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Maternal and paternal physical abuse: Unique and joint associations with child behavioral problems[☆]

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Abstract

Although there is a substantial amount of literature documenting the relationship between child abuse and behavioral problems in China, there is, on the other hand, a limited number of studies on the joint and unique associations of maternal and paternal physical abuse with child behaviors within the Chinese context. The present study, using the family systems theory as the theoretical framework, aims to examine these joint and the unique associations of maternal and paternal physical abuse with externalizing and internalizing behaviors among a community sample of Chinese children. A total of 296 children (54.7% boys, mean age 12.31 ± 0.56 years) from two-parent families participated in the study, and they reported their physical abuse experience by their mother and father in the previous year using the Chinese version of the Parent-Child Conflict Tactics Scale. Participants, using the Youth Self Report, reported personal externalizing and internalizing behaviors, and, similarly, their mothers, using the Child Behavior Checklist, assessed children's externalizing and internalizing behaviors. Linear mixed effect models with random intercept and slope were used to examine the joint and unique associations of maternal and paternal physical abuse with child externalizing and internalizing behaviors. Results revealed that physically abused children were more likely to be simultaneously abused by both mothers and fathers. Furthermore, when compared with their non-abused counterparts, children with physical abuse that was carried out solely by mothers (externalizing behaviors: $\beta = 6.71$, 95% CI = 2.45–10.98, $p < 0.01$; internalizing behaviors: $\beta = 4.52$, 95% CI = 0.37–8.66, $p < 0.05$) or by both mothers and fathers (externalizing behaviors: $\beta = 4.52$, 95% CI = 1.80–7.24, $p < 0.001$; internalizing behaviors: $\beta = 2.98$, 95% CI = 0.34–5.61, $p < 0.05$) reported more externalizing and internalizing behaviors. Externalizing and internalizing behaviors of children who were physically abused solely by fathers did not significantly differ from those of their non-abused counterparts, which may result from the small sample size. The present findings suggest that maternal physical abuse may have a dominant and unique association with child behaviors, regardless of whether paternal physical abuse occurs within the family. Implications for future research and practice within the Chinese context regarding the subject of child behaviors and parental abuse are discussed.

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Conflict of interest

There is no conflict of interest for the authors.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.chiabu.2017.05.003>.

Keywords

Physical abuse; Maternal behaviors; Paternal behaviors; Child; Behavior; Family

1. Introduction

The relationship between child physical abuse and behavioral problems has been well documented in both western and Chinese literature (e.g., Fang et al., 2015; Gershoff, 2002; Gilbert et al., 2009; Heim et al., 2010; McCrory, De Brito, & Viding, 2012). However, from a family research perspective, limitations exist in the understanding of the relationship between physical abuse and child behaviors. Specifically, very few Chinese studies focus on paternal physical abuse and whether it interacts with maternal physical abuse in child behavioral development. This lack of research on paternal abuse and child behavioral development in the Chinese context should be addressed, considering that, similar to the finding in the western context (Nobes & Smith, 2000), children are equally likely to be physically abused by their mothers and fathers in China (Cui, Xue, Connolly, & Liu, 2016). The present study will address this limitation by using the family systems theory as the theoretical framework.

1.1. Theoretical framework

According to the family systems theory, a family is a systematic unit that is constructed by hierarchical subsystems (e.g., mother-father subsystem, parent-child subsystem, child-sibling subsystem, etc.), within which individual members (e.g., mother, father, son, daughter, etc.) of the family are connected to, dependent on, and interact with one another (Cox & Paley, 1997). Family members have different roles in the family while sharing mutuality in the manner of circular causality (Cox & Paley, 1997). Within family systems, parents affect and are affected by one other, and their interactions have spillover effects on the relationships with their children (Cabrera, Fagan, Wight, & Schadler, 2011).

1.2. Similarities and differences in mothering and fathering

The family systems theory suggests that fathers and mothers share commonalities in their parenting practices. Concordantly, researchers found moderate to strong correlation among parenting styles between fathers and mothers. For example, Simons & Conger (2007) found that approximately two-thirds of children reported the same maternal and paternal parenting styles. Furthermore, Hovee, Dubas, Gerris, van der Laan, and Smeenk (2011) reported that maternal and paternal parenting styles were interdependent. Similarly, in a parent-child dyadic Chinese sample, Nelson, Hart, Yang, Olsen, and Jin (2006) found a moderate correlation between maternal and paternal psychological control. However, it is still unknown if such concordance exists in terms of child physical abuse by both mothers and fathers in China.

