
Research Article



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**COMMUNICATION DURING PEDIATRIC ASTHMA VISITS AND
SELF-REPORTED ASTHMA MEDICATION ADHERENCE**

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Abstract

Objective: Our objectives were to examine how certain aspects of provider-patient communication recommended by national asthma guidelines (ie, provider asking for child and caregiver input into the asthma treatment plan) were associated with child asthma medication adherence 1 month after visit.

Methods: Children ages 8 through 16 with mild, moderate, or severe persistent asthma and their caregivers were in nonurban areas of Erode and Namakkal, Tamilnadu, India. All medical visits were recorded. Children were interviewed 1 month after their medical visits, and both children and caregivers reported the child's control medication adherence. Generalized estimating equations were used to determine if communication during the medical visit was associated with medication adherence 1 month later.

Results: Children (n = 259) completed a visit interview 1 month after their visit, and 259 of these children were taking an asthma control medication at the time of the visit. Children reported an average control medication adherence for the past week of 72%, whereas caregivers reported the child's average control medication adherence for the past week was 85%. Child asthma management self-efficacy was significantly associated with both child- and caregiver-reported control medication adherence. When providers asked for caregiver input into the asthma treatment plan, caregivers reported significantly higher child medication adherence 1 month later.

Conclusions: Providers should ask for caregiver input into their child's asthma treatment plan because it may lead to better control medication adherence.

Keywords: Adherence, Asthma, Pediatric, Communication.

Introduction

Asthma is the most common chronic condition among Indian children.^{1,2} In the india, asthma affects.6 million children.³ The clinical practice guidelines of the National Asthma Education and Prevention Program of the National Heart Lung and Blood Institute encourage physicians to discuss medications with patients at every follow-up asthma visit.³ The guidelines also emphasize the importance of jointly determining the goals of

treatment with the patient and family.³ Moreover, the 2001 US Institute of Medicine report endorsed patient centered care and recommended that health care professionals implement the shared decision-making (SDM) model in clinical settings^{4,5} More recently, the concept of "patientcentered" approaches have been introduced as an effective way to involve and motivate the patient. In a study of adult asthma patients, a SDM approach was

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compared with traditional clinician decision-making. It was found that the SDM intervention resulted in better adherence to controller medications and better clinical outcomes.⁶ However, little is known about the relationship between provider-patient communication during pediatric asthma visits and its association with child- and caregiver-reported control medication adherence. The poor patient ratings of patient-provider communication about asthma were related to poor adherence to inhaled steroids. The regular inhaled corticosteroid use was related to whether patients perceived themselves as actively involved in treatment decisions during medical visits. A limitation of these previous studies is that they relied on subjective patient reports of medical visit communication rather than objective data, such as audio-tape recordings of the visits.^{7,8} This current article examines how certain aspects of provider-patient communication that are recommended by the national asthma guidelines (ie, number of control medication questions the provider asks, the total number of medication questions asked by children, and the provider asking for child and caregiver input into the asthma treatment plan) are associated with child asthma medication adherence 1 month after the visit.

Methods

The study was approved by the JKKMMRF Institutional Review Board. The providers were told that the study focused on communication during pediatric asthma visits. Children and their caregivers of these participating providers were recruited. Children were eligible if they (1) were ages 8 through 16 years, (2) were able to speak English, (3) could read the assent form, (4) had been seen at the clinic at least once before, (5) were present at the visit with an adult caregiver (parent or legal guardian) who could read and speak English and who was at least 18 years of age, and (6) had mild, moderate, or severe persistent asthma. Clinic staff referred potentially eligible patients who were interested in learning more about the study to a research assistant. Providers and families were told that the study was examining communication during pediatric visits. 1 month later, during which children were interviewed and caregivers completed self-administered questionnaires. A variety of demographic and sociocultural factors were examined as potential confounders. The child's insurance status, which

was reported by the caregivers, was measured by using the following categories: none, private insurance, Medicaid, the State Health Insurance Program, and other. Caregivers also reported the number of years the child had asthma, which was measured as a continuous variable and the number of control medications the child was taking at the home visit. Child reported outcome expectations for asthma medications was measured as a continuous variable by using an adapted version of Holden's 5-item outcome expectations scale. All analyses were conducted by using SPSS (SPSS Inc, Chicago, IL). First, we present descriptive statistics for all of the variables. Second, we examine bivariate relationships between the variables by using correlation coefficients, t tests, or Pearson χ^2 statistics.

