

Factors Impacting the Mental Health of the Caregivers of Children with Asthma in China: Effects of Family Socioeconomic Status, Symptoms Control, Proneness to Shame, and Family Functioning

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Caregiver mental health is widely considered to be an important factor influencing children's asthma symptoms. The present study aimed to examine key factors that contribute to caregiver mental health in pediatric asthma with a Chinese sample. Two hundred participants reported their family socioeconomic status (SES), proneness to shame, asthma symptoms control of their child, family functioning, and their depression and anxiety symptoms. Results suggested that low family SES, low family functioning, and a high level of shame proneness were associated with high levels of anxiety and depression for caregivers. Family functioning mediated the effects of SES and shame on caregiver mental health and also moderated the effects of SES and shame on caregiver depression. This study highlights the importance of reducing experience of shame and enhancing family functioning in families affected by pediatric asthma.

Keywords: Pediatric Asthma; Caregiver Mental Health; Proneness to Shame; Family Functioning

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Asthma is a chronic disorder of the airways that affects patients of all ages; however, morbidity is the highest among children and young adults (Onnis et al., 2001). As other chronic diseases, pediatric asthma impacts not only the child but also the family in whole. Based on previous research, caregivers of children with asthma report more negative affect and poorer psychological health when compared with caregivers of children without asthma (Bartlett et al., 2001; Brehaut et al., 2009).

Factors that affect the mental health and coping of caregivers have recently begun to receive considerable attention (Gelkopf & Roe, 2014; Hernandez, Barrio, & Yamada, 2013; Polenick & Martire, 2013; Zhou & Yi, 2014). Financial burden is an important factor

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which contributes to mental health problems of caregivers of children with asthma. It has been found that such caregivers from families with low socioeconomic status report lower levels of quality of life (Annett, Bender, DuHamel, & Lapidus, 2003; Celano, et al., 2008; Erickson et al., 2002). Factors related to the disease itself are also potential risk factors for the caregivers. Some researchers have found that more asthma symptoms and higher rates of health care use in children are associated with higher levels of depression (Wood et al., 2002) and lower quality of life in caregivers (Haltermann et al., 2004). However, effects of indices of asthma symptoms control do not reach significance in other studies (Annett et al., 2003; Shalowitz, Berry, Quinn, & Wolf, 2001; Vila et al., 2003).

Aside from those two objective stressors, family functioning has been studied as an important resource for families coping with a child's illness. Families with functional dynamics can flexibly make changes and work collaboratively to deal with stressors. There has been evidence that the successful psychological adaptation of caregivers to children's chronic illness is associated with family functioning that provides a high level of support (Drotar, 1997; Thompson, Gustafson, Hamlett, & Spock, 1992). In research particularly on pediatric asthma, family routines and rituals that bring family members together, have been found to be effective in reducing anxiety of caregivers (Fiese & Wamboldt, 2000; Markson & Fiese, 2000; Schreier & Chen, 2010). In addition, family functioning seems to relate to other factors and impact caregivers' mental health collaboratively. Despite not being examined in the specific context of pediatric asthma, research suggests that family support acts as a buffer to the effects of child-related stress on parental depression (Brown, Lambert, Hsu, & Eckman, 1998; Jackson, 1992). Furthermore, according to the Conservation of Resources theory, family stress occurs with resource loss, such loss serving to make families more vulnerable (Hobfoll & Spielberger, 1992). Dysfunctional dynamics prevent families from making positive use of their resources and can even create secondary stressors which make the situation worse (Chaney et al., 1997). Family conflict has been identified as an important stressor for caregivers (Kung, 2003). Therefore, family dysfunction seems to mediate the effects of stressors to caregiver mental health.

Although the effects of the aforementioned factors on caregivers' mental health in isolation have been examined repeatedly, how they work collaboratively is relatively less explored. Moreover, previous research is mainly conducted in western countries; similar research is scarce with Chinese participants. Due to the specific social and cultural characteristics, we expect such caregivers in China might encounter more specific stressors and the effects of the established factors might be different as well.

culture in which individuals are socialized to “have a sense of shame” and are encouraged to act so as to maximize the positive evaluation granted by others and avoid their disapproval (Fung, 1999). For Chinese, shame is closely related with the concept of “face”. Failure to fulfill positive duties and obligations and failure to keep social status are two important reasons for “losing face” and an important source of shame (Hwang, 2001).

Pediatric asthma is usually considered as a negative event for families and it could be a trigger of shame experience for caregivers with high proneness to shame. To begin with, the decrease in socioeconomic status because of the big medical costs for the illness could be a source of shame. Secondly, individuals with high proneness tend to attribute negative events to internal and stable factors (Shi & Qian, 1998). Such caregivers might attribute the symptoms to their failure to take good care of the child, which may lead them to feel ashamed. Furthermore, in the Chinese cultural context, the experience of shame is a group concern rather than an individual concern: People feel ashamed not only by behaviors of themselves but also by behaviors of their families, friends, and relatives (Li, Wang, & Fischer, 2004; Stipek, 1998). Having a child who is weak and needs special care might lead the caregivers to feel ashamed. For the reasonings listed above, for those caregivers with high proneness to shame, the asthma of the child could elicit a shame-related experience, with both cognitive and behavior patterns, including negative emotions, avoidance or hiding behaviors, and self-deprecation.