Mothers and fathers in a family unit differentiate their task of socializing a child (Yaacob, 2006), and mothering and fathering are quantitatively and qualitatively dissimilar. Quantitatively, mothers generally spend more time with children and are, therefore, more likely to engage in conflicts with children (Bornstein, 2001; Fagan et al., 2014).

Qualitatively, mothering is usually regarded as authoritative, warm, and caring, whereas fathering is more authoritarian, demanding, and less responsive (Holmbeck, Paikoff, & Brooks-Gunn, 1995; Russell et al., 1998; Russell et al., 2003). Culturally, maternal and paternal roles are typically encapsulated with the traditional Chinese adage that states, “Strict father, kind mother” (Shek, 1998). Chinese fathers, in comparison to Chinese mothers, are regarded as the primary source of disciplining school-aged children (Jankowiak, 1992). Conversely, Chinese mothers are more involved in daily activities such as dressing, feeding, and caring, and they are regarded as more affectionate, protective, and less harsh (Chen, Bian, Xin, Wang, & Silbereisen, 2010; Shek, 1998). Accordingly, researchers found differences between maternal and paternal disciplinary behaviors. Fathers carried out more physical abuse than mothers did (Lansford et al., 2002), while mothers practiced more psychological aggression and minor physical punishment (Cui et al., 2016; Lansford et al., 2002; Straus & Field, 2003; Tang, 2006). Nevertheless, a considerable proportion of children reported that physical abuse was carried out by their mothers (Cui et al., 2016).

1.3. Parenting and child behaviors

Given the comparable, yet dissimilar, roles that mothers and fathers play in child-rearing, fathering and mothering may have unique, as well as joint associations with child behavioral development. Empirical evidence shows that children whose parents practiced the same parenting styles demonstrated different behavioral outcomes compared with those whose parents had dissimilar parenting styles (Braza et al., 2015; Hovee et al., 2011). For example, Hovee et al. (2011) found that children with two neglectful parents showed more delinquency compared with children who had a neglectful mother but a permissive/authoritarian father. In addition, similar parenting styles by both mothers and fathers have been linked to different behavioral traits. For example, Gao, Raine, Chan, Venables, and Mednick (2010) found that a lack of maternal care was significantly associated with deviant behavior among children, while a lack of paternal care was significantly associated with emotional attachment-related psychopathy. Only one locatable Chinese study attempted to differentiate paternal and maternal physical punishment and abuse, and it found that maternal physical punishment was more strongly and significantly associated with anxiety in children compared with paternal physical punishment, and neither solely maternal nor paternal physical abuse were significantly related to anxiety in children (Wang, Wang, & Liu, 2016). However, this study did not estimate the joint association of coexisting maternal and paternal physical abuse on child behaviors.

Overall, despite the collective evidence of the relationship between parenting styles and child behaviors, few Chinese studies on physical abuse and child behavioral outcomes consider the possible coexistence of maternal and paternal abuse. The only example of such a study that examined paternal and maternal abuse and child behaviors is Wang et al. (2016), which, as previously mentioned, did not extrapolate on the coexistence of parental abuse on child behaviors. Therefore, the present study aims to examine the unique and joint associations of maternal and paternal physical abuse on externalizing and internalizing behaviors among children from twoparent families.

2. Methods

2.1. Participants and procedure

The present study used secondary data collected during Wave II of the China Jintan Child Cohort Study (Liu et al., 2015, 2011, 2010). The cohort was built in 2004–2005 using a two-step cluster sampling method that was based on school locations (i.e., urban, suburban, and rural settings) and recruited a total of 1656 children, aged 3–5 years initially. These children were in grades 1–3 in preschools (equivalent to the K1, K2, and K3 in the United States, respectively) and were representative of children of this age range in the city. They were followed up with for the Wave II data collection during 2011–2013. More specifically, children, along with their parents, who were originally from K3, K2 and K1 assessed child behaviors in 2011, 2012 and 2013, respectively. All children were invited to participate in a child abuse survey in 2013. Details about the cohort study were described elsewhere (Liu et al., 2015, 2011, 2010).

