Fathers and Asthma Care: Paternal Involvement, Beliefs, and Management Skills

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Abstract

Objective To compare asthma care roles of maternal and paternal caregivers, and examine associations between caregiver involvement and the outcomes of adherence, morbidity, and parental quality of life (QoL).

Methods Mothers and fathers in 63 families of children, ages 5–9 years, with persistent asthma completed semistructured interviews and questionnaires. Adherence was measured via electronic monitoring. Paired t tests compared parental asthma care roles, and analysis of covariance, controlling for socioeconomic status, evaluated associations of asthma outcomes with caregiver involvement scores.

Results Mothers had higher scores on measures of involvement, beliefs in medication necessity, and on four subscales of the Family Asthma Management System Scale interview (Asthma Knowledge, Relationship with Provider, Symptom Assessment, and Response to Symptoms). Maternal QoL was lowest when both maternal and paternal involvement was high. Paternal involvement was associated with increased morbidity.

Conclusions There is room for enhancement of fathers’ asthma care roles. Higher levels of paternal involvement may be driven by family need.

Key words: adherence; asthma; co-parenting; fathers; paternal; pediatric; quality of life.

Pediatric asthma management has been defined as a complex, multicomponent process that involves assessing and responding to symptoms, avoiding allergens and other asthma triggers, as well as, for children with persistent asthma, adhering to a daily regimen of preventive medications. Research identifying family factors that contribute to successful management is crucial to the development of effective interventions to reduce morbidity (Kaugars, Klinnert, & Bender, 2004).

A sizeable body of research supports the vital role that fathers play in child development. Supportive and coordinated co-parenting between mothers and fathers is known to have a positive impact on child psychosocial adjustment (Feinberg, 2003). Much less is known, however, about the role that fathers play in disease management in families of children with chronic illness generally, or about the role of fathers in family management of childhood asthma, specifically. Several pediatric psychology reviews have called attention to the underrepresentation of fathers in both research and treatment (Phares, Fields, Kamboukos, & Duhig, 2005; Phares, Fields, Kamboukos, & Lopez, 2005; Vetere, 2004). While mothers are more often identified as primary caregivers, family demographic data show that fathers are increasingly present in their children’s lives (Hofferth, Pleck, Stueve, Bianchi, & Sayer, 2001; Pruett, 1998). A recent report shows that the majority of children (61%) live with both biological parents, and demographic trends suggest that the
The proportion of time that fathers are involved in caregiving and play with their children has increased threefold from the years 1965 to 2011 (Livingston & Parker, 2011; U.S. Census Bureau, 2008). Yet, despite this documented increase in the involvement of fathers, research on childhood asthma management has often focused exclusively on the mother–child dyad, and little research exists on the parental coordination of such care in two-parent families.

Studies of pediatric asthma where father data have been examined have demonstrated significant findings for paternal parenting variables. For example, one study found that fathers of children with asthma tended to be more critical than fathers of healthy children, while another found that fathers’ critical attitude toward their child with asthma was related to a greater number of school absences (Schobinger, Florin, Zimmer, Lindemann, & Winter, 1992; Gartland & Day, 1999). Paternal perspectives also appear to be important; Markson and Fiese (2000) found that fathers’ perception of family routines served a protective function in the family.

Though more needs to be understood about the role of fathers in asthma management, Wysocki and colleagues conducted a series of studies examining paternal involvement in disease management in a sample of children with a chronic condition, which included children with asthma (Gavin & Wysocki, 2006; Wysocki & Gavin, 2004, 2006). Results showed that mothers and fathers were consistent with each other in their reports of the amount of father involvement in various disease management tasks, indicating that father participation occurred on 25–50% of available opportunities. Mothers’ report of the helpfulness of paternal involvement was higher than fathers’ report of their own perceptions of their helpfulness (Wysocki & Gavin, 2004). Paternal involvement was found to have a positive impact on factors related to family coping and disease management. The amount of paternal involvement was positively associated with family functioning and marital satisfaction, and mothers’ ratings of the helpfulness of paternal involvement was associated with fewer self-reported maternal psychiatric symptoms and less perceived impact of the chronic illness on family functioning (Gavin et al., 2006). Higher levels of paternal involvement were also associated with more favorable self-reported adherence to medical regimens and quality of life (QoL) among chronically ill adolescents (Wysocki & Gavin, 2006).

Hilliard and colleagues investigated paternal involvement in disease management in a sample of preadolescents with type 1 diabetes (Hilliard et al., 2011). This study used structural equation modeling to analyze a large sample of family-level data on a focused age range. Consistent with the findings of Wysocki and Gavin, mothers and fathers reported similar amounts of paternal involvement in diabetes care, and consistent with Wysocki & Gavin’ (2004) findings, mothers rated paternal involvement as significantly more helpful than did fathers themselves. Results of this study also provided support for a model in which greater paternal involvement was associated with worse metabolic control, as indicated by higher HbA1c values. This counterintuitive finding may suggest that fathers increase their involvement when children are demonstrating poorer glycemic control (Hilliard et al., 2011).

In another related study, Wysocki and colleagues (2009) sought to examine whether greater collaborative involvement with youth of primary and secondary caregivers is associated with more favorable diabetes outcome compared with family circumstances in which either one or both primary and secondary caregivers demonstrate lower levels of collaborative involvement with youth around diabetes management (Wysocki et al., 2009). Caregivers were defined by family consensus as adults who were involved in the youth’s diabetes care, with 87% of those identified as “primary caregivers” being mothers or stepmothers, and 82% of secondary caregivers being fathers or stepfathers. Groups were defined based on high and low values on measures of caregiver collaboration, and factorial multivariate analyses was used to examine outcomes as a function of combinations of high and low collaboration of primary and secondary caregivers. They found that higher collaborative involvement was associated with better diabetes outcomes, and this association was particularly strong for primary caregivers.

