Behavioral Problems in Taiwanese Children of Adolescent and Adult Mothers

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Abstract The purpose of this study was to estimate child behavioral problems over time and determine gender differences in behavioral problems between children born to adolescent and adult mothers in Taiwan. The consistency between parent’s and teacher’s reports was also examined. Secondary analysis of a longitudinal dataset from Taiwan was conducted. A matched sample of 107 children born to adolescent mothers and 111 children born to adult mothers were recruited. Child behavioral problems were assessed by parents at Time 1 (1st and 2nd grades) and by teachers at both Time 1 and Time 2 (5th and 6th grades). Generalized estimating equations and paired t-test were used. At Time 1, compared to children of adult mothers, children of adolescent mothers had more behavioral problems by both parental and teacher’s reports. Both parents and teachers reported that boys had more behavioral problems than girls. Moreover, according to teacher reports, children of adolescent mothers and boys had more behavioral problems and these differences persisted over time, even controlling for sociodemographic characteristics. In addition, parents reported higher scores of behavioral problems than teachers. In conclusion, child behavioral problems in Taiwan are associated with maternal age at child birth and child’s gender. Interventions may profitably focus on determining the mechanisms that lead to behavior problems in children of adolescent mothers, and/or reducing adolescent pregnancy as a way of decreasing child behavioral problems. Screening and preventive interventions for child behavior problems may need to be gender-specific.

Keywords Longitudinal study · Gender differences · Maternal influences · Children of teen mothers · Child behavioral problems

Introduction

Children born to adolescent mothers have adverse developmental outcomes, such as more cognitive, behavioral, intellectual, and psychosocial problems and low school achievement compared to children born to adult mothers (Brooks-Gunn and Furstenberg 1986; Hofferth and Reid 2002; Jaffee et al. 2001; Sommer et al. 2000; Whitman et al. 2001). Studies have shown that compared to preschoolers born to adult mothers, preschoolers born to adolescent mothers have more behavioral, social, and emotional problems, e.g. conduct problem, inattention, impulse, hyperactivity, and communication problems (Sommer et al. 2000; Whitman et al. 2001). During school age, children born to adolescent mothers have lower academic achievement and more behavioral problems, and thus, they are more likely to break school regulations, become a detained student, or drop out of school under these long-term disadvantages (Brooks-Gunn and Furstenberg 1986; Sommer et al. 2000). A few longitudinal studies that were conducted in western countries also indicated that the differences in child behavioral problems between adolescent and adult mothers increase over time (Brooks-Gunn and Furstenberg 1986; Sommer et al. 2000).
Dahinten et al. 2007; Whitman et al. 2001). Although numerous studies in western societies have documented differences in the developmental abilities of children born to adolescent mothers and adult mothers, relatively less research in Taiwan has explored the relationship between adolescent mothers and the development of behavioral problems among their offspring.

Boys and girls have different behavioral developmental trajectories after age four and express behavioral problems differently, with boys’ behavioral problems emerging earlier than girls’ (Keenan and Shaw 1997). School-age boys are more likely to have externalizing behavioral problems than school-age girls (Bongers et al. 2004; Keenan and Shaw 1997), whereas girls tend to develop internalizing behavioral problems from school-age and that increase during adolescence (Keenan and Shaw 1997; Lewinsohn et al. 1998). Studies conducted in western countries with predominantly unmarried mothers indicate that, in addition to maternal age at child birth, the risk factors for child behavioral problems also include other maternal characteristics (e.g. educational level, maternal behavioral problems such as antisocial behavior, substance abuse, or delinquency, and mental health problems such as depression/anxiety symptoms) or parental and social characteristics, e.g. education, employment, or parental involvement, parenting style, marital status, socioeconomic status, and family environment (Christ et al. 1990; Jaffee et al. 2001; López Turley 2003; Wakschlag et al. 2000). Young maternal age at child birth was found to be associated with conduct disorder in boys at age 7 to 12 (Wakschlag et al. 2000). Other studies found that child behavioral problems were associated with family environment factors and parental characteristics rather than young maternal age at child birth (Christ et al. 1990; López Turley 2003). Maternal and paternal antisocial behaviors and socioeconomic status influenced the number of conduct disorder behaviors (e.g. violation of major rules, bullying, assault, fighting, and cruelty to animals) in boys born to adolescent mothers at age 6 to 13 (Christ et al. 1990).