The present sample was the 414 (28.5%) children who were in K1 when the cohort was built. The data on their behaviors and physical abuse were cross-sectionally collected in 2013. The research team obtained completed data of child self-reported behaviors and child physical abuse from 314 children out of the 414 total children. Among them, 18 children were excluded: 5 participants were from families with parents who had divorced and the 13 remaining children had missing values on the covariates (listwise deletion was used to address the missing data issue because this method can produce robust estimates and does not threaten statistical power when the proportion of subjects with missing data is small, Allison, 2012). Therefore, data from 296 two-parent families were used in the analysis. The comparison tests between these 296 children (54.7% boys, mean age 12.31 ± 0.56 years) and the excluded children did not show significant differences in gender, age, school location when they were recruited into the cohort, socioeconomic status, child physical abuse, and self- or mother- reported behaviors from the included children (Supplemental Table 1).

Written informed consent was obtained from mothers and verbal informed assent was obtained from children. A questionnaire survey took place during regularly scheduled class time. A teacher was in the classroom to maintain discipline, and two trained research assistants were in charge of distributing and collecting the questionnaires, explaining the objectives and confidentiality of the study, and answering questions. The parent study obtained approval from the Institutional Review Board of the University of Pennsylvania and the Ethics Committee of the Jintan Hospital.

2.2. Measurements

2.2.1. Child maltreatment—The subscales of severe and very severe physical assault in the *Chinese Version of The Parent–Child Conflict Tactics Scale* (CTSPC, Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) was used to assess physical abuse by mother and father separately in the preceding 12 months (7 items, which are comprised of the following parental violent behaviors: hitting on some part of the body other than the bottom with objects, throwing or knocking down, hitting with a fist or kicking hard, beating up, grabbing around the neck and choking, purposely burning or scalding, and threatening with a knife or

other weapons) on a dichotomized scale: 0= “No”, 1=“Yes”. The mother and father were identified by the children as the primary caregivers who carry out most or all of the parenting responsibilities. Non-abused children were those with zeros on all items in the subscales for both mother and father. Otherwise, they were labeled as physical abuse survivors. The physical abuse survivors were further separated into three categories based on their relationship with abusers: solely abused by mother, solely abused by father, and abused by both father and mother. The associations between physical abuse solely by mother or solely by father and child behaviors were labeled as “unique association”. On the other hand, the association between physical abuse by both mother and father and child behaviors was labeled as “joint association.” The Chinese version of the CTSPC showed satisfactory to good reliabilities (Chan, 2012; Cui et al., 2016).

2.2.2. Child behaviors—Child behaviors data were collected using a multiple-informant approach. Children self-reported their behaviors using the *Youth Self-Report* (YSR) and their mothers assessed their children’s behaviors using the Chinese version of the *Child Behavior Checklist for Ages 6–18* (CBCL). The 115-item CBCL and the 112-item YSR were rated on a 3-point scale (0 = not true, 1= sometimes true, and 2= often true) and can be classified into three factors: externalizing behaviors, internalizing behaviors, and other problems (Achenbach & Rescorla, 2001). For the purpose of the study, data on externalizing and internalizing behaviors were used, and the subscale scores were transformed into normalized *T* scores (the ratio of the behavior score’s deviation from the population mean to its standard deviation; mean *T* score: 50 with a standard deviation of 10) to obtain the same scale for externalizing and internalizing behaviors. Higher *T* scores indicated more behavioral problems. Out of the 296 children with complete data on YSR, 243 had mother-reported behavior data. There was no significant difference between children with and without mother-reported behaviors except that there were relatively more boys than girls missing such data (Supplemental Table 2).

2.2.3. Covariates—Covariates included child sex, age, school location in preschool (i.e., urban, suburban, or rural settings), and socioeconomic status (SES). SES was generated according to the procedure described in (Straus, 2004). It is the standardized *z* score of the sum of *z* scores of children’s fathers’ and mothers’ number of years of education and monthly wages. The covariates were chosen based on the previous findings that they are risk factors for both child abuse and child behavioral problems (Liao, Lee, Roberts-Lewis, Hong, & Jiao, 2011; Liu, 2011).