As previous research has revealed, shame proneness is associated with a variety of mental disorders, such as depression (O'Connor, Berry, Inaba, Weiss, & Morrison, 1994; Zhong, Li, & Qian, 2003; Zhu, Wang, & Qian, 1999) and anxiety (Zhong et al., 2008). Hence, it is reasonable to propose the proneness to shame as a potential risk factor for caregiver mental health in pediatric asthma.

OBJECTIVE AND PURPOSE

The present study aimed to examine the effects of SES, asthma symptoms control, family functioning, and proneness to shame on caregiver mental health in pediatric asthma in a Chinese sample.

As low SES and poor symptoms control are objective stressors that cause financial, physical, and emotional burdens, we hypothesized that both of them would be positively correlated with caregiver depression and anxiety. As a cultural specific risk factor, we also hypothesized that proneness to shame could predict caregiver depression and anxiety positively. Consistent with the Conservation of Resource theory and previous research on the role of family functioning, we proposed that family functioning would mediate and moderate the effects of proposed risk factors above. The hypothesized model is presented in Figure 1.

METHOD

PARTICIPANTS

Participants were recruited from the pediatric department of a general hospital in a midsize city in Northern China. The inclusion criteria were (1) the child had been diagnosed with asthma and (2) participants were the patient's primary or regular caregivers. Two hundred and thirty-five caregivers who fulfilled the requirements volunteered to participate in the study, but only 200 of them provided complete data for all measures used in the analyses. In the final sample, most of the participants ($n = 192$) were parents, six respondents were grandparents, and two respondents did not specify their relationship with the child. One hundred and sixty-three families came from urban areas, whereas 37 families were from rural areas. The mean age of participants was 34.15 ($SD = 6.95$) years. Their highest educational attainment varied between junior high school and below

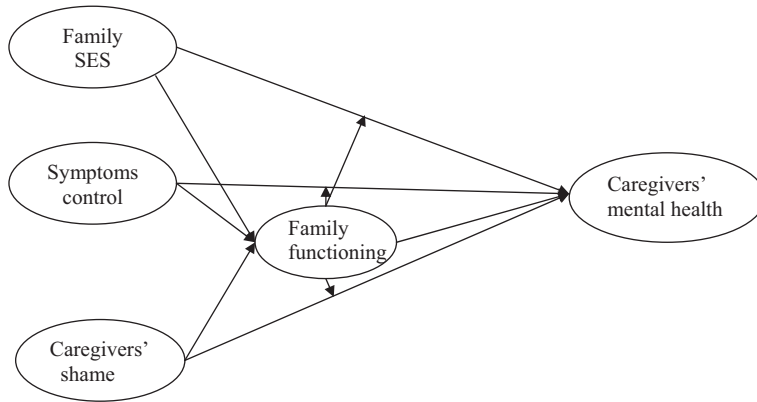


FIGURE 1. Hypothesized Effects of SES, Asthma Symptoms Control, Caregivers' Proneness to Shame, and Family Functioning on Caregivers' Mental Health

($n = 40$, 20%), senior high school ($n = 37$, 18.5%), college ($n = 78$, 39%), bachelor's degree ($n = 43$, 21.5%), and postgraduate degree ($n = 2$, 1%). Regarding the children involved in the study, 112 (56%) were boys and 88 (44%) were girls. Their mean age was 5.92 years ($SD = 3.47$).

METHOD

Family SES

A demographic questionnaire was used to obtain information about family SES including family residence, family income, and the education level of the caregiver.

Asthma symptoms control

Participants were asked to fill in the length of time since diagnosis as well as the number of acute episodes and number of hospitalizations in the last 12 months, which were used as indices of the child's asthma symptoms control.

Caregiver's proneness to shame

The Shame Scale (Qian, Andrews, Zhu, & Wang, 2000) is a 29-item questionnaire which was used to measure caregivers' proneness to shame. The questionnaire includes four subscales with the personality shame subscale measuring individuals' experience of shame regarding their personality and behavior patterns, the behavior shame subscale measuring individuals' avoidance behavior related to shame, the body shame subscale measuring one's shame regarding to his/her body shape, and the family shame subscale measuring how individuals feel ashamed by behaviors of family members. The scale's structural validity has been examined in a Chinese sample and its internal reliability in the present study ranges from .86 to .89.

Family functioning

The General Functioning subscale of the McMaster Family Assessment Device (FAD) was used in the present study to measure family functioning. There has been evidence that this 12-item subscale is highly correlated with total scores on FAD and can be taken as representative of overall family functioning (Kabacoff, Miller, Bishop, Epstein, & Keitner, 1990; Ridenour, Daley, & Reich, 1999). Participants were asked to rate items on a 4-point Likert-like scale, with higher scores indicating greater family dysfunction. The internal reliability is .84 in the present study.

Caregiver mental health

Caregiver anxiety was measured using the Self-Rating Anxiety Scale (SAS). There are 20 items which participants rate on a 4-point scale, with higher scores indicating more anxious symptoms. The Chinese version of the SAS has been validated and widely used in China (Tao & Gao, 1994). The internal consistency in the present study was .85.

The Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977) was used to measure depressive symptoms. It is a 20-item 4-point scale, with higher scores indicating higher levels of depression. Its reliability and validity has been examined in Chinese samples (Lin, Wei, Yi, Xiao, & Yao, 2008) and the internal consistency was .88 in the present study.

Participants

Participants were approached in the waiting hall of the pediatric department. After checking for inclusion criteria and explaining the goal of the study, the questionnaire packages were administrated and collected within 1 hour.

Data analysis

Correlation analysis was first conducted to examine the correlations between family SES, asthma symptoms control, caregiver's shame proneness, family functioning, and caregiver anxiety and depression. Structural equation modeling analyses were run to test the proposed hypotheses.

RESULTS

Participant characteristics

Means and standard deviations of main variables involved are displayed in Table 1. We first compared levels of anxiety and depression of this sample with the norms in China. Results revealed that the anxiety level of caregivers of children with asthma (39.75 ± 8.66) was higher than the average level in China (29.78 ± 0.46), with $p < .01$ (Wu, 1999). However, the difference between the depression level in this sample (32.09 ± 7.52) and the norm (31.26 ± 9.82) was not significant ($p = .11$) (Zhang, et al., 2010).

As demonstrated in Table 1, indices of SES, symptoms control, proneness to shame, and family functioning were interrelated. Family income was negatively correlated with personality shame ($r = -.22, p < .01$) and family dysfunction ($r = -.22, p < .01$). Length of time since diagnosis had positive correlations with behavior shame ($r = .19, p < .01$) and personality shame ($r = .15, p < .05$). Times of hospitalization showed a small negative correlation with body shame ($r = -.15, p < .05$). And family dysfunction was positively correlated with behavior shame ($r = .20, p < .01$), body shame ($r = .15, p < .05$), personality shame ($r = .40, p < .01$), and family shame ($r = .25, p < .01$).

Regarding correlations with caregivers' mental health, family income, proneness to shame, and family functioning showed moderate correlations with caregiver depression and anxiety, but indices of asthma symptoms control only had significant correlations with anxiety.

Measurement model

To examine the hypothesized model on the effects of family SES, asthma symptoms control, caregivers' shame, and family functioning on caregivers' mental health, we first test

TABLE 1
The Means, Standard Deviations, and Correlations among Variables

	<i>M</i>	<i>SD</i>									
1. Family income	3667.57	2079.83	-								
2. Length of time diagnosed with asthma	2.14	2.63	-.02	-							
3. Asthma episodes	2.39	2.42	-.03	.11	-						
4. Times of hospitalization	0.92	1.21	-.07	-.06	.24**	-					
5. Behavior shame	18.12	5.13	-.04	.19**	-.05	-.12	-				
6. Body shame	6.01	2.39	.03	.12	.02	-.15*	.41**	-			
7. Personality shame	20.75	5.76	-.22**	.15*	.10	-.09	.71**	.48**	-		
8. Family shame	5.98	2.38	-.13	.00	-.07	-.03	.35**	.37**	.38**		
9. Family dysfunction ^a	2.01	0.41	-.22**	.04	.07	-.05	.20**	.15*	.40**	.25**	
10. Depression	32.09	7.51	-.33**	.12	.11	-.02	.25**	.19**	.44**	.63**	
11. Anxiety	39.75	8.66	-.28**	.18*	.18**	.07	.13	.34**	.36**	.47**	
										.56**	

Note. Cronbach's α of each subscale is listed in the diagonal in boldface type.

*Indicates correlation is significant at the .05 level.

**Indicates correlation is significant at the .01 level (two-tailed).

^aBecause higher FAD scores indicate greater family dysfunction, the label 'family dysfunction' is used here for convenience.

the moderating model with family functioning as the moderator and then examine its mediating effects.

Moderating effects of family functioning

We tested a series of SEM models that included three exogenous variables (SES/caregiver's proneness to shame/children's asthma symptoms control, family functioning, and the interaction term) and one endogenous latent factor (caregiver's depression/anxiety). The calculation of the latent interaction was followed by methods recommended by Marsh, Wen, and Hau (2004). For example, to obtain the latent interaction term of family functioning and SES, products of family functioning and the three indices of SES were put into a latent construct. Confirmatory factor analysis was applied to examine the goodness of fit and loadings of indices in the interaction term. The product of family functioning and residence was removed because of its low loading ($\lambda = .29$). The same procedure was used to obtain the interaction term of family functioning and caregiver's shame and that of family functioning and children's asthma symptoms control.

Results of SEM yielded significant moderating effects of family functioning in the SES-caregiver depression link, $\chi^2(10, N = 185) = 23.54, p < .01, CFI = 0.95, GFI = 0.96$ and $RMSEA = 0.08$ and $\gamma_{interaction} = -0.25, p < .01$, and caregiver's shame-depression link, $\chi^2(31, N = 200) = 61.92, p < .001, CFI = 0.95, GFI = 0.94$ and $RMSEA = 0.07$ and $\gamma_{interaction} = 0.22, p < .01$. However, the moderating effects of family functioning in the asthma symptoms control-depression link and all the models with anxiety as the outcome variable were not significant.