Results

The participating clinics were primary care pediatric practices. Two providers refused to participate for a participation rate of 95.3%. Ninety-four percent of the families approached agreed to participate in the study. 259 of the participating children. Forty nine percent of the providers were women. Providers ranged in age from 30 to 50 years (mean = 41.6 years, SD = 7.4). The current article focuses on the 246 of 296 children (88%) who completed interview 1 month after their visit. Table 1 presents the child and caregiver demographic characteristics. Child age ranged from 8 to 16 years (mean age = 11.1 years, SD = 2.4). Approximately 50.6% of the sample was male. Seventy one percent of the children had moderate/severe persistent asthma. Child self-efficacy scores ranged from 2 to 5 (mean = 4.05, SD = 0.62). Child outcome expectation scores ranged from 3.6 to 9 (mean = 7.9, SD = 1.1). Eighty-three percent of the children were taking 1 or more control medications (N = 216).

Children asked medication questions during 13% of visits (range, 0–6 questions; mean = 0.20; SD = 0.64). Providers asked for child input into the asthma management plan during only 7.8% of the visits. Providers asked for caregiver input into the asthma management plan during only 9% of the visits. Providers asked questions about control medications during 66.8% of visits (range, 0–16 questions; mean = 2.4; SD = 2.9) Adherence Table 2 presents the distribution of child- and caregiver-reported adherence. Children reported an average

control medication adherence for the week before visit of 72.4% (SD = 32.9; range, 0–100). Caregivers reported an average child control medication adherence for the week before the visit of 84.7% (SD = 26.1; range, 0–100). The average

child reported control medication adherence was 12% lower than the average caregiver-reported adherence. However, caregiver- and child-reported control medication adherence were highly correlated (Pearson correlation = 0.64, P = 0.00)

Table No. 01: Child and Caregiver Demographic Characteristics (N = 259)

	%(N)
Child age Mean (SD), range	11.1(2.4)
Child gender	
Male	50.6(131)
Female	49.4(128)
Asthma severity	
Mild persistent	28.6(74)
Moderate/severe persistent	71.4(185)
Years living with asthma Mean (SD), range	6.12(3.9)
Caregiver age Mean (SD), range	40.9(8.6)
Caregiver Gender	
Male	13.2(54)
Female	86.8(244)
Insurance type	
None	29.72(77)
Private	27.2(70)
State government	41.69(108)
Others	4.24(11)
Number of medications	
1	47.8(124)
2	41.7(108)
>3	10.5(27)

Table No. 02: Child and Caregiver Reported Control Medication Adherence Reported During the Past Week

Reported Adherence	Child(N=216), %(N)	Caregiver (N=216), %(N)
0%	8.8(19)	2.8(6)
1%-10%	0.5(1)	0(0)
11%-20%	1.9(4)	2.8(6)
21%-30%	5.1(11)	1.9(4)
31%-40%	0.9(2)	0.9(2)
41%-50%	5.6(12)	0.9(2)
51%-60%	6.9(15)	4.6(10)
61%-70%	5.6(12)	2.3(5)
71%-80%	5.1(11)	6.0(13)
81%-90%	11.6(25)	7.9(16)
91%-100%	48.2(104)	62.5(135)

Table 3 presents the GEE results predicting child-reported control medication adherence during the past week. Children taking more than 1 control medication reported being significantly more adherent than children taking just 1 control medication. Children with higher asthma

management self-efficacy reported being significantly more adherent than children with lower asthma management self efficacy. Children with longer lengths of visits were significantly more adherent. The total number of control medication questions the provider asked during the

visit was significantly related to child-reported adherence in the bivariate analysis (Pearson

correlation = 0.18, $P = .01$) but did not remain significant in the adjusted GEE analysis.

Table No. 03:GEE Predicting Child Reported Control Medication Adherence During the Past Week at the Visit (N = 165)

Independent Variables	β Coefficient (95% Confidence Interval)
Child-reported medication adherence at visit	0.22 (0.08 to 0.36)**
Years living with asthma	-0.47 (-1.61 to 0.66)
Child asthma severity	4.96 (-4.20 to 14.12)
Child taking >1 controller medication	7.87 (0.26 to 15.48)*
Child age	-0.64 (-2.47 to 1.19)
Child gender	3.23 (-4.55 to 11.01)
Child asthma management self-efficacy	9.36 (2.32 to 16.39)**
Number of asthma medication questions	-3.70 (-12.62 to 5.21)
Provider asked for child input into asthma treatment plan	-2.53 (-16.20 to 11.13)
Provider asked for caregiver input into asthma treatment plan	4.87 (-5.87 to 15.60)
Number of control medication questions the provider asks	0.49 (-0.69 to 1.67)
Child asthma outcome expectations	0.35 (-3.53 to 4.23)
Length of visit	0.01 (0.00 to 0.02)*

* $P, .05$; ** $P, .01$.