Fathers of children born to adolescent mothers are more likely than fathers of children born to adult mothers to have low socioeconomic status and to have substance abuse and behavioral problems—factors that may affect parenting (Tan and Quinlivan 2006; Ekéus and Christensson 2003). In Western countries, most biological fathers of children born to adolescent mothers do not live with their children (Gee and Rhodes 2003). Father absence not only had a negative influence on adolescent mothers’ psychological adjustment but also on children’s behavioral development (Gee and Rhodes 2003). Children of single mothers tend to have more behavioral problems and poorer school performance compared to children who reside with both parents (Unger and Cooley 1992; Gee and Rhodes 2003). Higher levels of positive paternal involvement, consistent father contact, or longer time of co-residing partners were associated with less child behavioral problems, better school performance, and higher reading achievement over time (Chang et al. 2007; Howard et al. 2006; Smith et al. 2013), particularly in children with a high-risk mother (e.g. depression, low cognitive readiness, high internalizing and externalizing problems). In addition, grandmother support may complement the insufficient paternal support for the adolescent mothers and supplement the child care for adolescent mothers. However, studies showed that children born to adolescent mothers had more behavioral problems in school age when grandmothers were co-residents compared to those who did not have co-resident grandparents, especially when they experienced abuse and mothers’ depression symptoms (Black et al. 2002; Gee and Rhodes 2003).

The majority of studies of children born to adolescent mothers were conducted in western countries and in the African American population. In 2012, the national statistics of teen childbearing in United State showed that 89% of adolescent mothers aged 15 to 19 with teen births were not married (Child Trends 2014). In contrast, in Taiwan, most adolescent mothers married their children’s biologic fathers who were older, and had low educational levels, high unemployment, and less independent economic status (Chen et al. 2005; Kuo et al. 2010). Approximately one half of adolescent mothers still lived with their biological parents and around two-thirds of adolescent mothers received financial support from their parents (Chen et al. 2005). Hence, the studies about behavioral problems of children born to adolescent mothers in western societies may not generalize to Taiwan given the very different characteristics of Taiwanese adolescent mothers and Taiwanese social/cultural system.

The purpose of this study is to estimate child behavioral problems over time in boys and girls born to adolescent or adult mothers in Taiwan. In the present study, our research questions were: (1) Do children’s behavioral problems in grades 1–2 vary by maternal age at child birth and child’s gender, controlling for sociodemographic characteristics? (2) Do differences in behavioral problems between children born to adolescent and adult mothers remain significant over time controlling for socioeconomic characteristics? (3) Do parents and teachers reports of child behavior problems differ?

Method

Participants

This study is part of a longitudinal research project about children born to adolescent and adult mothers, which
examines behavioral problems and academic performance from elementary school to middle school. Participants for the parent study were initially recruited through 12 elementary schools in one school district in Taiwan. Inclusion criteria were: (1) child in first or second grade, (2) child born when mother was less than 20 years of age, (3) child had no cognitive impairment, and (4) parent(s) who are child’s primary caregivers agree to participate. After recruitment of the children of adolescent mothers was complete, a matched (on gender and classroom) comparison sample of children born to adult mothers was recruited. Parents (at Time 1 and Time 3) and teachers (at every time-point) of children who participated in this study were also recruited to provide data on children’s behavior problems. Time 1 data was collected in 2002 when children were grade 1 and 2; Time 2 was conducted in 2006 when children were grade 5 and 6; and Time 3 was conducted in 2009 when children were grade 8 and 9. The relevant data for this study was measured at Time 1 and Time 2. We excluded children with incomplete information on behavioral problems or sociodemographic characteristics at Time 1 or Time 2. There were 107 children born to adolescent mothers and 111 children born to adult mothers with a total of 218 parents as well as 81 teachers at Time 1 and 102 teachers at Time 2 in the current data analyses.