To further analyze the moderating effect of family functioning in the relationship between SES and caregiver's depression, a simple slope test was conducted. The sample was divided into a high-functioning family group (<1 SD below the mean) and a low-functioning family group (≥ 1 SD above the mean). Results indicated that although correlations between SES and caregiver depression in both groups were significant, with $t = -7.79, p < .01$ and $t = -10.57, p < .01$, respectively, the correlation between SES and caregiver depression in families with high family functioning was less pronounced than that in families with low levels of family functioning (Figure 2).

Similarly, a simple slope analysis on moderating effects of family functioning between caregiver's shame and depression was conducted. Results indicated that the correlation between caregiver's shame and depression in families with low family functioning was significant ($t = 2.81, p = .006$), while that in families with high family functioning was not

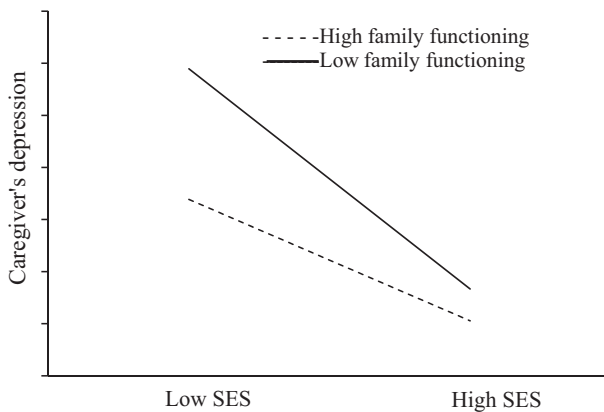


FIGURE 2. The Correlations between Family SES and Caregiver's Depression in High and Low Family Functioning Groups

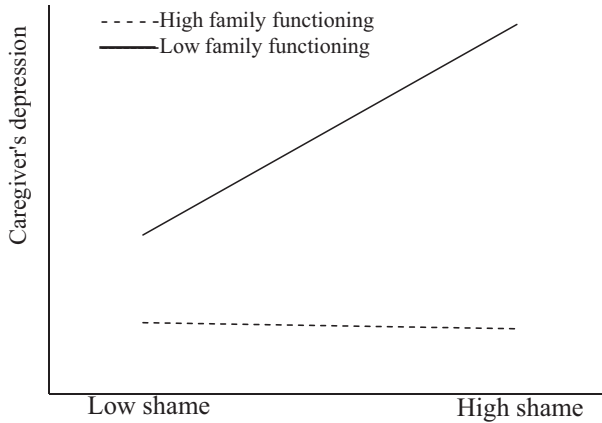


FIGURE 3. The Correlations between Caregiver's Proneness to Shame and Depression in High and Low Family Functioning Groups

significant ($t = -0.13$, $p = .91$). The correlations between caregiver's proneness to shame and depression in high and low family functioning groups are depicted in Figure 3.

Mediating effects of family functioning

To test the hypothesized mediating effects of family functioning, the method recommended by Baron and Kenny (1986) was used. There are four steps to establish a mediation effect. First, the correlation between the predictor and the outcome variable must be significant. Second, the predictor must be significantly related to the mediator. Third, the mediator must be significantly related to the criterion. Finally, the effect of the predictor on the criterion should be significantly weaker after including the mediator in the model. Therefore, before testing the mediation effects of family functioning on the relationships of SES, children's asthma symptoms control, and caregiver's proneness to shame to caregiver's mental health, we first checked these three prerequisites.

Results showed that SES predicted caregiver's depression ($\gamma = -0.46$, $p < .01$) and anxiety significantly ($\gamma = -0.26$, $p < .01$). Caregiver's shame also predicted caregiver's depression ($\gamma = 0.45$, $p < .01$) and anxiety significantly ($\gamma = 0.36$, $p < .01$). However, children's asthma symptoms control only predicted caregiver's anxiety ($\gamma = 0.21$, $p < .05$). In addition, family functioning was significantly related to SES ($\gamma = 0.22$, $p < .01$), caregiver's shame ($\gamma = 0.40$, $p < .01$), and caregiver's depression ($\gamma = 0.63$, $p < .01$) and anxiety ($\gamma = 0.47$, $p < .01$), whereas it did not significantly correlate with children's asthma symptoms control ($\gamma = 0.04$, $p > .05$). Hence, the prerequisites for establishing the mediation effects of family functioning on the asthma symptoms control-caregiver's depression link and the symptoms control-caregiver's anxiety link were not fulfilled, and asthma symptoms control was excluded from the mediation models.

Two models with family SES and caregiver's proneness to shame as predictors, family functioning as a mediator, and caregiver depression/anxiety as the outcome variable were examined.