2.3. Statistical analysis

Sample characteristics were summarized by descriptive statistics. Bivariate analyses, including *t* tests, *chi*-square tests, ANOVA, and Pearson correlation were used to examine the bivariate associations among demographic characteristics, physical abuse, and child behaviors. Child externalizing (both child and mother reports) and internalizing (both child and mother reports) behaviors were used as the dependent variables, respectively. An indicator of the reporter of child behaviors (i.e., child or mother) was entered into the model as an independent variable together with other independent variables. The linear mixed effect model that used maximum likelihood method was applied to analyze the unique and

joint associations. This method was chosen to account for the intra-class correlation of child behaviors reported by children and their mothers, as well as the clustered nature of the data at school location level when the cohort study was built to correct the variances.

Additionally, this method is advantageous because it can use all available information when data are missing at random, and, thus, the cases without mother-reported behaviors could be retained in analyses. Two levels of random intercept in the linear mixed model were constructed. The purpose of the first level was to estimate the variance at school location level, and the second level was to allow the assessments of child behaviors vary between families. A random slope was also used to allow the associations of maternal and paternal physical abuse with child behaviors vary between child reporters and mother reporters.

Five models (Models 1–5) were constructed to analyze the relationship between maternal and paternal physical abuse and child externalizing behaviors, and another five models (Models 6–10) analyzed the relationship between physical abuse and child internalizing behaviors. Specifically, Model 1 (Model 6) was to test the individual association of maternal physical abuse with child externalizing (internalizing) behaviors after adjusting for the covariates. Model 2 (Model 7) was built by replacing maternal physical abuse with paternal physical abuse in Model 1 (Model 6). Model 3 (Model 7) included both maternal and paternal physical abuse as independent variables, as well as other covariates to test the independent association of one abuser's behaviors with child externalizing (internalizing) behaviors after adjusting for their partner's behaviors and other covariates. Next, Model 4 (Model 9) was built on Model 3 (Model 8) by adding the interaction term of maternal physical abuse and paternal physical abuse to test whether jointly abused children scored higher on externalizing (internalizing) behaviors. Likelihood-ratio tests were performed to test the difference of model fit between Model 3 and 4, as well as Model 8 and 9, to determine the significance of the interactive effects of maternal and paternal physical abuse. Finally, Model 5 (Model 10) was constructed using the joint physical abuse variable, which has four categories (i.e., non-abused, maternal abuse only, paternal abuse only, and both maternal and paternal abuse), as the independent variable to further examine the pattern of joint and unique associations of maternal and paternal physical abuse on child externalizing (internalizing) behaviors.

The significance level was set at $\alpha = 0.05$. Analyses were performed using STATA 13.0 for Windows (College Station, TX).

3. Results

3.1. Sample description

Table 1 shows the sociodemographic characteristics of the sample. Among the 296 children, there were slightly more boys (54.7%) than girls (45.3%). The majority (96.4%) of the children were aged 11 or 12 years old, with a mean age of 12.31 ± 0.56 years old. When they were recruited in the cohort study, two-fifths of the children were from rural areas, two-fifths of the children were from suburban areas, and only one-fifth of the children were from urban areas. Almost 30% of the children reported physical abuse experiences by their mother or father in the previous year, and 21.9% of the children reported joint physical abuse by both their mother and father.

3.2. Bivariate associations

Compared to girls, boys were more likely to be physically abused by either their mother ($\chi^2 = 6.53, p < 0.05$) or father ($\chi^2 = 21.80, p < 0.001$). Child survivors of physical abuse were more likely to report physical abuse by both their mothers and fathers simultaneously ($\chi^2 = 132.89, p < 0.001$), which indicates a high concordance between maternal and paternal physical abuse. See Table 1.

Table 2 shows the results of the bivariate analysis of the associations between sociodemographic characteristics and physical abuse and child behaviors. Compared with girls, boys showed significantly more externalizing behaviors, which was rated by either children or their parents (p values < 0.05). Physically abused children showed more externalizing behaviors, regardless of which parental figure was the abuser or which individual reported the information on behaviors (p values < 0.05). Children who reported maternal physical abuse rated themselves to have more internalizing behaviors ($t = 3.30, p < 0.01$). Children who were physically abused by both their mother and father reported more self-rated or mother-rated externalizing behaviors and self-rated internalizing behaviors in comparison to their non-abused counterparts (p values < 0.05 in Scheffe's post hoc tests. Results are not shown in the table).