A total of 60 boys (56.1%) and 47 girls that were born to adolescent mothers (adolescent group) and 54 boys (48.6%) and 57 girls that were born to adult mothers (adult group) had complete data on relevant study variables at both Time 1 and Time 2. The sample characteristics are shown in Table 1. The mean age at child’s birth for mothers in the adolescent group was 18.3 (SD = 1.5) years and for mothers in the adult group was 27.1 (SD = 3.3) years. Mean age at child’s birth for fathers of children born to adolescent mothers was 23.6 (SD = 4.7) years and for fathers born of children born to adult mothers was 29.5 (SD = 4.1) years. Maternal and paternal education and occupations were lower for those in the group of adolescent mothers compared to the group of adult mothers. The adolescent group was also more likely to be separated or divorced. Adolescent mothers’ family had a higher percentage of grandparents or other relatives involved in the child’s care at both Time 1 and Time 2.

Procedure

At both time 1 and time 2, the researchers invited children, teachers, and parents (at Time 1) who met the inclusion criteria to participate in the study. Before conducting the study activities, informed consent was obtained from all individual participants included in the parent study. Researchers distributed the questionnaires for teachers and parents in schools. Because the researchers were unable to contact the parents directly, children were asked to take the parental questionnaires home to their parents. Parents completed the questionnaires on child behavioral problems and sociodemographic characteristics at home. Teachers helped to remind children to bring completed parental questionnaires back to school. This secondary analysis of data has been approved by the University Institutional Review Boards.

Measures

Child behavioral problems were measured with the Chinese version of Conners Parental and Teacher Rating Scale (Wang et al. 1993). The Chinese version of Conners

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| Table 1 Sample characteristics |
|-------------------------------|
| Variables                      | Adolescent\(^a\) | Adult\(^b\) | \(\chi^2\) |
| Maternal educational level     |                 |           |          |
| Below junior high school       | 58 (56.3)       | 25 (22.5) | 45.36**  |
| Senior high school             | 45 (43.7)       | 62 (55.9) |          |
| College and above              | 0 (0.0)         | 24 (21.6) |          |
| Paternal educational level     |                 |           | 41.51**  |
| Below junior high school       | 64 (60.4)       | 29 (26.1) |          |
| Senior high school             | 38 (35.8)       | 47 (42.3) |          |
| College and above              | 4 (3.8)         | 35 (31.5) |          |
| Maternal occupation            |                 |           | 16.24**  |
| Unskilled                      | 61 (62.2)       | 65 (59.6) |          |
| Semi-skilled                   | 32 (32.7)       | 19 (17.4) |          |
| Professional                   | 5 (5.1)         | 25 (22.9) |          |
| Paternal occupation            |                 |           | 24.65**  |
| Unskilled                      | 29 (27.6)       | 21 (19.4) |          |
| Semi-skilled                   | 61 (58.1)       | 38 (35.2) |          |
| Professional                   | 15 (14.3)       | 49 (45.4) |          |
| Family structure               |                 |           | 1.53     |
| Parents only                   | 57 (54.8)       | 69 (62.2) |          |
| Parents and Grandparents       | 24 (23.1)       | 24 (21.6) |          |
| Parents and other relatives    | 23 (22.1)       | 18 (16.2) |          |
| Marital status                 |                 |           | 34.21**  |
| Single                         | 2 (1.9)         | 0 (0.0)   |          |
| Married                        | 82 (76.6)       | 111 (100.0)|          |
| Separated or divorced          | 23 (21.5)       | 0 (0.0)   |          |
| Maternal age at child birth    | 18.3 (1.5)      | 27.1 (3.3) | 25.50**  |
| Paternal age at child birth    | 23.6 (4.7)      | 29.5 (4.1) | 9.48**   |

\(^a\) Children born to adolescent mothers, \(n = 107\)

\(^b\) Children born to adult mothers, \(n = 111\)

\(^c\) Fisher’s Exact Test

\(\chi^2 < .01\)
Parental and Teacher Rating Scale have been translated from the revised Conners Parental Rating Scale (CPRS-48) and the revised Conners Teachers Rating Scale (CTRS-28) as well as reworded by pediatricians, psychiatrists, and elementary school teachers for this cohort study. The revised Conners Rating Scales, including Chinese version, have been demonstrated to have acceptable internal consistency, test-retest reliability, and construct validity (Gianarris et al. 2001; Goyette et al. 1978; Wang et al. 1993).