For the model predicting caregiver depression, the data fit the model well, $\chi^2(23, N = 185) = 71.22$, $p < .001$, CFI = 0.92, GFI = 0.93, and RMSEA = 0.08. Path coefficients of the mediation model are presented in Figure 4. Although the path coefficients from SES and caregiver's shame to caregiver's depression were both significant ($\gamma = -0.29$, $p < .01$, $\gamma = 0.20$, $p < .01$, respectively), the magnitude of the direct association was reduced significantly: for SES (from -0.38 to -0.29), $z = -2.21$, $p < .05$, and for caregiver's shame (from

0.37 to 0.20), $z = 3.80$, $p < .01$ (Table 2). Therefore, these findings support the partial mediation effects of family functioning on the associations between family SES and caregiver's shame with caregiver depression.

The same analytic procedure was conducted to examine the anxiety model. Detailed indices of the model's goodness of fit are listed in Table 2 and path coefficients are presented in Figure 5. The addition of family functioning in the model reduced the magnitude of the direct association between SES and anxiety (from 0.22 to 0.15, $z = -2.12$, $p < .05$), as well as the association between caregiver's shame and anxiety (from 0.31 to 0.16, $z = 3.66$, $p < .01$). The mediation effect of family functioning on the relationship between SES and caregivers' shame on caregiver anxiety was supported.

DI C ION

The present study focused on the mental health of the caregivers of children with asthma and aimed to clarify factors contributing to the mental health problems of such caregivers in the Chinese social context.

As the results revealed, caregivers of children with asthma showed heightened levels of anxiety, but not depression compared with the norms. It may be related to the nature of

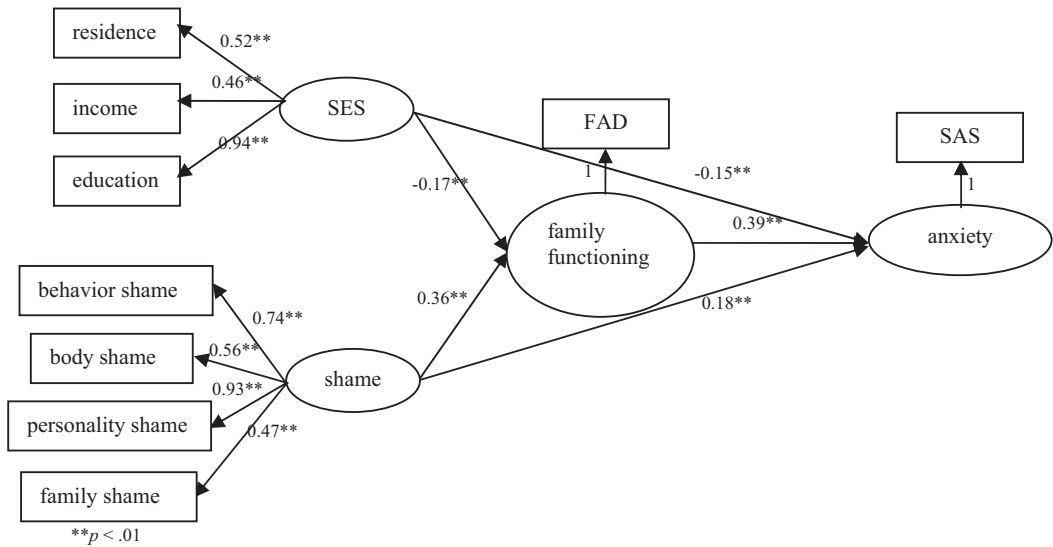


FIGURE 5. Mediation Effect of Family Functioning in the Association between SES and Caregiver's Proneness to Shame with Caregiver's Anxiety

this disease. Due to its chronic course and its frequent episodes of symptoms, caring for a child with asthma means a large daily investment of energy and great responsibilities. Caregivers have to be alert to potential environmental allergens, to do additional house cleaning, and to help the child with regular medication use. Aside from such chronic stress, they face greater stress in the asthma acute episodes. They may miss work because of frequent visits to hospitals. The symptoms can be severe and sometimes even threatening to life (Lenney, 1997). It is easy to understand the heightened anxiety level in those caregivers under the circumstances. Nevertheless, pediatric asthma is not untreatable. Under appropriate treatment and monitoring, the symptoms could be well controlled. Therefore, experiences such as helplessness and hopelessness related to depression seem not common in these caregivers.

Regarding factors that affect anxiety and depression levels of the caregivers of children with asthma, we focused on effects of three factors which have been frequently studied, that is, family SES, asthma symptoms control and family functioning, and one factor with specific cultural meanings, that is, proneness to shame.

Consistent with most previous research and as support to our hypothesis, our findings suggest that family SES can negatively predict caregiver anxiety and depression. For many families, the long course of the disease and the repeated occurrence of acute episodes mean frequent visits to hospitals and large expenses. The financial burden is particularly great for those families with low income. For those who live in rural areas, it is relatively difficult to get access to high-quality healthcare resources and useful medical information. This influences caregiver mental health because, as previous research indicates, literacy on asthma effectively reduces caregiver anxiety (Shone, Conn, Sanders, & Halterman, 2009). Those with a low educational level might have difficulty finding information about asthma by themselves, and may suffer from excessive worries and a sense of insecurity.

In opposition to our hypothesis, the relationship between asthma symptoms control and caregiver mental health did not reach significance. This finding, however, is consistent with previous research which has insisted that disease symptoms control has little impact on the adaption of families (Annett et al., 2003; Shalowitz et al., 2001; Vila et al., 2003).