3.3. Maternal and paternal physical abuse and child behaviors: linear mixed effect models

Table 3 illustrates the results of Models 1–5, which use both child- and mother-reports of externalizing behaviors as the dependent variable, and Models 6–10, which use both child- and mother-reports of internalizing behaviors as the dependent variable. Child-reported behaviors were not statistically different from mother-reported behaviors in all models. In terms of child externalizing behaviors, Models 1 and 2 show that there were significant individual associations between physical abuse by mother ($\beta = 4.89, 95\% \text{ CI} = 2.53\text{--}7.25, p < 0.001$) or father ($\beta = 3.57, 95\% \text{ CI} = 1.06\text{--}6.08, p < 0.001$) and more externalizing behaviors, respectively. When both maternal and paternal physical abuse was introduced into the same model (Model 3), maternal physical abuse still showed significant association with more child externalizing behaviors ($\beta = 4.73, 95\% \text{ CI} = 1.56\text{--}7.90, p < 0.01$). In contrast, paternal physical abuse was no longer significantly associated with child externalizing behaviors ($\beta = 0.24, 95\% \text{ CI} = -3.07\text{--}3.56, p = 0.88$). In Model 4, the interaction of maternal and paternal physical abuse was not statistically significant ($\beta = -4.04, 95\% \text{ CI} = -10.40\text{--}2.31, p = 0.49$), and a further post-estimation showed that there was no significant improvement in model fit between Models 3 and 4 ($\chi^2 = 1.55, df = 2, p = 0.46$. Result is not shown in tables).

Model 5 shows that children who were jointly-physically abused by both mother and father ($\beta = 4.52, 95\% \text{ CI} = 1.80\text{--}7.24, p < 0.001$), or solely abused by mother ($\beta = 6.71, 95\% \text{ CI} = 2.45\text{--}10.98, p < 0.01$), demonstrated significantly more externalizing behaviors than non-abused counterparts, and the post-estimation analysis showed that these two groups of children did not differ significantly from one other ($\beta = 2.19, 95\% \text{ CI} = -6.95\text{--}2.57, p = 0.367$, not shown in the tables). Children who were abused by the mother alone scored almost 5 points higher than children who were only physically abused by the father alone,

but this difference did not achieve the significance level from the post-estimation analysis ($\beta = 4.92$, 95% CI $= -1.03-10.87$, $p = 0.11$, not shown in tables).

With respect to the relationship between physical abuse and internalizing behaviors, results from Models 6–10 show similar patterns as those in Models 1–5.

4. Discussion

The present study found significant co-existence between maternal and paternal physical abuse in this community sample of Chinese children. In addition, maternal physical abuse showed a significant and unique association with both externalizing and internalizing behaviors, whereas the unique association of paternal physical abuse was not statistically significant after adjusting for maternal physical abuse. Regarding the joint association, children who reported physical abuse by both mother and father had more behavioral problems than their non-abused counterparts, but they had similar levels of behavioral problems compared to those with maternal physical abuse alone, which indicated that maternal physical abuse was dominantly associated with child behavioral problems, regardless of paternal physical abuse.

In the present sample, 29.2% and 28.7% of children reported that they had experienced maternal and paternal physical abuse in the previous 12 months, respectively. This finding is consistent with the one in a meta-analysis by (Ji & Finkelhor, 2015) that reported that the pooled estimate of the prevalence of physical abuse of 47 Chinese studies was 26.6% (95% CI: 21.4–31.8).

The study found that abused children were more likely to report both their mother and father as their abusers. This is consistent with the previous finding that parents in a family usually practice similar parenting styles (Putnick et al., 2012; Simons & Conger, 2007) to maintain the stability of the couple subsystem in the family unit (Belsky, Lang, & Huston, 1986; Cox & Paley, 1997). However, Wang & Liu (2014) found that only 5.48% of Chinese mother-father dyads reported physical abuse of their children concomitantly, which was much lower than the rate in the present study. This difference may be because of the lower rates of maternal (15.1%) and paternal (12.9%) physical abuse in Wang & Liu's sample in comparison to the rates in the present study and the meta-analysis (Ji & Finkelhor, 2015). The disparity in the rates may be also due to the reporters of physical abuse. Wang and Liu (2014) collected data from children's mothers and fathers, who may tend to underreport their use of physical abuse due to social desirability and violence approval compared to their children (Chan, 2012, 2015).