Parent ratings of child behavioral problems

Conners Parental Rating Scale (CPRS-48) is not a direct measure of child’s behavior, but a reflection of parental perception (Gianarris et al. 2001). It consisted of 48 items and 6 subscales, including conduct problems, learning problems, psychosomatic problems, impulsivity-hyperactivity, anxiety, and hyperactivity index (Gianarris et al. 2001; Goyette et al. 1978). Items were scored on a 4-point scale from (0) not at all present through to (3) very much present, and then the sum of score for items in each subscale was calculated. Higher scores indicated that parents perceived more child behavioral problems. Cronbach’s alpha coefficients for the subscales ranged from .72 to .83 in this study.

Teacher ratings of child behavioral problems

Conners Teacher Rating Scale (CTRS-28) was a teacher-reported behavior rating scale to screen for child’s psychological adjustment problems (Goyette et al. 1978). It consisted of 28 items measuring 4 subscales, including conduct problems, hyperactivity, inattention-passivity, and hyperactivity index. Each item was rated on a 0 (not at all present) to 3 (very much present) scale. Scale scores were computed by calculating the sum of scores for items in each subscale, and higher scores represented more behavioral problems. The internal consistency coefficients (Cronbach’s alpha) in the present study for subscales ranged from .85 to .92 at Time 1 and .88 to .90 at Time 2.

The hyperactivity index subscale in both CPRS and CTRS was a global measure of psychopathology that reflects items from each of the other scales, and not as a specific indicator of the diagnosis of attention deficit hyperactivity disorder (Gianarris et al. 2001). The scores of CPRS had high correlation with Achenbach’s Child Behavior Checklist, and the scores of CTRS had high correlation with Teacher’s Report Form (Costenbader and Keller 1990; Roussos et al. 1999).

Sociodemographic characteristics

Parental age at child birth, child’s gender, parental educational levels, parental occupation, marital status, and family structure (family members residing with child) were measured. In this study, parental education was coded into three levels: below junior high school, senior high school, college and above. Parental occupation was classified into three categories by skill and expertise: unskilled, semi-skilled, and professional.

Data Analyses

Generalized estimating equations was used to determine (1) if child behavioral problems differed by maternal age at child birth and child’s gender according to parent’s reports and teacher’s reports; and (2) whether teachers reports of behavior problems persisted over time. Maternal education, paternal education, maternal occupation, paternal occupation, marital status, and family structure were entered as covariates. The interaction effects of time with maternal age at child birth and child’s gender were also estimated. The consistency between CPRS and CTRS was also evaluated by paired t-test and Pearson correlation.

Results

The means and standard deviations of child behavior problems from parental and teachers’ reports at Time 1 as well as group comparisons of child behavior problems by maternal age at child birth and child’s gender are presented in Table 2. According to parent reports (the top half of Table 2), children born to adolescent mothers had significantly higher scores for anxiety compared to those born to adolescent mothers; boys had higher conduct problems, learning problems, impulsivity-hyperactivity, and hyperactivity index scores than girls. However, after controlling for maternal education, paternal education, maternal occupation, paternal occupation, marital status, and family structure, anxiety from parental reports no longer differed by maternal age at child birth. In contrast, children born to adolescent mothers had higher learning problems and hyperactivity index scores compared to those born to adult mothers after controlling for those sociodemographic characteristics. According to teacher reports (the bottom half of Table 2), children born to adolescent mothers and boys had higher conduct problems, hyperactivity, inattention-passivity, and hyperactivity index scores compared to those born to adult mothers and girls. These differences persisted after controlling for maternal education.

Next, we estimated child behavior problems by maternal age at child birth and child’s gender over time. According to teacher’s reports, the differences in behavioral problems between children born to adolescent and adult mothers and between children’s genders persisted from Time 1 to Time 2 (see Table 3). There was no interaction effect of time with
Table 2 Comparison of the CPRS and CTRS by maternal age at child birth and child’s gender at Time 1