The current findings provide additional information about caregivers' proneness to shame and its association with their mental health. As indicated in the results, high proneness to shame is related with low family SES, family dysfunction, as well as long course of pediatric asthma. The result is consistent with the argument that low social status is a vital source of shame in the Chinese cultural context (Hwang, 2001). Also, the long course of illness of the child might aggravate the shame of caregivers. The reasons may lie in the self-blaming of inappropriate care and symptoms management or the social stigma of having a child with illness. For the correlation between shame and family dysfunction, it may be that individuals with high proneness to shame are more likely to withdraw and hide feelings which might hinder effective communication within the family, and in turn do harm on family functioning (Qian, Liu, & Zhang, 2003; Shi & Qian, 1998). The reverse is also possible. In families which are full of judgment and criticism, while lacking in warmth and support, individuals' self-esteem might rely much on external evaluation and they are more likely to feel ashamed (Yi, 2001).

Consistent with previous research on the associations between shame and psychopathology, our results suggest that the higher a caregiver scored on proneness to shame, the more depressive and anxious symptoms he or she experienced (Tangney, Wagner, & Gramzow, 1992; Qian, Liu, & Zhu, 2001; Zhong, Li, & Qian, 2003). Low self-esteem has been found as a mediator between the relationship between proneness to shame and depression (Zhu, Wang, & Qian, 1999). The internal and stable attribution style and avoidance coping style which relate with shame proneness also make individuals more vulnerable to external stress (Shi & Qian, 1998).

The hypotheses on the moderating and mediating effects of family functioning are also supported. As indicated by the results, family functioning is a buffer but also a vulnerable mediator in the association between stressors (low family SES and high proneness to shame) and caregiver mental health. On one hand, functional families are an important resource for caregivers dealing with stressors such as childhood asthma. In families with high functioning, the negative effects of external stressors, such as low SES, and internal vulnerabilities, such as shame, become dramatically less pronounced. This is consistent with previous research suggesting that spousal support buffers the effects of child-related stress on parental depression (Jackson, 1992). On the other hand, risk factors such as low family SES and high proneness to shame also have a negative impact on this coping resource. Consistent with the Conservation of Resources theory, as well as a previous study (Mitrani et al., 2006), family functioning is a mediator by which SES and proneness to shame do harm to caregivers' mental health.

The findings from the present study have important implications for interventions designed for children with asthma in China. As suggested by the results, caregivers of children with asthma suffer from greater anxiety than average. Reducing anxiety level of caregivers should be an important part in the interventions. Providing resources directly should be a way to help them obtain the sense of mastering and decrease anxiety. For example, for those families living in rural places, it is important to provide information on medical resources available. For families with low SES, financial support might be a key to improve caregivers' mental health. However, it is also possible to stimulate energy within the family itself. As indicated by this study's results, decreasing the experience of shame and improving family functioning might be beneficial for the caregivers, especially for those from families with low SES. Psycho-education on shame proneness, family functioning, and their relationship with the caregiver's mental health and the child's symptoms control could be conducted, and a booklet containing suggestions on release from experience of shame and maintaining functional family dynamics when dealing with the child's illness could be sent out to the caregivers. Family therapy is also an option for the affected families. There has been evidence that systemic family therapy is effective in

reducing the depression symptoms of caregivers of patients with chronic disease (Eisdorfer et al., 2003), and that it is helpful in controlling the symptoms of children with asthma (Onnis et al., 2001).

It is also important to acknowledge the limitations of the present study. First, this is a caregiver-report investigation which lacks objective measures of asthma symptoms control. The indices of asthma symptoms control used in the present study might be not sensitive enough to detect its effect on caregivers' mental health. Second, although we found that family functioning can help caregivers deal with the stress associated with pediatric asthma, precisely which aspects of family functioning are relevant remains unclear. Third, we recruited participants in a hospital, which means the sample is more representative of caregivers whose children are in an acute episode rather than the whole population of caregivers of children with asthma. The sampling bias might affect the generalizability of the results.