The risk and resistance model of Wallander and colleagues (Wallander et al., 1989) suggests that psychosocial adaptation to chronic illness is determined by both risk (e.g., condition severity, psychosocial stress) and resistance factors (e.g., coping skills and resources). Within two-parent homes, the involvement of both parents in child asthma care may be considered a positive coping resource, and hence, a resistance factor, that may strengthen a family’s ability to manage the chronic illness, leading to better health outcomes for children with asthma. Greater involvement of both parents may lead directly to better adherence to controller medications for young children when each parent is able to contribute and cover when the other parent has competing responsibilities (e.g., work), and also may contribute to better outcomes such as parental QoL when parents are able to support each other instrumentally or emotionally in their asthma care roles.

The present study aims to build on previous research on paternal involvement in families of children with a chronic illness, and address a gap in the
research literature on family asthma management, by examining several key components of the role of fathers in disease management in a sample of children with persistent asthma requiring daily controller medication. We first sought to compare the roles of mothers and fathers in two-parent families focusing on the following domains: involvement in daily asthma management tasks, beliefs about asthma medication, and asthma management skills (e.g., the ability to assess and respond to an asthma episode). Second, we sought to examine associations between maternal and paternal involvement and relevant childhood asthma outcomes: (1) Adherence to controller medication, measured by objective monitoring over the course of 1 month, (2) parent-reported asthma morbidity, and (3) parent-reported QoL. Using an analytic approach similar to Wysocki and colleagues (2009), described above, the present study examines whether higher levels of maternal and paternal involvement in asthma care are associated with better asthma-related outcomes than when either or both maternal and paternal involvement is low.

One potential strength of the study is a narrow developmental focus on young children aged 5–9 years, where parents are typically primarily responsible for asthma care (vs. a shared model of parent–child responsibility) and where, as such, parental coordination of asthma care could potentially have a large impact on health outcomes. A validated measure of the Amount and Helpfulness of father involvement, the Dad’s Active Disease Support Scale (DADS) developed by Wysocki and Gavin (2004) was incorporated, and adapted for this study such that direct comparisons between maternal involvement and paternal involvement in asthma care could be accomplished. In this way, the prior investigation of paternal involvement in illness management was replicated with a particular focus on childhood asthma, and extended to include a comparison of maternal and paternal asthma management involvement. In addition, this study adds to the literature by including an assessment of maternal and paternal beliefs about medication and asthma management skills. Parental beliefs about asthma medications have been shown to impact management and morbidity (Grus et al., 2001; Horne & Weinman, 1999). One study found that one of the most frequent barriers to asthma care in urban children was parental beliefs about the ineffectiveness or lack of safety of medication use (Mansour, Lanphear, & DeWitt, 2000). McQuaid and colleagues (2009) found positive associations between beliefs about medication and use of controller medications in a study of parents of Latino children with asthma, with greater concerns being reported by Latino than non-Latino white parents, suggesting that differences in medication beliefs may contribute to reported disparities in controller medication use (McQuaid et al., 2009). A study of the differences in beliefs between mothers and fathers has not been previously conducted. Furthermore, this study extends previous literature by including separate semistructured interview assessments of mother and father asthma management, using a well-established measure (the Family Asthma Management System Scale, or FAMSS; McQuaid, Walders, Kopel, Fritz, & Klinnert, 2005), providing a multicomponent and novel view of maternal versus paternal asthma management practices and effectiveness.

We conducted two sets of analyses: A comparison of maternal and paternal variables (Amount and Helpfulness of Involvement, Beliefs about Medication Necessity and Concerns about Medication, and seven subscales of the FAMSS interview measuring Asthma Management Effectiveness) using paired-samples t tests, and an examination of the impact of high and low maternal and paternal involvement on asthma outcomes using factorial analysis of variance (ANOVA). Based on the theoretical model of Wallander et al. (1989), and the previous research on paternal involvement, we hypothesized the following: (1) Fathers would demonstrate a high degree of involvement in asthma care tasks, though mothers would be significantly more involved (e.g., more often have the primary caretaking role). Therefore, Amount and Helpfulness scores on the DADS would be higher for mothers than fathers. (2) Given that increased involvement may lead to greater opportunities to practice and hone asthma management skills, mothers would rate higher than fathers on the subscales of the FAMSS interview (e.g., ability to assess symptoms and respond to asthma episodes). (3) ANOVA analyses would reveal that maternal and paternal involvement would be related to family asthma outcomes (adherence, morbidity, maternal and paternal asthma-related QoL), such that (a) there would be significant main effects for both maternal and paternal Amount and Helpfulness scores on the DADS measure of parental involvement. Families in which Maternal or Paternal Involvement scores are greater than or equal to the median will have more favorable asthma outcomes (higher rates of objectively monitored adherence, lower parent-reported asthma morbidity, and greater parent-reported asthma-related QoL) compared with families in which scores were less than the median value; (b) there will be a significant interaction between Maternal and Paternal Involvement Scores, such that each parent’s involvement will have a greater impact on outcomes when the other parent’s score is also high; and (c) pairwise comparisons between groups (High-High, High-Low, Low-High, and Low-Low) will reveal that those families in which maternal and paternal
involvement are both high will have the most favorable outcomes.