Caregivers reported significantly higher adherence for younger children and children who had higher asthma management self-efficacy scores. Caregivers reported significantly higher child adherence if the Table 1 Child and Caregiver Demographic provider asked for the caregiver's input into the asthma treatment plan during the medical visit. Caregivers reported lower child adherence if the provider asked for child input into the asthma treatment plan during the medical visit.

Discussion

When controlling for important demographic characteristics and baseline medication adherence, we found that provider-patient communication during a medical visit was associated with caregiver-reported child medication adherence 1 month later. We also found that child asthma management self-efficacy was significantly associated with both child- and caregiver-reported control medication adherence. Self-efficacy is 1 of the key constructs in social cognitive theory.¹³ According to social cognitive theory, individuals with higher levels of self-efficacy to perform a certain behavior such as using medications are more likely to undertake the behavior.^{14,15} This finding suggests it is important for health care providers to work with children and caregivers to improve their self-efficacy or self-confidence in

managing their asthma. One way providers can improve asthma management self efficacy is to model positive medication behaviors. For example, if children or their caregivers have smart phones, providers could show them how to use a medication reminder application. Another important finding is that if providers asked for caregiver input into their child's asthma management treatment plan, caregivers reported higher child medication adherence 1 month later. This finding suggests it is important for providers to ask for caregiver input into their child's asthma management treatment plan because it might be easier for them to follow a plan for which they have had input. In fact, the National Heart, Lung, and Blood Institute guidelines³ specifically emphasize teaching patients how to effectively manage their asthma as well as the importance of using a collaborative approach between providers, parents, and children to develop an appropriate asthma management plan for the child. Research has revealed the importance of patient-centered approaches such as SDM.⁴⁻⁶ However, we found that children were only asked for their input into treatment plans during 7.8% of visits and that parents were asked for their input during only 9% of visits. These low rates of SDM occurred even though providers were aware that the medical visit was being recorded to examine communication

during pediatric asthma visits. A recent study revealed that SDM increased adherence to controller medications and better clinical outcomes for adult asthma patients as opposed to clinician decision-making.⁶ These findings support the importance of identifying patient preferences and goals to shape treatment plans. Child age was not significantly associated with whether providers asked for child input into the treatment regimen. Future research should determine whether this result can be replicated in other asthma populations. Children taking more than 1 control medication reported being significantly more adherent than children taking 1 control medication. A previous study revealed that teenagers were more willing to take medications when they felt ill.⁶ Because children taking more than 1 control medication may experience more symptoms when not taking their medications, they may be more likely to adhere. Further research should explore this relationship to better understand patient adherence. Caregivers reported that younger children were more adherent to their control medications than older children. This might be because caregivers are more actively involved in helping younger children take their control medications than older children. Providers should make sure to talk with older children directly about their control medication adherence to assess possible barriers to using them and to offer suggestions on how to improve adherence. Previous research has revealed nonadherence to be greatest among older children and adolescents due to 2 factors, including more risk-taking behaviors and onset of depressive symptoms.⁶ Additionally, teenagers have reported that concerns with side effects, busy schedules, spending nights away from home, and the bad taste of inhaled corticosteroids can interfere with adherence. Thus, providers may want to engage older adolescent children in discussions of barriers to adherence. Children and caregiver adherence were highly correlated, yet children reported an average adherence rate of 72% for the past week, and caregivers reported an average adherence rate of 85%. Previous research has revealed that both children and parents greatly over report their adherence to asthma medications.^{16,17} In 1 study comparing self-reported adherence to electronic devices attached to participants' metered-dose inhalers, both caregivers and children significantly over reported their adherence.¹⁶ The study revealed that parents

were more likely to be outside the 25% accuracy range when compared with children. Although we cannot confirm whether child or caregiver reports of adherence are more accurate, our results suggest that children's adherence to asthma control medications is suboptimal.

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