REFERENCES

- Annett, R. D., Bender, B. G., DuHamel, T. R., & Lapidus, J. (2003). Factors influencing parent reports on quality of life for children with asthma. *Journal of Asthma*, 40, 577–587.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Bartlett, S. J., Kolodner, K., Butz, A. M., Eggleston, P., Malveaux, F. J., & Rand, C. S. (2001). Maternal depressive symptoms and emergency department use among inner-city children with asthma. *Archives of Pediatrics and Adolescent Medicine*, 155, 347–353.
- Brehaut, J. C., Kohen, D. E., Garner, R. E., Miller, A. R., Lach, L. M., Klassen, A. F. et al. (2009). Health among caregivers of children with health problems: findings from a Canadian population-based study. *American Journal of Public Health*, 99, 1254–1262.
- Brown, R. T., Lambert, R. G., Hsu, L., & Eckman, J. R. (1998). Family functioning and social support in the adaptation of caregivers of children with sickle cell syndromes. *Journal of Pediatric Psychology*, 23, 377–388.
- Bury, M. (1982). Chronic illness as biographical disruption. *Sociology of Health and Illness*, 4, 167–182.
- Byrne, P. (2000). Stigma of mental illness and ways of diminishing it. *Advances in Psychiatric Treatment*, 6, 65–72.
- Chaney, J. M., Mullins, L. L., Frank, R. G., Peterson, L., Mace, L. D., Kashani, J. H. et al. (1997). Transactional patterns of child, mother, and father adjustment in insulin-dependent diabetes mellitus: A prospective study. *Journal of Pediatric Psychology*, 22, 229–244.
- Charmaz, K. (2000). Experiencing chronic illness. In G. L. Albrecht, R. Fitzpatrick, & S. C. Scrimshaw (Eds.), *The handbook of social studies in health and medicine* (pp. 277–292). Thousand Oaks, CA: Sage Publications Ltd.
- Celano, M., Bakeman, R., Gaytan, O., Smith, C. O., Koci, A., & Henderson, S. (2008). Caregiver Depressive Symptoms and Observed Family Interaction in Low-Income Children with Persistent Asthma. *Family Process*, 47, 7–20.
- Crandall, C. S., & Moriarty, D. (1995). Physical illness stigma and social rejection. *British Journal of Social Psychology*, 34, 67–83.
- Drotar, D. (1997). Relating parent and family functioning to the psychological adjustment of children with chronic health conditions: What have we learned? What do we need to know? *Journal of Pediatric Psychology*, 22, 149–165.
- Eisdorfer, C., Czaja, S. J., Loewenstein, D. A., Rubert, M. P., Argüelles, S., Mitrani, V. B. et al. (2003). The effect of a family therapy and technology-based intervention on caregiver depression. *The Gerontologist*, 43, 521–531.
- Erickson, S. R., Munzenberger, P. J., Plante, M. J., Kirking, D. M., Hurwitz, M. E., & Vanuya, R. Z. (2002). Influence of sociodemographics on the health-related quality of life of pediatric patients with asthma and their caregivers. *Journal of Asthma*, 39, 107–117.
- Fiese, B. H., & Wamboldt, F. S. (2000). Family routines, rituals, and asthma management: A proposal for family-based strategies to increase treatment adherence. *Families, Systems, and Health*, 18, 405–418.
- Fung, H. (1999). Becoming a moral child: The socialization of shame among young Chinese children. *Ethos*, 27, 180–209.
- Gelkopf, M., & Roe, D. (2014). Evaluating outcome domains assessing caregivers of individuals with mental illness: A review. *Family Process*, 53, 150–174.

- Halterman, J. S., Yoos, H. L., Conn, K. M., Callahan, P. M., Montes, G., Neely, T. L. et al. (2004). The impact of childhood asthma on parental quality of life. *Journal of Asthma*, *41*, 645–653.
- Hernandez, M., Barrio, C., & Yamada, A. (2013). Hope and burden among Latino families of adults with schizophrenia. *Family Process*, *52*, 697–708.
- Hinshaw, S. P. (2007). *The mark of shame: Stigma of mental illness and an agenda for change*. New York: Oxford University Press.
- Hobfoll, S. E., & Spielberger, C. D. (1992). Family stress: Integrating theory and measurement. *Journal of Family Psychology*, *6*, 99–112.
- Hwang, K.-K. (2001). The deep structure of Confucianism: A social psychological approach. *Asian Philosophy*, *11*, 179–204.
- Jackson, P. B. (1992). Specifying the buffering hypothesis: Support, strain, and depression. *Social Psychology Quarterly*, *55*, 363–378.
- Joachim, G., & Acorn, S. (2000). Stigma of visible and invisible chronic conditions. *Journal of Advanced Nursing*, *32*, 243–248.
- Kabacoff, R. I., Miller, I. W., Bishop, D. S., Epstein, N. B., & Keitner, G. I. (1990). A psychometric study of the McMaster Family Assessment Device in psychiatric, medical, and nonclinical samples. *Journal of Family Psychology*, *3*, 431–439.
- Kung, W. W. (2003). The illness, stigma, culture, or immigration? Burdens on Chinese American caregivers of patients with schizophrenia. *Families in Society: The Journal of Contemporary Social Services*, *84*, 547–557.
- Lenney, W. (1997). The burden of pediatric asthma. *Pediatric Pulmonology*, *24*, 13–16.
- Li, J., Wang, L., & Fischer, K. W. (2004). The organization of Chinese shame concepts? *Cognition and Emotion*, *18*, 767–797.
- Lin, Y., Wei, Y., Yi, J., Xiao, J., & Yao, S. (2008). Factorial structure of the CES-D scale among Chinese high school students. *Chinese Journal of Clinical Psychology*, *16*, 265–267.
- Markson, S., & Fiese, B. H. (2000). Family rituals as a protective factor for children with asthma. *Journal of Pediatric Psychology*, *25*, 471–480.
- Marsh, H. W., Wen, Z., & Hau, K.-T. (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods*, *9*, 275–300.
- Mitrani, V. B., Lewis, J. E., Feaster, D. J., Czaja, S. J., Eisdorfer, C., Schulz, R. et al. (2006). The role of family functioning in the stress process of dementia caregivers: A structural family framework. *The Gerontologist*, *46*, 97–105.
- O'Connor, L. E., Berry, J. W., Inaba, D., Weiss, J., & Morrison, A. (1994). Shame, guilt, and depression in men and women in recovery from addiction. *Journal of Substance Abuse Treatment*, *11*, 503–510.
- Onnis, L., Di Gennaro, A., Cespa, G., Dentale, R. C., Benedetti, P., Forato, F. et al. (2001). Prevention of chronicity in psychosomatic illness: A systemic research study into the treatment of childhood asthma. *Families, Systems, and Health*, *19*, 237.
- Polenick, C. A., & Martire, L. M. (2013). Caregiver attributions for late-life depression and their associations with caregiver burden. *Family Process*, *52*, 709–722.
- Qian, M., Andrews, B., Zhu, R., & Wang, A. (2000). The development of shame scale of Chinese college students. *Chinese Journal of Mental Health*, *14*, 217–220.
- Qian, M., Liu, J., & Zhang, Z. (2003). The difference of shame proneness and coping style towards shame stories. *Acta Psychologica Sinica*, *35*, 387–392.
- Qian, M., Liu, X., & Zhu, R. (2001). Phenomenological research of shame among college students (in Chinese). *Chinese Journal of Mental Health*, *15*, 73–75.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.
- Ridenour, T. A., Daley, J., & Reich, W. (1999). Factor analyses of the family assessment device. *Family Process*, *38*, 497–510.
- Schreier, H., & Chen, E. (2010). Longitudinal relationships between family routines and biological profiles among youth with asthma. *Health Psychology*, *29*, 82–90.
- Shalowitz, M. U., Berry, C. A., Quinn, K. A., & Wolf, R. L. (2001). The relationship of life stressors and maternal depression to pediatric asthma morbidity in a subspecialty practice. *Ambulatory Pediatrics*, *1*, 185–193.
- Shi, C., & Qian, M. (1998). Attribution styles and coping traits among shame prone persons. *Chinese Mental Health Journal*, *12*, 193–195.
- Shone, L. P., Conn, K. M., Sanders, L., & Halterman, J. S. (2009). The role of parent health literacy among urban children with persistent asthma. *Patient Education and Counseling*, *75*, 368–375.
- Snadden, D., & Brown, J. B. (1992). The experience of asthma. *Social Science and Medicine*, *34*, 1351–1361.
- Stipek, D. (1998). Differences between Americans and Chinese in the circumstances evoking pride, shame, and guilt. *Journal of Cross-Cultural Psychology*, *29*, 616–629.
- Tangney, J. P., & Fischer, K. W. (1995). *Self-conscious emotions*. New York: Guilford.