Method
Participants
Participants were recruited from three hospital-based clinic sites: (1) a pediatric pulmonary specialty clinic located at a hospital, (2) a general pediatric clinic located within a hospital, and (3) a general pediatric clinic located at community health center. Clinics were located within a large urban academic medical center serving a diverse population from the city and surrounding suburbs, and an affiliated community health center serving a predominantly Latino population. To be eligible for the study, families had to include two parents and have a child between the ages of 5 and 9 years with physician-diagnosed asthma requiring daily controller medication. Inclusion in the study required that both parents be willing to participate. For the purpose of this study, fathers were defined as the male parent (biological, adoptive, step-parent, or father figure) living in the home with the participating child for at least the past year. Exclusion criteria included the presence of another chronic illness condition requiring substantial daily management (e.g., cystic fibrosis), either in the participating child or a sibling.

Participants included 63 families with one participating child, mother, and father. Of the 63 fathers participating, 52 were self-identified as biological fathers, 9 were step-fathers, and 2 were adoptive fathers. Children in the sample ranged from 5 to 9 years old (M = 6.8, SD = 1.49). Forty-six percent (n = 29) of participating children were female. Fifty-one percent of children were identified by their parents as Latino/Hispanic. Most identified their child’s racial background as White (62%), with the remainder described as Black (13%), Asian (2%), or “Other” (10%), while 14% did not identify a racial background. The modal level of education completed was reported as completed high school or general educational development (GED) (29% of mothers, 32% of fathers). The median yearly income level for the family was reported to be in the range of $65,000–$74,999.

Procedure
Participants were recruited through flyers and physician referral. Participants were also identified through a hospital-wide asthma registry. Potential participants identified through the registry were recruited via a letter that was co-signed by their asthma doctor (pediatrician or specialist) and then by follow-up phone contact.

Data collection occurred primarily during two home visits, though two families opted to meet with the research assistant for those sessions at the hospital. During the first home visit, both informed consent and a release of information to review the child’s medical chart were obtained. Parents provided written consent and children aged ≥7 years provided verbal and written assent. Procedures for monitoring controller medication use were explained and an electronic monitoring device was attached to each of the child’s controller medication(s). All prescribed controller medications that could be monitored with available technology (Fluticasone, Montelukast, and Fluticasone/Salmetrol) were monitored over the course of the study (1 month). The majority of the participating children (58.7%) were prescribed Fluticasone alone (n = 37), 15 were prescribed Montelukast alone (23.8%), one was prescribed Fluticasone/Salmetrol alone (1.6%), and 10 children were prescribed both Montelukast and Fluticasone (15.9%).

The second home visit occurred 1 month later, at which point, the electronic monitoring device(s) were collected and both parents independently completed a set of questionnaires and a semistructured interview. Families received $50 at the final assessment. The institutional review board of the participating hospital approved this study.

Depending on family language preference, the protocol was conducted in English or Spanish by a trained bilingual research assistant. Twenty-five percent of the participating families elected to have the questionnaires, and a semistructured interview was administered to them in Spanish. Questionnaires were subjected to a stringent translation process to work toward achieving semantic, content, and technical equivalence for each measure (Esteban et al., 2009). Translations of the majority of questionnaires and the FAMSS interview were developed for use in a larger multisite study investigating health disparities for Latino children with asthma (Canino et al., 2009). The translation process for that study included use of a bilingual committee and back-translation. The demographic questionnaire, DADS (Wysocki & Gavin, 2004), and the additions to the FAMSS that were adapted specifically for this study, were translated by a bilingual research assistant who was a certified medical interpreter, and then reviewed by members of the hospital translation services team trained in translation of measures for research purposes.

Measures
Parental Involvement in Asthma Management
Parental involvement in asthma management was assessed using the DADS (Wysocki & Gavin, 2004). The measure was designed to measure father involvement, and there are two forms, one to assess mothers’ perception of paternal involvement and the other to measure father self-report. These forms were adapted
for this study to assess maternal involvement as well. Both mothers and fathers reported on each other’s involvement in disease management tasks, as well as whether they perceived that involvement to have positively impacted the family’s coping with the illness and its treatment, yielding two subscale scores for each measure, Amount and Helpfulness. Each parent additionally rated these same aspects (Amount and Helpfulness) of their own involvement in asthma care. For example, when mothers rated paternal involvement, they first indicated whether each management task was “needed” or “not needed.” The mother would then rate, on a 5-point Likert Scale, how often the father was involved in that task when it was needed over the past 6 months, and on another 5-point Likert Scale, whether the paternal involvement in that particular task made family coping easier or harder. Items cover both instrumental support (i.e., “How often did he administer medication to the child at prescribed times?”) as well as emotional/social support (i.e., “How often did he talk with you to understand how the medical condition affects you or your child socially?”). Higher scores on this measure indicate greater involvement in asthma care. Construct validity of the original measure has been established. Factor analysis has provided support for the validity of a two-factor model (Amount and Helpfulness of paternal involvement). Internal consistency of this measure has been reported as good, with \( \alpha > .92 \) for both amount and helpfulness scale scores (Wysocki & Gavin, 2004). Based on the present sample, \( \alpha \) coefficients were .97 for Mothers’ self-report of their own Amount of Involvement, and .74 for Father report of their own Amount of Involvement. Alpha coefficients were .99 for father report of Maternal Amount of Involvement, and .97 for mother report of Paternal Amount of Involvement. Alpha coefficients for Maternal Helpfulness were .94 based on self-report and .93 when reported by fathers, and were .94 for Paternal Helpfulness based on self-report and .97 when reported by mothers.

