is the difference in scores between the necessity subscale and the concern subscale (range: -20 to 20). A positive score indicates greater necessity or need for the medications, and a negative score indicates greater concern about the medications. This differential was developed and used by Horne and Weinman¹⁵ in adults with chronic illnesses to measure the relative importance, or "risk-benefit ratio," of their beliefs about medications.

The previously validated 4-item Medication Adherence Scale¹⁸ measured adherence to daily preventive asthma medications by parent report. This scale has good reliability in adults with chronic illnesses (Cronbach's $\alpha = .60-.83$)¹⁸ and in parents of young urban children with asthma (Cronbach's $\alpha = .78$).¹² Four questions (eg, "I sometimes alter the dose of my child's medication to suit their needs" and "Some people forget to give their child his/her medicines, how often does this happen to you?"), based on a 5-point Likert scale, were summed for a final adherence score ranging from 4 to 20 (4 = poor adherence; 20 = good adherence).

Sociodemographic and Health Variables

Demographic variables for participating children included gender, age (2-7 vs 8-16 years), Medicaid insurance (yes or no), and minority status. Because most children were white (80%) and non-Hispanic (99%), we created the minority variable as follows: black or Hispanic versus white non-Hispanic. Parental characteristics included parent education (any college versus no college) and parent age (<30 years or 30 years). To measure the parents'

trust in their child's physician, caregivers were asked how much they agree with the following statement: "I trust the judgment of my child's doctor about their health" and were asked to respond using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Parents were also asked to report the preventive medications that the child was currently taking for their asthma by the question, "What asthma medications is your child currently prescribed to take on a daily basis?" Children whose parents reported any preventive medication (inhaled corticosteroid, mast cell stabilizer, or leukotriene inhibitor) were considered to be using a preventive medication. We also asked parents, "In the past 12 months, have you used alternative therapies or home remedies, including herbs, teas, dietary changes, breathing exercise, meditation, prayer, massage, biofeedback, or homeopathy to control your child's asthma symptoms?" A positive response to this question indicated the use of alternative therapies for asthma.

The child's symptom severity was assessed by parent report of the number of days over the past month that the child had symptoms that interfered with running or playing and the number of nights that the child had symptoms that interfered with sleep. Children with 9 days with symptoms or 3 nights with symptoms during the past month were classified as having mild-persistent to severe-persistent asthma in accordance with the National Heart, Lung, and Blood Institute guidelines³ for severity classification. We also included a measure of the parent's rating of their child's asthma severity, which asked the parent to rate their child's last asthma exacerbation as mild, moderate, or severe.

Analysis

We performed all of the analyses using SPSS 10.0 software (SPSS Inc, Chicago, IL). We used χ^2 analyses to assess the relationship between beliefs about medications and demographic characteristics. We performed bivariate and multivariate linear mixed-model analyses to assess the relationship between beliefs about medications and medication adherence while controlling for the random effect of physician. The multivariate model included the following factors: necessity-concern differential score as a continuous variable, minority status, parent's rating of the child's asthma severity, use of alternative therapies, number of preventive medications used, trust in the doctor's judgment, and child's asthma symptoms. Because patients within a particular physician panel may be more similar to each other than to patients from different physician panels, we gave each physician a unique identification number, which was entered as a subject variable in the mixed models. A 2-sided α level of $<.05$ was considered statistically significant.

RESULTS

Demographic characteristics of the 622 children included in the study are displayed in Table 1. Sixty-four percent of the children were boys, and 17% had Medicaid insurance. Eighty-four percent of the parents were nonminority, and the majority (78%) had some college education. Thirty-eight percent of the children had parent-reported mild-persistent to severe-persistent symptoms over the past month, and 63% of parents described their child's last asthma exacerbation as moderate to severe. Approximately one half of the children were using 2 preventive medications, and nearly one quarter reported the use of alternative

therapies to help with asthma. Seventy-four percent of parents strongly agreed that they trusted the doctor's judgment regarding their child's health care.

The mean adherence score for this sample of children was 15.70 (SD: 3.11; range: 5–20). Only 14% of parents reported being fully adherent (score of 20) with their child's preventive asthma medications. Approximately one third of the parents had strong concerns about their child's medications (score of 16), and 72% felt strongly that their child's asthma medications were necessary for maintaining health (score of 16).

