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 (Halterman 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 adaption 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.

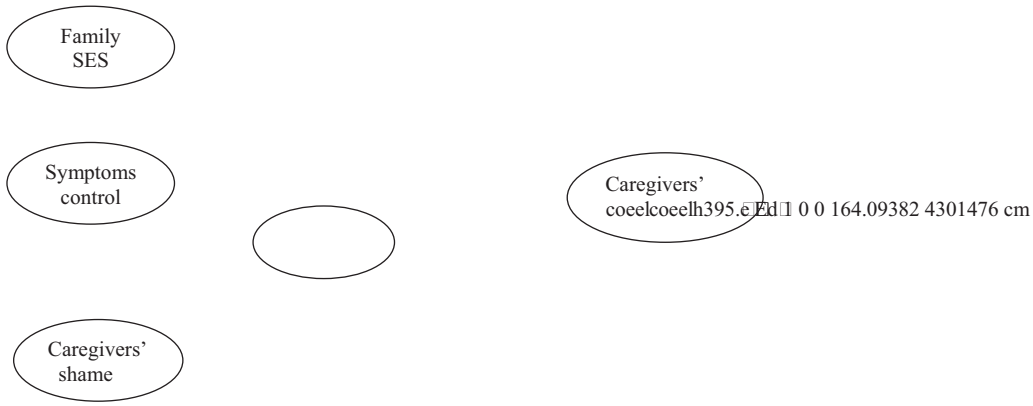
First of all, according to the medical insurance policies in China, most expenses of pediatric asthma have to be paid by the affected families. The medical costs could be a heavy burden for many families. Hence, the impact of family economic status on the mental health of caregivers might be more salient.

Secondly, as previous research suggests, chronic illness sometimes relates with experience of shame and social stigma (Bury, 1982; Charmaz, 2000; Crandall & Moriarty, 1995; Joachim & Acorn, 2000). Shame is a complex social emotion accompanied by self-evaluated failure and shortcomings, which implies negative introspection such as "I am weak, incompetent, and inferior" (Tangney & Fischer, 1995; Fung, 1999). In previous research in the West, illness-related shame seems to be more reported in the context of psychiatric disorders than in physical diseases (Byrne, 2000; Hinshaw, 2007). Also, it seems more likely to be reported in patients than in caregivers. For example, previous research has found that adult patients of chronic asthma report the experience of shame because of the illness (Snadden & Brown, 1992), but the elevation of shame in caregivers in pediatric asthma is rarely reported. However, the case in China might be different.

Shame seems to be an important experience in the Chinese cultural context. Chinese culture, along with other East Asian cultures, is considered to be a shame-socialized

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



(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).

Measures

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.

Procedure

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

Preliminary analysis

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.

Model testing

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

			1	2	3	4	5	6	7	8	9	10	11
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	(.89)						
6. Body shame	6.01	2.39	.03	.12	.02	−.15*	.41**	(.86)					
7. Personality shame	20.75	5.76	−.22**	.15*	.10	−.09	.71**	.48**	(.88)				
8. Family shame	5.98	2.38	−.13	.00	−.07	−.03	.35**	.37**	.38**	(.89)			
9. Family dysfunction													

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).

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-caregivers' 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 ($\gamma = -0.29$, $p < .01$, $\gamma = 0.20$, $p <$

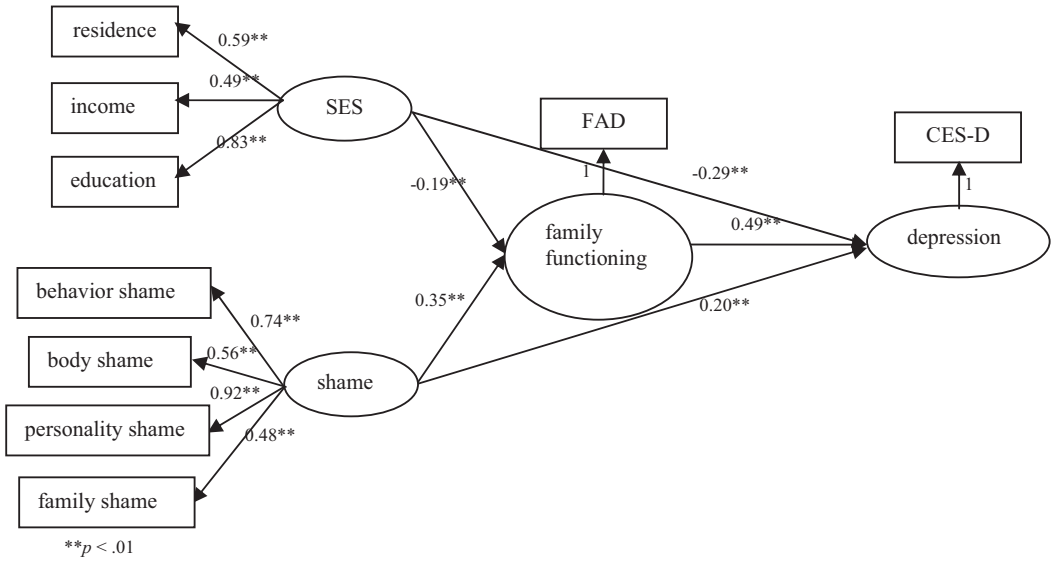


FIGURE 4. Mediation Effect of Family Functioning in the Association between SES and Caregiver's Proneness to Shame with Caregiver's Depression

TABLE 2
Mediation Effects of Family Functioning

Predictor	Criterion		χ^2	RMSEA	CFI	GFI	Causal effect: Direct	Causal effect: Indirect
SES shame	Depression	23	71.22	0.08	0.92	0.93	−0.38**	−0.09**
							0.37**	0.17**
SES shame	Anxiety	23	86.93	0.10	0.88	0.92	−0.22**	−0.07**
							0.31**	0.15**

Note. ** p < .01.

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.

DISCUSSION

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

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

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.

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