Beliefs About Medication
The Beliefs about Medication Questionnaire (BMQ; Horne & Weinman, 1999) was administered to both mothers and fathers separately. The BMQ comprises two five-item scales assessing parental beliefs about the necessity of prescribed medication for controlling their child’s illness (i.e., “My child’s health in the future will depend on these medicines”), and their concerns about potential consequences of taking it (i.e., “Having to take these medicines disrupts my child’s life”). Respondents indicate their agreement with each statement on a 5-point Likert scale. A higher score on the necessity subscale indicates a stronger belief regarding the necessity of medications, and a higher score on the concerns subscale indicates a greater degree of concern about medication use. Both scale scores have demonstrated associations with treatment adherence. Internal consistency estimates are good to excellent (Horne & Weinman, 1999). The \( \alpha \) coefficient for the present sample was .78 for mother report and .81 for father report.

Family Asthma Management Practices
FAMSS (Klinnert, McQuaid & Gavin, 1997; McQuaid et al., 2005) is a well-established semistructured interview assessing asthma management at the level of the family system. For the present study, the interview, which takes approximately 30–45 min to complete, was administered separately to mothers and fathers. The parents were each asked questions regarding their knowledge and use of behaviors characteristic of effective asthma management. Interviews were digitally recorded, and clinical ratings were made in accordance with guidelines for seven 9-point scales. Each of these 9-point scales is rated along a continuum of ineffective or harmful to adaptive management (i.e., from a score of 1, “family is unable to manage attacks; they under-react; they over-react; or they overuse the medical system” to a 9, “Has a systematic, coherent plan for monitoring symptoms and responding to exacerbations—e.g. has a plan for increasing appropriate medications as exacerbations arise”). Convergent validity for the FAMSS measure has been established, with the FAMSS scores being positively correlated to other indices of asthma management. The Response to Symptoms Scale was found to be significantly correlated with both an electronic measure of medication adherence and parent rating of asthma functional morbidity (.25 and -.29, respectively; McQuaid et al., 2005). The FAMSS also demonstrated good internal consistency when used in a study with an urban African-American sample. Higher scores were associated with less parenting stress and better family functioning, as well as asthma management criteria, such as adequate inhaler technique (Celano, Klinnert, Holsey, & McQuaid, 2009).

In the present study, separate coders rated mother and father interviews from each family to minimize rater bias. A team of research assistants received extensive training in both the administration and reliable coding of the FAMSS. Rating consensus meetings were regularly held with one of the developers of the FAMSS interview and her research team. This procedure was part of a protocol, to insure standard FAMSS ratings, monitor reliability, and minimize rater drift. Ten percent of digital recordings of interviews from this study were rated independently by a core group of FAMSS interviewers, and ratings were discussed for consensus with the larger group of FAMSS raters during consensus meetings. Intraclass
correlations were computed as an estimate of reliability between raters and consensus ratings across subscales. All FAMSS coders were trained to interrater reliability at >.70 for each of the 7 FAMSS scales used in this study, and intraclass correlations ranged from .71 to .97 across subscales.

Adherence to Daily Controller Medications
Medication adherence was measured objectively using a combination of electronic and mechanical monitoring procedures (Smartinhaler/dose counter, made by Nexus6 Ltd., Auckland, New Zealand, and Mems TrackCap, made by AARDEX Ltd., Zug, Switzerland). These procedures provide an estimation of actual controller medication use over a 1-month period. For those children with oral preventive medications (i.e., montelukast), the TrackCap was used to collect adherence data. The TrackCap is an electronic pill cap with an embedded microchip that registers the date and time when the pill bottle is opened. For those children with inhaled medications, two methods were used concurrently to capture adherence. The Smartinhaler is a metered-dose inhaler case with an internal microprocessor that records the date and time of each actuation (Burgess, Wilson, Cooper, Sly, & Devadason, 2006; Patel et al., 2013). Smartinhalers were used as one method of monitoring adherence to inhaled medications. At the same time, the count on the mechanical dose counter, built into the inhaler canister, was also recorded at the beginning and end of the 1 month assessment period, as a secondary method of adherence monitoring. Smartinhaler data collected at the beginning of the study were consistent with expected patterns, with recorded actuations occurring at or somewhat below the rate of the prescribed treatment regimen. Technical difficulties with the Smartinhaler devices occurred mid-study, however, and made the reliability of the data at that point questionable. Actuation bursts were recorded several times above the prescribed rate of two to four per day. In one outlying case, over 150 recorded actuations occurred in one day. These technical difficulties would have compromised our ability to use collected data for a portion of participating families. Therefore, in order to preserve our sample size and maximize power, we decided to use the mechanical dose counter data as our primary method of assessment for this study. Smartinhaler data judged to be reliable (i.e., consistent with expected rates of use) were used for the first 10 participating children with inhaled medication, where counter data were not available.

For those children with multiple prescribed controller medications (for example, both Singulair and Flovent), devices were attached to each, and an average rate of adherence was calculated across medications. The initial 3 days of TrackCap and Smartinhaler data were excluded to minimize the effect of potential changes in use due to reactivity to device novelty (McQuaid, Kopel, Klein, & Fritz, 2003). Adherence was calculated as a proportion, with the total doses taken over the course of the monitoring period divided by prescribed doses over monitored days.