We found that children who were solely abused by their mother showed more externalizing and internalizing behaviors. This is consistent with previous findings that maternal abuse increases risks of aggression and anxiety problems (Gao et al., 2010; Sheehan & Watson, 2008; Xing & Wang, 2013; Xing et al., 2011). The salient relationship may be because children expect their mother to be protective and warm. Hence, maternal physical abuse may be regarded as rejection and denial, and hence, increases children's vulnerability to behavioral problems (Lansford et al., 2010). However, it is inconsistent with the finding in

Wang et al. (2016) that, in a Chinese sample, maternal physical abuse was not significantly related to child anxiety after adjusting for maternal and paternal psychological aggression and physical punishment, paternal physical abuse, and other covariates. The absence of significant association between maternal abuse and child behavioral outcomes in Wang et al. (2016) may be because the possible multicollinearity between maternal and paternal physical abuse and between physical abuse and other types of child abuse influences the accuracy of the statistical significance tests.

Although paternal physical abuse demonstrated a significant adverse association with child behavioral problems, the relationship was attenuated to be not statistically significant after controlling for maternal physical abuse. In line with this, Models 5 and 10 show that the unique association of paternal physical abuse did not achieve the level of significance. This non-significant finding may be due to the small sample size of children who were physically abused solely by their father in the study, which resulted in low statistical power to detect the possible relationship between paternal physical abuse and child behaviors. However, it is worth noting that the sample size of children abused solely by their mother was as small as that of children that were abused solely by their father, and, nevertheless, the association between solely maternal abuse and child behavioral problems was statistically significant. Therefore, it is possible that the association of paternal physical abuse and child behavioral problems is not as significantly strong as that of maternal abuse. Empirical evidence also suggests that mothering may play a dominant role in child development. For example, Gao et al. (2010) found that paternal care on psychopathy was not statistically significant when maternal care was taken into consideration. A meta-analysis of 48 studies also found that maternal parenting stress was associated with child relational aggression, while paternal parenting stress was not (Kawabata, Alink, Tseng, Van Ijzendoorn, & Crick, 2011). The absence of a significant unique association of paternal abuse can be explained by the Chinese cultural context. Chinese fathers are the primary disciplinary providers within the family unit, and, therefore, children may perceive paternal physical abuse as normal or even necessary strategies to correct their misbehavior and train their filial piety. Consequently, the association of paternal physical abuse and child behavioral problems is not observed.

Children who were jointly abused by both mothers and fathers showed more externalizing and internalizing behaviors than their non-abused counterparts, but their behavioral problems were not significantly different from the group of children with maternal abuse alone, suggesting that the joint association of maternal and paternal physical abuse may be driven by the unique association of maternal physical abuse. In accord with this, we did not find a significant interactive effect between maternal and paternal physical abuse on child behaviors in Models 4 and 9. The insignificant interaction may be a result of low statistical power. Nonetheless, this finding is consistent with the previous finding that maternal and paternal care did not exhibit interaction in child psychopathy, and paternal care did not show significant association with psychopath after controlling for maternal care (Gao et al., 2010). Similarly, Braza et al. (2015) found significant main effect of authoritarian mothering on child internalizing behaviors, but insignificant main effect of authoritarian fathering and insignificant interactive effect of authoritarian mothering and authoritarian fathering. However, they found that authoritarian fathering attenuated the association between authoritarian mothering and externalizing behaviors, despite authoritarian fathering not

showing significant main effect (Braza et al., 2015). In contrast, Hoeve et al. (2011) found that children with two abusive parents exhibited more delinquency than those with an abusive mother and an authoritarian or permissive father, which suggests that the punishment style of fathering contributed to child delinquency in addition to the punishing style of mothering. Given the mixed findings and the scarce evidence of joint physical abuse by both mother and father, more studies using larger sample sizes are needed to better understand the role of maternal and paternal physical abuse in child behaviors.