| Variables                        | Adolescent | Adult | Coef. | Coef.† | Boys | Girls | Coef. | Coef.† |
|----------------------------------|------------|-------|-------|--------|------|-------|-------|--------|
|                                  | M (SD)     | M (SD)|       |        | M (SD)| M (SD)|       |        |
| Parent rating (n = 218)          |            |       |       |        |      |       |       |        |
| Conduct                          | 7.13 (5.1) | 6.41 (4.1) | 0.62 | 0.88   | 7.73 (4.7) | 5.65 (4.3) | 2.04** | 2.34** |
| Learning problem                 | 3.95 (2.5) | 3.36 (2.3) | 0.56 | 0.95†  | 4.02 (2.5) | 3.23 (2.2) | 0.76†  | 0.86** |
| Psychosomatic                    | 1.01 (1.8) | 1.11 (1.6) | −0.11 | 0.04   | 1.26 (2.0) | 0.83 (1.2) | 0.43   | 0.42   |
| Impulsivity-hyperactivity        | 2.93 (2.6) | 2.77 (2.1) | 0.12 | 0.38   | 3.19 (2.4) | 2.45 (2.2) | 0.74†  | 0.85** |
| Anxiety                          | 3.46 (1.6) | 3.92 (1.7) | −0.47† | −0.23  | 3.73 (1.8) | 3.65 (1.5) | 0.10   | 0.04   |
| Hyperactivity index              | 7.86 (5.5) | 6.95 (4.7) | 0.81 | 1.76†  | 8.42 (5.2) | 6.21 (4.7) | 2.17** | 2.37** |
| Teacher rating (n = 81)          |            |       |       |        |      |       |       |        |
| Conduct                          | 5.06 (4.4) | 3.66 (3.6) | 1.28† | 1.36†  | 5.50 (4.5) | 3.01 (3.1) | 2.42** | 2.09** |
| Hyperactivity                    | 4.73 (4.4) | 3.04 (3.7) | 1.55** | 1.53** | 5.34 (4.5) | 2.16 (2.9) | 3.11** | 3.06** |
| Inattention-passivity            | 7.21 (5.5) | 4.16 (4.2) | 2.91** | 2.61** | 7.10 (5.3) | 3.99 (4.2) | 2.97** | 3.20** |
| Hyperactivity index              | 6.56 (5.5) | 3.88 (4.5) | 2.51** | 2.54** | 6.85 (5.6) | 3.28 (3.8) | 3.46** | 3.39** |

M (SD) mean (standard deviation), Coef. coefficient
†After controlling for maternal education, paternal education, maternal occupation, paternal occupation, marital status, and family structure
*p < .05; ** p < .01

Table 3 CTRS scores by maternal age at child birth and child’s gender over time

| Variables                        | Adolescent group | Adult group | Coef. | Coef. | Coef. |
|----------------------------------|------------------|-------------|-------|-------|-------|
|                                  | Boys M (SD)      | Girls M (SD)| Boys M (SD) | Girls M (SD) |       |
| Conduct problem                  | Time 1           | 6.32 (4.7)  | 3.45 (3.3) | 4.63 (4.0) | 2.63 (2.8) |
|                                  | Time 2           | 6.32 (5.0)  | 4.11 (3.8) | 5.04 (4.9) | 2.78 (3.4) |
|                                  | Wald χ²(3)       | 38.88, p < .0001 | 1.29** | 2.33** | 0.28 |
|                                  | †Wald χ²(9)      | 42.36, p < .0001 | 1.17** | 2.13** | 0.46 |
| Hyperactivity                    | Time 1           | 6.30 (4.7)  | 2.72 (2.9) | 4.33 (4.1) | 1.67 (2.8) |
|                                  | Time 2           | 5.87 (4.5)  | 2.89 (3.1) | 4.39 (4.7) | 1.93 (2.4) |
|                                  | Wald χ²(3)       | 63.68, p < .0001 | 1.39** | 2.91** | −0.00 |
|                                  | †Wald χ²(9)      | 71.80, p < .0001 | 1.23** | 2.85** | 0.19 |
| Inattention-passivity            | Time 1           | 8.58 (5.4)  | 5.47 (5.1) | 5.54 (4.8) | 2.70 (2.8) |
|                                  | Time 2           | 8.93 (5.2)  | 5.81 (5.0) | 5.39 (4.7) | 3.65 (3.3) |
|                                  | Wald χ²(3)       | 59.30, p < .0001 | 2.90** | 2.69** | 0.36 |
|                                  | †Wald χ²(9)      | 67.28, p < .0001 | 2.39** | 2.85** | 0.35 |
| Hyperactivity index              | Time 1           | 8.28 (5.6)  | 4.36 (4.6) | 5.35 (5.3) |
|                                  | Time 2           | 8.45 (5.4)  | 4.89 (4.7) | 5.68 (5.9) | 2.98 (3.5) |
|                                  | Wald χ²(3)       | 62.12, p < .0001 | 2.44** | 3.29** | 0.41 |
|                                  | †Wald χ²(9)      | 66.27, p < .0001 | 2.31** | 3.23** | 0.60 |