Functional Morbidity
Asthma functional morbidity was derived from a combined measure based on caregiver report on both the Asthma Functional Severity Scale (AFSS, Rosier et al., 1994) and the Asthma Control Test (ACT; Nathan et al., 2004). The AFSS examines four components of children’s asthma morbidity, including frequency of episodes, frequency of symptoms between episodes, intensity of impairment during an episode, and intensity of impairment during the intervals between episodes. An overall score of functional limitation is computed from the mean across all items. Alpha coefficients in the present sample were .88 and .85 for mother and father report, respectively. The ACT is a 5-item questionnaire assessing frequency of daytime and nocturnal asthma symptoms, use of rescue medication, activity limitation, and parent perception of disease control over the past 4 weeks (α = .84). The ACT has been demonstrated to be a reliable and valid measure of asthma control, with agreement between the measure and specialist rating ranging between 71 and 78% (Nathan et al., 2004). In the present sample, α coefficients were .79 and .71 for mother and father report, respectively. Mother and father report on the AFSS were highly correlated (r = .67, p < .001), as were parent reports on the ACT (r = .69, p < .001). The mean report on the AFSS and the ACT were also highly correlated with each other (r = .87, p < .001). Parent reports across both measures were averaged to obtain one robust outcome assessment of functional morbidity, with higher scores on this measure indicating a greater degree of impairment.

Asthma-Related QoL
The Pediatric Asthma Caregiver Quality of Life questionnaire (Juniper et al., 1996) is a 13-item instrument used to assess caregiver activity limitation and emotional function related to their child’s asthma. Each parent completed this questionnaire and items were rated on a 7-point Likert scale. A QoL total score was generated from the mean of all items, with a higher score indicating a better reported QoL. Reliability and validity for this measure have been established (e.g., Juniper et al., 1996). In the present sample, α coefficients were .91 for maternal QoL and .92 for paternal QoL.

Data Analysis
We first conducted paired-samples t tests to compare mothers and fathers with regard to their role in
childhood asthma management within the family system. We then conducted an ANOVA to examine the relationship between Maternal and Paternal Involvement variables on the DADS measure (Amount and Helpfulness) and the following outcome measures: (1) adherence as measured by objective monitoring devices, (2) asthma functional morbidity based on a questionnaire measure, (3) maternal and paternal QoL, based on self-report on a questionnaire measure. Median splits on scale scores for Maternal and Paternal Amount and Helpfulness were used to create binary variables of either high (≥median) or low (<median) scores for maternal and paternal variables. A separate set of analyses were run for self-report and other-parent reported scores on the DADS measure. Therefore, high and low categories were created for the following variables: Maternal Amount–self report, Maternal Amount–father report, Paternal Amount–self-report, Paternal Amount–mother report, Maternal Helpfulness–self report, Paternal Helpfulness–self-report, and Paternal Helpfulness–mother report.

These categories served as independent variables in a 2 (Mother Involvement score high or low) × 2 (Father Involvement score high or low) factorial ANOVA. The four groups created for each of the variables were as follows: (1) High-High: Both mother and father obtained a score on the DADS Involvement subscale at or above the median; (2) Low-Low: Both mother and father obtained a score on the DADS Involvement subscale that was below the median; (3) High-Low: The mother obtained a score at or above the median, and the father obtained a score below the median; and (4) Low-High: The father obtained a score at or above the median, and the mother obtained a score below the median.

Univariate ANOVAs for each dependent variable were chosen rather than multivariate ANOVA as the method of analysis because different covariates were used for various dependent variables. Preliminary analyses of potential demographic covariates (child age, sex, ethnicity, and socioeconomic status [SES]) with outcome variables of adherence, asthma functional morbidity, and asthma-related QoL indicated a significant correlation between QoL and SES ($r = .34$, $p = .01$ for maternal QoL and $r = .32$, $p = .02$ for paternal QoL). Given that inclusion of covariates would likely diminish statistical power, conducting univariate analyses allowed for including the covariate of SES only for the analyses in which the outcome measure was significantly correlated with SES. Tests of analyses of variance were run as analyses of covariance (ANCOVAs), with SES as a covariate, for the outcome variables of maternal and paternal QoL.

**Results**

**Comparing Maternal and Paternal Asthma Management Practices**

Comparisons of mothers and fathers on seven domains of family asthma management, as assessed by the FAMSS interview, yielded differences on four of the subscales (See Figure 1). There was a difference in the scores for mothers ($M = 6.2$, $SD = 1.77$) and fathers ($M = 5.4$, $SD = 1.92$) on the subscale of Asthma Knowledge; $t(62) = 2.58$, $p = .012$, 95% CI [.18, 1.43]). Mothers also demonstrated a greater Knowledge of and Ability to Assess Symptoms

![Figure 1](https://academic.oup.com/jpepsy/article-abstract/40/8/768/929591/774)

*Figure 1.* Results of paired-samples t-test comparisons of mothers and fathers on the Family Asthma Management System Scale interview. *$p \leq .05$, **$p \leq .01$; error bars indicate 1 standard error of measurement.*
Comparing Involvement in Asthma Management and Beliefs About Asthma Medication