The present findings should be interpreted cautiously due to limitations. Firstly, we caution that none of the relationships demonstrated in the study can be interpreted as causal relationships due to the cross-sectional design. Instead, the association between maternal physical abuse and child behavioral problems could be bidirectional, as suggested by the family systems theory. In the parent-child subsystem, parental behaviors can affect child development, and, meanwhile, child characteristics can influence parenting behaviors (Cox & Paley, 1997). There is empirical evidence supporting the reciprocal relationship between maternal physical discipline and child behavioral outcomes (e.g., Lansford et al., 2011; Sheehan & Watson, 2008), but these previous studies failed to capture the role of paternal physical discipline. Therefore, future studies with more sophisticated research designs and analytic approaches are warranted to further study if the unique and joint associations of maternal and paternal abuse with child behavioral problems have a bidirectional pattern. Secondly, child gender was not taken into consideration in examining the effect of maternal and paternal physical abuse, considering the small sample size of children who were abused solely by one parent. Several studies suggest that the occurrence and effect of child abuse are functions of both parents and child gender (Braza et al., 2015; Cui et al., 2016; Hoeve et al., 2011; Lansford et al., 2010). Future studies are needed to investigate both the interaction between parents and child gender in the relationship between child abuse and behaviors. Finally, all of the participants were from two-parent families. The unique effect of maternal and paternal physical abuse in two-parent families may not be generalizable to single-parent families. Further research is needed to address this issue.

Despite these limitations, this study contributes to the current literature by revealing the unique and joint associations of maternal and paternal physical abuse with child externalizing and internalizing behaviors in a community sample of Chinese children. The high rate of co-existing maternal and paternal physical abuse in the sample suggests that prevention and intervention programs to eliminate child abuse or prevent its re-occurrence should target both mothers and fathers, rather than focusing on mothers alone (Chen & Chan, 2016; Pinquart & Teubert, 2010). Although we did not find significant unique association of paternal physical abuse with child behaviors, findings such as these are expected to initiate the efforts in research, practice, and policy to address the roles of fathers in effectively preventing child maltreatment and its adverse effects on child development in the Chinese context, as well as in countries with similar sociocultural backgrounds.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1Demographic characteristics and bivariate associations ($n=296$).

	Total $n(\%/M \pm SD)$	Maternal Physical Abuse		Paternal Physical Abuse		χ^2/df
		No ($n=210$) $n(\%/M \pm SD)$	Yes ($n=86$) $n(\%/M \pm SD)$	No ($n=212$) $n(\%/M \pm SD)$	Yes ($n=84$) $n(\%/M \pm SD)$	
Child sex						21.80***
Boys	162 (54.7)	105 (64.8)	57 (35.2)	98 (60.5)	64 (39.5)	
Girls	134 (45.3)	105 (78.4)	29 (21.6)	114 (85.1)	20 (14.9)	
Child age	12.31 $\pm$ 0.56	12.30 $\pm$ 0.53	12.31 $\pm$ 0.64	12.30 $\pm$ 0.52	12.34 $\pm$ 0.67	0.63
SES	0.05 $\pm$ 1.06	0.09 $\pm$ 1.01	-0.06 $\pm$ 1.18	0.05 $\pm$ 1.00	0.05 $\pm$ 1.20	0.02
Location						8.96*
Rural	124 (41.9)	90 (72.6)	34 (27.4)	92 (74.2)	32 (25.8)	
Suburban	130 (43.9)	94 (72.3)	36 (27.7)	98 (75.4)	32 (24.6)	
Urban	42 (14.2)	26 (61.9)	16 (38.1)	22 (52.4)	20 (47.6)	
Maternal physical abuse						132.89***
No	210 (70.9)			191 (90.9)	19 (9.1)	
Yes	86 (29.1)			21 (24.4)	65 (75.6)	
Paternal physical abuse						
No	211 (71.3)					
Yes	85 (28.7)					

Notes. SES, socioeconomic status. The bolded number refers to the frequency of children who reported physical abuse experience by both mother and father.

 $p < 0.001$.

Table 2
Bivariate associations between demographic variables and physical abuse and child behaviors.