M (SD) mean (standard deviation), Coef. coefficient
†After controlling for maternal education, paternal education, maternal occupation, paternal occupation, marital status, and family structure
a Maternal age
b Child’s gender
c Overall time
** p < .01
maternal age at child birth and child’s gender; therefore, the interaction terms were excluded from the models. Children born to adolescent mothers and boys had higher conduct problems, hyperactivity, inattention-passivity, and hyperactivity index scores than those children born to adult mothers and girls. These differences persisted after controlling for maternal education, paternal education, maternal occupation, paternal occupation, marital status, and family structure. There was no significant time effect, which indicates that the behavioral patterns were stable over time.

Next, we compared the difference of the average scores for conduct problems and hyperactivity index between parent- and teacher-reports at Time 1 (see Table 4). Parents rated significantly higher conduct problem (Mean difference: 2.4, t(217) = 6.8, p < .001) and hyperactivity index scores (Mean difference: 2.2, t(217) = 5.2, p < .001) compared to teachers’ ratings. The conduct problem and hyperactivity index scores were also significantly higher from parent-reports than teacher-reports in each subgroup (girls of adolescent mothers, girls of adult mothers, and boys of adult mothers) with the exception of boys of adolescent mothers (p = .41).

Overall, parent-reports were significantly but modestly positively correlated with teacher-reports for conduct problems (r(216) = .27, p < .001) and hyperactivity index (r(216) = .27, p < .001) for the whole sample. Both conduct problems and hyperactivity index scores had significant correlations between parent and teacher reports among the children born to adolescent mothers (r(105) = .21, p = .03; r(105) = .24, p = .01), the those born to adult mothers (r(109) = .34, p < .001; r(109) = .28, p = .003), and boys (r(115) = .26, p = .004; r(115) = .23, p = .01), but not girls (r(109) = .15, p = .15; r(109) = .17, p = .08). For the subgroups, only boys of adult mothers (conduct problem: r(55) = .37, p = .005; hyperactivity index: r(55) = .32, p = .02) had significant correlations between parent- and teacher-reports. There were no significant correlations between parent and teacher reports of conduct problems and hyperactivity for boys born to adolescent mothers (conduct problem: r(58) = .18, p = .17; hyperactivity index: r(58) = .12, p = .36), girls born to adult mothers (conduct problem: r(52) = .14, p = .31; hyperactivity index: r(52) = .08, p = .55), and girls born to adolescent mothers (conduct problem: r(45) = .14, p = .37; hyperactivity index: r(45) = .24, p = .11).

**Discussion**

The purpose of this study was to examine child behavioral problems over time in boys and girls born to adolescent or adult mothers in Taiwan. Overall, our findings suggest that controlling for socioeconomic characteristics, (a) children of adolescent mothers had more behavior problems than children of adult mothers, (b) boys had more behavior problems than girls, (c) these differences in behavior problems from teacher reports persisted over time (from grades 1–2 until grades 5–6). These results suggest that maternal age at child birth vary child behavioral problems over time even after taking the sociodemographic characteristics into account. Our findings are also consistent with previous studies in the west that have shown gender differences in behavioral problems (Rescorla et al. 2007)—girls tended to score higher on internalizing behavioral problems, especially at ages 12 to 16, whereas boys tended to score higher on externalizing behavioral problems, especially at ages 6 to 11.

There was no significant time effect on child behavioral problems from teacher’s reports. Children born to adolescent mothers and boys had more persistent behavioral problems (i.e. conduct problems, hyperactivity, and inattention-passivity) during the elementary school period compared to those born to adult mothers and girls. Accordingly, early detection or prevention for child behavioral problems in very early childhood is essential. Moreover, it is also important to continue to examine behavioral patterns through adolescence to determine whether behaviors persist.