We created a necessity-concern differential score, which represents a weighting of parents' positive and negative beliefs about their child's medications. We then categorized the necessity-concern differential score into the 3 groups: greater necessity than concern, necessity equal to concern, and greater concern than necessity. For 77% of parents, necessity scores outweighed concern scores; for 17% of parents, concerns outweighed necessity; and 6% had equal scores.

The relationship between parental beliefs about medications and child and family factors is shown in Table 2. Nonminority parents were more likely to have necessity scores that exceed concern scores (79% vs 68%; $P = .03$) compared with minority parents. In addition, older parents were more likely to have their necessity scores exceed their concern scores compared with younger parents. Factors associated with the child's asthma, such as parent rating of the severity of the child's last exacerbation and medication use, were also associated with the parent's beliefs about their child's medications. Parents who rated their child's last exacerbation as moderate to severe felt less need and more concern for the medications. Parent report of the child's symptom frequency (representing National Heart, Lung, and Blood Institute severity classifications) was not associated with parent's beliefs about medications. Parents of children using ≥ 2 preventive asthma medications were more likely to feel greater need (81% vs 72%; $P = .01$) and less concern (12% vs 22%; $P < .001$) about their child's medications. In addition, parents who used alternative therapies to treat asthma were more likely to have their concern scores exceed their necessity scores (23% vs 15%; $P = .03$).

Table 3 shows the relationship between the categories of the necessity-concern differential score and parent report of medication adherence. Mean adherence scores increased as the necessity-concern differential score increased (greater concern: 14.90; equal scores: 15.44; greater necessity: 15.86; $P = .02$). Specifically, as the parents' necessity for the medications increased relative to concern, their adherence to the medications increased. In a multivariate regression including factors known to influence adherence,^{20,21} we found that a higher necessity-concern differential score and being nonminority independently predicted higher (better) medication adherence scores (Table 4).

DISCUSSION

In this study, we found that a strikingly low proportion of parents reported being fully adherent with their child's preventive asthma medications. Consistent with the literature, we found that, whereas many parents felt that their child's medications were necessary, many

also had significant concerns about these medications.^{12–16} To our knowledge, this is the first study to assess the relationship between the weighted impact of parents' positive and negative medication beliefs regarding asthma medication and parent-reported medication adherence. When these beliefs are weighed against each other, most parents felt greater need for their child's medications than concern, and a higher rating of necessity compared with concern was independently associated with better adherence scores.

These findings are consistent with other studies, suggesting a relationship between beliefs about medications and medication adherence.^{12–14,16,22–24} In a study of adults with asthma, Apter et al¹⁶ found that favorable attitudes toward inhaled corticosteroids, including feelings that the inhaled steroids help and the belief that asthma symptoms improved after using the medications, were associated with better adherence. Additional studies in adults^{15,25,26} and children^{12,13} have linked fears and concerns about medications to poor adherence. However, none of these studies considered the balance of positive versus negative medication beliefs in a parent population.

We also found that parents using alternative therapies to treat their child's asthma were more likely to have greater concern scores (versus necessity) compared with parents who did not report using alternative therapies. Studies have reported the use of alternative therapies among children with asthma and allergies^{27–29}; however, we are not aware of other studies considering the relationship between beliefs about conventional medications and the use of alternative therapies among parents of children with asthma. Additional assessment of parent use of alternative therapies to treat their child's asthma in relation to their beliefs about conventional medications is needed.

Lastly, consistent with previous research,¹⁶ we found that nonminority parents were more likely to feel that their child's asthma medications were necessary for maintaining health and were less likely to be concerned about the medications compared with minority families. After controlling for potentially confounding variables, nonminority status was independently associated with higher (better) adherence scores. This finding is particularly pertinent, because poor and minority children are at greatest risk for asthma morbidity^{1,30,31} and comprise the group least likely to receive appropriate preventive medications.^{2,32,33} Additional exploration is needed to better understand how beliefs about medications differ among parents of various racial and ethnic backgrounds and how these beliefs influence medication adherence.