	Externalizing Behaviors			Internalizing Behaviors		
	Child report (n = 296)	t/F/r	Mother report (n = 243)	Child report (n = 296)	t/F	Mother report (n = 243)
Child sex		2.14 [*]			-0.46	
Boys	52.8 ± 10.64		52.79 ± 13.24	50.84 ± 10.60		51.45 ± 12.59
Girls	50.19 ± 10.26		49.17 ± 9.19	51.38 ± 9.59		50.95 ± 9.99
Child age		-0.06			-0.03	
SES		-0.04			-0.04	
Location		1.50			0.70	
Rural	52.83 ± 11.54		50.69 ± 13.18	51.70 ± 10.77		51.36 ± 11.25
Suburban	50.92 ± 9.08		49.78 ± 8.45	50.29 ± 9		49.67 ± 10.15
Urban	50.21 ± 11.40		56.98 ± 14.35	51.69 ± 11.55		56.42 ± 14.67
Maternal physical abuse		-3.90 ^{***}			-3.30 ^{**}	
No	50.13 ± 8.91		49.38 ± 9.54	49.88 ± 9.61		50.39 ± 10.23
Yes	55.28 ± 13.11		55.47 ± 14.88	54.10 ± 10.87		53.44 ± 13.80
Paternal physical abuse		-3.40 ^{**}			-1.85	
No	50.34 ± 10.19		50.12 ± 11.76	50.42 ± 9.98		50.88 ± 10.58
Yes	54.88 ± 10.80		53.64 ± 10.82	52.83 ± 10.44		52.20 ± 13.35
Joint physical abuse		6.20 ^{***}			3.70 [*]	
None	49.73 ± 9.02		49.36 ± 9.67	49.91 ± 9.64		50.50 ± 10.10
Solely abused by mother	55.86 ± 16.89		58.17 ± 24.12	55.03 ± 11.99		54.98 ± 14.57
Solely abused by father	54.16 ± 6.60		49.59 ± 8.26	49.51 ± 9.54		49.20 ± 11.94
By both parents	55.09 ± 11.78		54.71 ± 11.22	53.80 ± 10.56		53.00 ± 13.69

Notes. SES, socioeconomic status.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 3

Linear mixed model of the relationship between physical abuse and child behavioral problems controlling for covariates.

	Child Externalizing Behaviors			Child Internalizing Behaviors		
	β	95% CI	p value	β	95% CI	p value
Model 1 (6)						
Maternal physical abuse						
No	ref			ref		
Yes	4.89	(2.53, 7.25)	<0.001	3.58	(1.29, 5.86)	0.002
Model 2 (7)						
Paternal physical abuse						
No	ref			ref		
Yes	3.57	(1.06, 6.08)	0.005	2.00	(-0.41, 4.42)	0.104
Model 3 (8)						
Maternal physical abuse						
No	ref			ref		
Yes	4.73	(1.56, 7.90)	0.003	4.13	(1.07, 7.19)	0.008
Paternal physical abuse						
No	ref			ref		
Yes	0.24	(-3.07, 3.56)	0.885	-0.87	(-4.07, 2.33)	0.592
Model 4 (9)						
Maternal physical abuse						
No	ref			ref		
Yes	6.52	(2.29, 10.76)	0.003	4.56	(0.46, 8.66)	0.029
Paternal physical abuse						
No	ref			ref		
Yes	2.15	(-2.31, 6.60)	0.345	-0.42	(-4.73, 3.89)	0.847
Maternal physical abuse *	-4.04	(-10.40, 2.31)	0.213	-0.96	(-7.12, 5.19)	0.760
Paternal physical abuse						
Model 5 (10)						
Joint physical abuse						
None	ref			ref		

	Child Externalizing Behaviors			Child Internalizing Behaviors		
	β	95% CI	p value	β	95% CI	p value
Solely abused by mother	6.71	(2.45, 10.98)	0.002	4.52	(0.37, 8.66)	0.033
Solely abused by father	1.79	(-2.69, 6.27)	0.434	-0.49	(-4.85, 3.86)	0.824
By both parents	4.52	(1.80, 7.24)	0.001	2.98	(0.34, 5.61)	0.027

Notes. The numbers in the parentheses in the first column are corresponding to the models using internalizing behavior as the dependent variable. ref, reference level. Models adjusted child sex, child age, socioeconomic status, and school location in preschool.