The sample characteristics were different from samples of previous studies conducted in western countries. In the western societies, grandparents assistance is typically from the maternal side for adolescent mothers, and the children’s father may be less involved in their children’s lives, particularly if he father did not marry or keep a positive/
romantic relationship with the children’s mothers (Gavin et al. 2002; Krishnakumar and Black 2003). In contrast, children born to adolescent mothers in Taiwan were more likely to marry the child’s biological fathers and to live with grandparents in our study. As such, Fathers are more likely to be involved in the child’s life and both maternal and paternal grandparents may be more likely to be involved in the child’s life.

There were some differences between parent-reports and teacher-reports in this study. The parent-reports did not show many differences between children born to adolescent and adult mothers, but the teacher-reports showed that children born to adolescent mothers had more behavioral problems than children born to adult mothers. Past studies have found that teacher-reports are more objective and had stronger predictive power of the adverse outcomes of child behavioral problems than parent-reports (Cheramie 1994; Reid et al. 1987). They suggested that parent-reports may be influenced by low educational levels, maternal depression, parental mood and ability. The discrepancy between parent- and teacher-reports may also be due to children behaving differently across different settings (i.e. home and school) or parents and teachers noticing different types of children’s problem behaviors (Youngstrom et al. 2000). Teachers may be more aware of disruptive or attentional problems than internalizing problems compared to parents and vice versa (Youngstrom et al. 2000).

While parents rated conduct problems and hyperactivity scores significantly higher than teachers, for boy children of adolescent mothers, parent and teacher scores were not significantly different. This might be due to the influence of Chinese culture in which boys usually receive more attention than girls in Chinese families (Wang et al. 1993). Some parents may have underrated their boys’ levels of behavioral problems because they tend to rationalize boys’ problematic behaviors. However, teachers may tend to overrate children problematic behaviors according to their students’ academic achievements, family characteristics, or defiant and disobedient behavior. Thus, the results also support the premise that it is import to collect information from multiple sources to have complementary information and compare between mother and father or between parents and teachers in order to obtain an integrated evaluation of the child’s problematic behavior (Tassé and Lecavalier 2000; Wang et al. 1993).

The study findings need to be considered in light of important limitations. The relatively small sample size in each subgroup (maternal age at child birth and child’s gender) may have limited internal validity and generalizability of the study results. Although we adjusted for several sociodemographic characteristics in our analyses, other factors may also potentially influence child behavior problems and the parental/teachers’ reports. For example, child’s physical/psychological trauma, parental problem behaviors and mental disorders, teacher’s characteristics (e.g. years teaching, awareness of the child’s family status), and family/neighborhood environments were not measured in the parent project. Thus, we could not estimate their effects on child behavioral problems. Despite these limitations, the longitudinal data with matched samples is a strength of our study.

The findings of our study provide a fundamental understanding of the behavior patterns of elementary school aged-children of adolescent mothers. Child behavioral problems in Taiwan are associated with maternal age at child birth and child’s gender. Children’s behavioral patterns did not change significantly during the 4-year period of elementary school. This suggests that health care providers and teachers need to be aware that boys and children born to adolescent mothers may be more likely to have behavioral problems that persist at least throughout early childhood. Accordingly, maternal age at child birth and child’s gender should be taken into account in a risk assessment for child development. Studies to determine the mechanisms that lead to child behavior problems in children of adolescent mothers and boys are needed to inform prevention and early intervention programs. Moreover, interventions to reduce teen pregnancy may be another way to decrease and/or prevent child behavioral problems. Therefore, health care providers working with adolescents should emphasize the importance of pregnancy prevention. In addition to prevention, early intervention and continuous support/follow-up for adolescent mothers and their offspring may prevent or reduce behavioral problems in their children. Lastly, further studies are needed to follow Taiwanese adolescent mothers’ offspring until later in adolescence in order to determine behavioral trajectories and their outcomes throughout adolescence as well as identifying underlying mechanisms to target for intervention and prevention.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. However, for this type of study formal consent is not required.
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