- Tangney, J. P., Wagner, P., & Gramzow, R. (1992). Proneness to shame, proneness to guilt, and psychopathology. *Journal of Abnormal Psychology, 101*, 469–478.
- Tao, M., & Gao, J. (1994). Reliability and validity of the Chinese version of self-rating anxiety scale (in Chinese). *Chinese Journal of Nervous and Mental Diseases, 20*, 301–303.
- Thompson, R. J., Gustafson, K. E., Hamlett, K. W., & Spock, A. (1992). Psychological adjustment of children with cystic fibrosis: The role of child cognitive processes and maternal adjustment. *Journal of Pediatric Psychology, 17*, 741–755.
- Vila, G., Hayder, R., Bertrand, C., Falissard, B., de Blic, J., Mouren-Simeoni, M.-C. et al. (2003). Psychopathology and quality of life for adolescents with asthma and their parents. *Psychosomatics, 44*, 319–328.
- Wood, P. R., Smith, L. A., Romero, D., Bradshaw, P., Wise, P. H., & Chavkin, W. (2002). Relationships between welfare status, health insurance status, and health and medical care among children with asthma. *American Journal of Public Health, 92*, 1446–1452.
- Wu, W. (1999). Self-rating anxiety scale, SAS. In X. Wang, Wang, X., Ma H. (Ed.), *Rating Scales for Mental Health* (pp. 235). Beijing: Chinese Mental Health Journal.
- Yi, C. (2001). Association between family interaction and adolescent depression and intervention study. Doctoral dissertation. Beijing: Peking University.
- Zhang, J., Wu, Z., Fang, G., Li, J., Han, B., & Chen, Z. (2010). Development of the Chinese age norms of CES-D in urban area. *Chinese Mental Health Journal, 24*, 139–143.
- Zhong, J., Li, B., & Qian, M. (2003). Shame, personality and mental health: An original structural model research. *Chinese Mental Health Journal, 17*, 31–35.
- Zhong, J., Wang, A., Qian, M., Zhang, L., Gao, J., Yang, J. et al. (2008). Shame, personality, and social anxiety symptoms in Chinese and American nonclinical samples: A cross-cultural study. *Depression and Anxiety, 25*, 449–460.
- Zhou, T., & Yi, C. (2014). Parenting styles and parents' perspectives on how their own emotions affect the functioning of children with autism spectrum disorders. *Family Process, 53*, 55–66.
- Zhu, R., Wang, T., & Qian, M. (1999). Correlation research of shame, mental health, self-efficacy and self-esteem. *Chinese Mental Health Journal, 13*, 225–227.