Mothers were found to be more involved in asthma management tasks than fathers, when comparisons were made based on self-report of Amount of Involvement (Maternal, M = 94.59, SD = 17.51; Paternal, M = 69.37, SD = 22.70; t(59) = 6.49, p < .001, 95% CI [17.44, 33.01]) and when comparisons were based on the report of the other parent (i.e., fathers reporting on mothers and vice versa; Maternal, M = 96.19, SD = 16.37; Paternal, M = 67.38, SD = 25.81; t(58) = −7.27, p < .001, 95% CI [−36.74, −20.87]). In addition, there were significant discrepancies with regard to maternal and paternal Helpfulness. Again, maternal Helpfulness was greater than paternal Helpfulness, whether comparing mother and father self-report (Maternal, M = 69.85, SD = 17.1; Paternal, M = 63.67, SD = 17.00; t(60) = 2.08, p = .042, 95% CI [−2.4, 12.11]) or parent report of the helpfulness of the other parent’s involvement in asthma care tasks (Maternal, M = 75.31, SD = 22.62; Paternal, M = 66.55, SD = 15.96; t(59) = −2.51, p = .015, 95% CI [−15.74, −1.77]) (See Figure 2). Interestingly, parental perceptions of Amount of involvement were significantly correlated (r = .37, p = .004 for maternal Amount; r = .63, p < .001 for paternal Amount). With regard to Helpfulness of paternal involvement, however, parental perceptions were not significantly correlated (r = .14, p = .27 for maternal Helpfulness, r = .10, p = .42 for paternal Helpfulness). Though not a statistically significant difference, mothers rated fathers’ contributions to asthma management as more helpful to family coping than did fathers (Mother report, M = 66.55, SD = 15.96; Father report, M = 63.51, SD = 17.09; t(59) = 1.06, p = .29, 95% CI [−2.68, 8.75]).

Maternal and paternal beliefs about the necessity of asthma medication and their concerns about potential consequences of medication were correlated (r = .48, p < .001 for necessity, and r = .26, p = .043 for concerns), but there was a difference between parental ratings such that mothers rated more strongly their belief in the necessity of medications for controlling asthma than fathers (Mothers, M = 3.8, SD = .72; Fathers, M = 3.4, SD = .75; t(61) = 4.57, p < .001, 95% CI [−2.4, 6.3]).

Are Greater Maternal and Paternal Involvement Associated With More Favorable Asthma-Related Outcomes?

Outcome measures for this set of analyses included Maternal QoL, Paternal QoL, Asthma Functional Morbidity (as measured by report on questionnaires), and Adherence (as measured by objective monitoring devices).

Table I summarizes the univariate ANOVA between-subjects effects of Maternal Amount of

![Figure 2](https://academic.oup.com/jpepsy/article-abstract/40/8/768/929591) Comparing Mother and Father Amount and Helpfulness of Involvement. *p ≤ .05, **p ≤ .01; error bars indicate 1 standard error of measurement.
Involvement, Paternal Amount of Involvement, and the Maternal Amount of Involvement × Paternal Amount of Involvement interaction. Results for the outcome variables of Maternal and Paternal QoL are ANCOVA results, controlling for SES.

Significant univariate between-subjects effects of Maternal Amount of Involvement (by self-report) were obtained for the outcome measure of Maternal QoL with greater Amount of Involvement associated with decreased QoL. Significant univariate between-subjects effects of Paternal Amount of Involvement (by self-report) were obtained for the scores on outcome measures of Maternal QoL, Paternal QoL, and Asthma Functional Morbidity. Paternal Amount of Involvement was associated with lower scores on the Maternal and Paternal QoL measures, and higher scores on the measure of Morbidity. There were no significant between-subjects effects attributable to the interaction of self-reported Maternal × Paternal Amount of Involvement.

Results for this set of analyses when Amount of Involvement was reported by each parent on the other parent are as follows: There was a significant between-subjects interaction effect attributable to the interaction of Maternal × Paternal Amount of Involvement for the outcome measure of Maternal QoL (see Figure 3). Independent t tests were computed to give a conservative estimate of simple main effects

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Amount by self-report</th>
<th>Amount by report of other parent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>p</td>
</tr>
<tr>
<td>Maternal amount of involvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life by self-report</td>
<td>5.325</td>
<td>.025*</td>
</tr>
<tr>
<td>Paternal quality of life by self-report</td>
<td>1.921</td>
<td>.172</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.211</td>
<td>.648</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>2.981</td>
<td>.090</td>
</tr>
<tr>
<td>Paternal amount of involvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life by self-report</td>
<td>7.499</td>
<td>.008**</td>
</tr>
<tr>
<td>Paternal quality of life by self-report</td>
<td>4.218</td>
<td>.045*</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.064</td>
<td>.801</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>4.748</td>
<td>.034*</td>
</tr>
<tr>
<td>Maternal × paternal amount of involvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life by self-report</td>
<td>0.237</td>
<td>.629</td>
</tr>
<tr>
<td>Paternal quality of life by self-report</td>
<td>1.298</td>
<td>.260</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.017</td>
<td>.898</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>0.728</td>
<td>.397</td>
</tr>
</tbody>
</table>

*Results for this dependent variable are presented after controlling for covariate of socioeconomic status.

$p ≤ .05; **p ≤ .01; ***p ≤ .001.$

Figure 3. Interaction between high and low maternal and paternal amount of involvement (by other parent report) for the outcome of Maternal Quality of life. *$p ≤ .05,$ **$p ≤ .01,$ ***$p ≤ .001;$ error bars indicate 1 standard error of measurement.
for this significant interaction. As seen in Figure 3, mean Maternal QoL for H-H families (4.50) was significantly lower than for L-L families (5.92) at \( p = .01 \), H-L families (6.37) at \( p < .001 \), and L-H families (5.65) at \( p = .02 \). Mean Maternal QoL was also significantly lower for L-H families (low Maternal and high Paternal Amount of Involvement), with a mean of 5.66 than H-L families (high Maternal and low Paternal Amount of Involvement) with a mean of 6.37, \( p = .035 \).