Limitations to this study include the cross-sectional design that prevents the assumption of a causal relationship between beliefs about medications and medication adherence. Parent-reported rates of medication adherence may bias the data toward overstated reports of good adherence; however, the use of self-reported adherence to therapy is common.^{13,19,26} Although we assessed parents' beliefs about medications using a validated scale, we do not have qualitative data to further delineate the specific concerns that parents were referring to. Lastly, this study can only be generalized to similar populations of patients and caregivers.

Poor adherence to preventive asthma therapy is a long-standing problem, particularly for young urban children,^{6,7} as are the recognition of factors that influence beliefs about

medications and providing appropriate counseling. It is possible that some parents are unaware of the potential benefits of these medications for their child and, thus, underestimate the “need.” Similarly, many concerns about medications may be unfounded, and simple education regarding actual adverse effect profiles of the medications could help to alleviate anxiety. It is possible that such counseling would help readjust the balance between parents’ feelings of necessity and concern for medications and subsequently improve their adherence to the prescribed therapy.

Implications

Studies have detailed the complexity surrounding medication adherence and barriers to routine medication delivery.^{20,21} This study suggests that the balance of parent’s positive and negative beliefs about preventive medications relates to how they adhere to their child’s therapy. A better understanding of parents’ medication beliefs and their impact on adherence likely would help clinicians counsel effectively to promote better adherence.

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TABLE 1

Population Demographics

Demographic	n (%)
Child age, y	
2–7	323 (52)
8–16	299 (48)
Child gender	
Male	396 (64)
Female	226 (36)
Medicaid	
Yes	106 (17)
No	514 (83)
Minority parent	
Yes	95 (16)
No	502 (84)
Parent age, y	
22–30	72 (12)
31–40	294 (48)
>41	247 (40)
Parent education	
No college	134 (22)
Any college	485 (78)
Asthma severity (past month)	
Mild	386 (62)
MPSP	234 (38)
Parent rating of severity of child's last exacerbation	
Mild	224 (37)
Moderate to severe	382 (63)
No. of preventive medications	
1	298 (48)
2	324 (52)
Alternative therapies	
Yes	135 (22)
No	487 (78)

MPSP indicates mild persistent to severe persistent.

TABLE 2

Demographics and Beliefs About Medications

Demographic	More Need Than Concern, n (%)	More Concern Than Need, n (%)
Overall	474 (77)	103 (17)
Child age, y		
2–7	240 (74)	60 (19)
8–16	234 (79)	43 (14)
Child gender		
Male	300 (76)	65 (16)
Female	174 (77)	38 (17)
Medicaid		
Yes	77 (73)	20 (19)
No	396 (78)	82 (16)
Minority (parent)		
Yes	64 (68) ^a	16 (17)
No	394 (79) ^a	82 (16)
Parent age, y		
22–30	47 (66) ^a	15 (21)
31–40	225 (76) ^a	52 (18)
>41	196 (80) ^a	34 (34)
Parent education		
No college	101 (75)	23 (17)
Any college	370 (77)	80 (17)
Parent rating of severity of child's last exacerbation		
Mild	181 (82) ^a	28 (13) ^a
Moderate to severe	281 (74) ^a	74 (20) ^a
No. of preventive medications		
1	213 (72) ^a	66 (22) ^a
2	261 (81) ^a	37 (12) ^a
Use of alternative therapies		
No	379 (78)	72 (15) ^a
Yes	95 (71)	31 (23) ^a

^aStatistically significant relationships.

TABLE 3

Necessity-Concern Differential and Medication Adherence

Necessity-Concern Differential	<i>n</i>	Mean Adherence Score	Overall <i>P</i>
More need than concern	474	15.86	—
Need equal to concern	41	15.44	.02
More concern than need	103	14.90	—

— indicates no data.

TABLE 4

Multivariate Mixed-Model Linear Regression Predicting Medication Adherence

Variable	Estimate	P
Minority	.765	.035
Necessity-concern differential	.093	.000
Parent rating of severity of child's last exacerbation	-.422	.110
Alternative therapies	.385	.215
No. of preventive medications used	.218	.120
Trust doctor's judgment	-.149	.319
Symptoms	-.047	.857

The model was controlled for the random effect of physician.