There were significant between-subjects effects of Paternal Amount of Involvement on Maternal QoL and Asthma Functional Morbidity, with higher scores on Paternal Amount of Involvement associated with lower Maternal QoL and Higher Morbidity. There were no significant between-subjects effects for Maternal Amount of Involvement, when reported by fathers, on any of the outcome measures. There were no significant associations between Maternal and Paternal Amount of Involvement and an electronically monitored measure of adherence.

Table II summarizes the univariate ANOVA between-subjects effects of Maternal Helpfulness, Paternal Helpfulness, and the interaction of Maternal Helpfulness × Paternal Helpfulness. Findings are presented after controlling for SES as a covariate. There was a significant between-subjects effect of self-reported Maternal Helpfulness on the Asthma Functional Morbidity score, with greater Helpfulness associated with higher rated Functional Morbidity. There was also a significant between-subjects effect of self-reported Paternal Helpfulness on the Asthma Functional Morbidity score in the same direction. There were no significant between-subject effects for measures of predictor variables when examining the measure as reported by the other parent. There were also no significant interaction effects for Maternal Helpfulness × Paternal Helpfulness for either self-reported or other parent-reported predictor variables. There were no significant associations between Maternal and Paternal Helpfulness and an electronically monitored measure of adherence.

Table II. Results of 2 × 2 (Maternal High or Low Helpfulness of Involvement × Paternal High or Low Helpfulness of Involvement) Analysis of Variance

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Helpfulness by self-report</th>
<th>Helpfulness by report of other parent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( F ) ( p ) Partial ( \eta^2 )</td>
<td>( F ) ( p ) Partial ( \eta^2 )</td>
</tr>
<tr>
<td>Maternal helpfulness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life(^a)</td>
<td>0.776 .382 .015</td>
<td>2.533 .118 .047</td>
</tr>
<tr>
<td>Paternal quality of life(^a)</td>
<td>3.215 .079 .057</td>
<td>0.973 .328 .018</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.175 .677 .003</td>
<td>0.580 .450 .010</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>4.989 .029* .080</td>
<td>0.699 .407 .012</td>
</tr>
<tr>
<td>Paternal helpfulness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life(^a)</td>
<td>0.362 .530 .007</td>
<td>1.861 .178 .035</td>
</tr>
<tr>
<td>Paternal quality of life(^a)</td>
<td>0.186 .668 .004</td>
<td>0.060 .808 .001</td>
</tr>
<tr>
<td>Adherence</td>
<td>1.393 .243 .024</td>
<td>0.392 .534 .007</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>4.439 .040* .072</td>
<td>1.883 .175 .033</td>
</tr>
<tr>
<td>Maternal × paternal helpfulness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal quality of life(^a)</td>
<td>0.053 .819 .001</td>
<td>1.025 .316 .020</td>
</tr>
<tr>
<td>Paternal quality of life(^a)</td>
<td>0.025 .875 .000</td>
<td>0.736 .395 .014</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.070 .792 .001</td>
<td>0.059 .809 .001</td>
</tr>
<tr>
<td>Asthma functional morbidity</td>
<td>0.614 .437 .011</td>
<td>0.098 .755 .002</td>
</tr>
</tbody>
</table>

\(^a\)Results for this dependent variable are presented after controlling for covariate of socioeconomic status.

\(^* p \leq .05.\)

Discussion

The present study expands on the existing body of research on paternal involvement in childhood disease management. This study compares maternal and paternal beliefs and behaviors in asthma care using a cross-sectional multisource and method study design, and examines associations between maternal and paternal involvement and asthma outcomes, including an objective measure of adherence to controller medication. In contrast to earlier research, the study provides a focused examination of asthma management in families of children between the ages of 5 and 9 years, a time when parents would be highly involved in their child’s asthma care, and so when parental collaboration may be particularly relevant. The comparison of maternal and paternal beliefs about medicine, and maternal and paternal approaches to asthma care management (assessment of symptoms and response to asthma episodes) provides a novel window into the role of fathers in two-parent families of children with asthma. In addition, the recruitment of participants from a community health setting and the specific effort to recruit families where the primary language spoken at home is Spanish, increases the generalizability of study findings to a more ethnically and economically diverse community population.
Mothers were found to be more involved than fathers in the daily tasks associated with childhood asthma care. Fathers, however, clearly had a role to play in asthma management as well. While mothers may more often be considered “primary caregivers,” they do not appear to be solely responsible for the child’s health-related care, as evidenced by both parents’ report on the assessment of involvement in daily tasks. Mothers and fathers views on the amount of their own and each other’s involvement in daily tasks were significantly correlated. Maternal and paternal perceptions of the “helpfulness” of father involvement in childhood asthma management, however, were not correlated. Mothers rated paternal contributions as more helpful to family coping than did fathers, suggesting that father’s may undervalue their asthma management role. This findings mirror the results of previous studies by the developers of the DAD’s measure of paternal involvement (Wysocki & Gavin, 2004) and also the study by Hilliard and colleagues, using this same measure in families of children with diabetes (Hilliard et al., 2011).

There were significant differences between mothers and fathers when beliefs about asthma medicine and specific behaviors indicative of asthma management effectiveness were compared. Mothers reported holding stronger beliefs in the necessity of medications to treat their child’s asthma. Mothers were also better able to describe their child’s specific symptom pattern, and were more readily able to follow the steps in the asthma action plan in response to an exacerbation as assessed by semistructured interview. Fathers scored lower than mothers on measures of asthma knowledge, and collaborative relationship with the asthma care provider.

Differences did not emerge between ratings of mothers and fathers on the FAMSS subscales measuring Environmental Control (evidence and extent of environmental exposures), Adherence to Asthma Medications (availability and appropriate use of both quick-relief and long-term controller medications), and Balanced Integration of Asthma into Family Life (the balance of attention to asthma management with other family and developmental issues) (Klinnert et al., 1997; McQuaid et al., 2005). Ratings on these three particular subscales, as opposed to those subscales where there were differences found, reflected asthma management at the family system or household level, as individual parents ratings in these domains could not be meaningfully coded. Therefore, parental differences would not have been expected, and the lack of differences found on these scales based on separate mother and father interviews may be interpreted as evidence of validity of the family-level ratings. The three subscales on which there were significant differences between maternal and paternal ratings, on the other hand, were rated at the individual parent level. Symptom Assessment and Appropriateness of Response to Exacerbation were each rated based on the mother or father’s description of what they do, or would do, on their own, without assistance from the other parent, to manage an asthma exacerbation. Coding of the subscale, Collaborative Relationship with the Provider, was similarly based on the individual parent’s relationship with the child’s asthma care provider regardless of the other parent’s relationship. For example, if one parent did not know the name of the doctor or the asthma action plan, the Collaborative Relationship with the Provider was coded at the lower end of this scale, even if the other parent in the family might have had a better-functioning relationship with the provider.

Overall, comparisons of mother and father involvement, beliefs, and asthma management skills suggest that while fathers are involved in daily asthma management tasks, and that involvement is viewed as helpful to family coping, fathers may not be as knowledgeable or as skilled as mothers. Fathers may not feel as strongly about the necessity of asthma medications to treat their child’s asthma. Furthermore, their working relationships with asthma care physicians tend to be less strong, and they tend to be behind mothers in their knowledge of asthma and maybe more critically, their ability to recognize asthma symptoms and respond to an exacerbation. These findings suggest that there is room for enhancement of father’s role in disease management, not just in the arena of providing instrumental or emotional support to mothers, but also in their understanding of asthma and management skills.

Our hypotheses regarding associations between maternal and paternal involvement in asthma management tasks and asthma-related outcomes were not supported. There were no significant findings for the outcome of adherence to controller medication, and significant findings were somewhat counterintuitive, in that greater involvement seemed to be associated with the negative outcome of higher levels of morbidity and lower parent-reported asthma-related QoL. Higher level of paternal involvement (either by mother or by father report) was associated with lower self-reported maternal QoL. A greater amount of self-reported maternal involvement (at or above the median level) was also associated with lower self-reported maternal QoL, and similarly a greater amount of self-reported paternal involvement was associated with lower self-reported paternal QoL. There was also a significant interaction between maternal and paternal involvement (based on other parent report) with the outcome of maternal QoL, such that maternal QoL was lowest for the group in which both maternal and paternal Amount of
Involvement was high, and significantly lower in this group than for the groups in which paternal Amount of Involvement was low.

This pattern of findings suggests that higher symptom severity and asthma functional morbidity may result in higher levels of involvement in asthma care. Parents may necessarily work together more often when the child’s asthma is not well controlled and when there is greater functional morbidity. Fathers may increase their level of involvement in daily management tasks, contributing to family coping, with escalating concerns about family-level functioning. These findings are consistent with Hilliard and colleagues’ study about father involvement in diabetes management (Hilliard et al., 2011). More research is needed to further examine the relationships between these variables, and to test whether greater parental collaboration might be predictive of positive child health outcomes when mothers and fathers in two-parent homes are supported with interventions that help increase asthma knowledge and management effectiveness.

There are several limitations of the current study which may point to recommendations for future research in this area. This was a pilot project with a relatively small sample size. The small sample size precluded the use of statistical methods to manage the nonindependence of respondents within the same family, which would be important to account for in future research with greater sample sizes. Future studies in this area may use dyadic data analysis and family-level approaches. The average levels of adherence to asthma controller medication in this sample (75%) were high compared with other studies where electronic measures of adherence were used (Bender et al., 2000). While an effort was made to recruit an economically diverse community sample, focus of the study on two-parent families may bias selection toward families with greater economic resources and fewer chronic stressors, which in turn might create a selection bias toward higher average levels of medication adherence. Given the cross-sectional nature of this study, assumptions cannot be made about causality regarding significant associations between paternal involvement and asthma outcomes. This study focused on families of young children between the ages of 5 and 9 years; findings may differ for older children. Longitudinal research would be necessary to understand the role that fathers play in family asthma management over time and through key developmental transitions, and whether paternal collaboration may impact trajectories of adherence and asthma morbidity as these young children transition into preadolescence and adolescence. Further research is needed to investigate paternal involvement in asthma management in families in which fathers take a primary caregiver role, as well as in nonintact families in which there may need to be parental collaboration in asthma care across two different home environments. Future studies might also examine the wider variety of inter-parental processes that may impact asthma management, including the role of alternative caregivers.

Clinically, results of this current study suggest that the role of fathers in child asthma management would benefit from enhancement. As fathers tend to devalue the importance of their involvement, asthma providers and educators may want to expressly reinforce the father’s disease management role. Asthma providers and educators who specifically request that fathers attend key appointment and become involved in learning asthma care may improve the collaborative relationship with the family as a whole. Family-based interventions may enhance adaptive family system involvement in childhood asthma care and be an effective avenue for improving asthma outcomes.

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**Conflicts of interest:** None declared.

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emotion, medication, parent contact, and life events. *Journal of Clinical Psychology, 55*, 573–584.


