BMJ Paediatrics Open

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Journal:	*BMJ Paediatrics Open*
Manuscript ID	bmjpo-2020-000657
Article Type:	Original research
Date Submitted by the Author:	07-May-2020
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Keywords:	Child Psychology, Comm Child Health

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Mental health of young children after parental separation: the importance of living arrangements and coparenting quality

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ABSTRACT

Background. Parental separation has been associated with adverse child mental health outcomes in the literature. For school aged children, joint physical custody (JPC) i.e. spending equal time in both parents' homes after a divorce, has been associated with better health and wellbeing than single care arrangements. Preschool children's wellbeing in JPC is less studied. The aim of this study was to investigate the association of living arrangements and coparenting quality with mental health in preschool children after parental separation.

Methods. This cross-sectional population-based study includes 12,845 3-year-old children in Sweden. Mental health was measured by parental reports of the Strength and Difficulties Questionnaire (SDQ) and coparenting quality with a four item scale. The living arrangements of the 642 children in non-intact families were categorized into JPC, mostly with one parent and only with one parent.

Results. Linear regression models, adjusted for socio-demographic confounders, showed an association between increased mental health problems and living mostly with, and only with one parent (B=1.21; CI=0.54-1.89, and B=1.01; CI=0.34-1.67 respectively), while children in JPC versus intact families did not differ significantly in terms of mental health problems (B=0.09; CI=-0.37-0.55). Low coparenting quality was strongly associated with child

mental health problems (B=2.05; CI=1.86-2.23). After adjusting the analysis for coparenting quality, differences in child mental health between living arrangements were minimal.

Conclusions. This study suggests that coparenting quality, and not living arrangements per se, is a key determinant of mental health in preschool children in general and thus should be targeted in preventive interventions.

Key words. Children, Divorce, Joint physical custody, Coparenting, Parental separation, Psychological problems

WHAT IS KNOW ABOUT THIS SUBJECT:

- Parental separation is an increasingly common experience of children in high-income countries.
- Joint physical custody, where children share their time about equally between their parents', has become an increasingly common living arrangement after parental separation.
- There is a dearth of empirical studies of the consequences for mental health of joint physical custody in the preschool age.

WHAT THIS ADDS:

- We found similar mental health in children in joint physical custody and intact families, while children living with one parent had more mental health problems.
- Once we accounted for coparenting quality, child mental health in the diverse living arrangements was very similar.
- Our results imply that coparenting could be targeted with interventions in families with young children, regardless of family type.

INTRODUCTION

Around 35% of Swedish children experience parental separation before reaching the age of 18 years, and previous studies have shown that the experience of parental separation is associated with adverse mental health outcomes in the short as well as the long term (1, 2). During recent decades, parenting norms have changed in the Nordic countries, and sole custody among mothers has become less common than joint physical custody (JPC), where children share their time about equally between their parents' respective homes (3-5). In Sweden, approximately 10% of all school children live in JPC arrangements (3). JPC is also increasingly common even in countries with more conservative family values such as Germany and France (6, 7).

Living arrangements and child wellbeing

A growing body of research has shown that living arrangements and contact with both parents is associated with post-divorce child wellbeing (8). Most studies in the literature have suggested that school-aged children and adolescents in JPC fare better on several outcomes compared to children in single-parent arrangements (9, 10).

JPC arrangements among preschool children has been much less studied. In a recent Swedish study (11), 3- to 5-year-olds who lived in JPC had fewer mental health problems compared to those living in single-parent arrangements. Similar findings were reported in a Nordic study on children aged 2-9 years (12). Studies in contexts outside of the Nordic countries have shown similar but somewhat more diverse results (13-15). Pruett, Ebling (14) found that overnight stays with the second parent were associated with advantages in social functioning and fewer psychological problems among girls. However, McIntosh and Smyth (13) found that generally the 2- to 3-year-olds who spent 35% or more time with their second parent, experienced more problems compared to their peers who has less contact with their second parent. Tornello, Emery (15) did not find any association between custody

arrangements in socially and economically disadvantaged families and psychological problems at age 3, but nonetheless found fewer problems among 5-year-old children who had JPC versus single-parent arrangements at age 3.

Coparenting quality and child wellbeing

High-quality coparenting has been found to contribute to a positive emotional family climate, and to affect child mental health and social adjustment positively (16). Children whose parents work well together in childrearing issues are typically better off during early childhood, adolescence, and adulthood (17). The association between coparenting quality and child wellbeing outcomes seems to be even stronger than other characteristics of parental relationships, such as intimacy and love (18).

The lower levels of health and wellbeing observed among children with separated parents may, thus, hypothetically be linked to their parents' ability to amiably share the responsibilities of childrearing (19). It is important to highlight that coparenting quality is a broader construct than parental conflict. Not only does coparenting include positive measures, it is conceptually distinct from the quality of parental relationships because it directly involves the children (17).

The aim of this study was to investigate whether mental health in 3-year-old children is associated with their living arrangements after a parental separation, and whether parental coparenting quality moderates this association.

METHODS

Study population

The population of this study was sampled from a total population of 19,294 children in a defined geographical area in the Stockholm country, who were invited to a routine visit at the age of three years by the regional Preventive Child Health Care (PCHC) from December 2015 to May 2018. The PCHC is funded by regional taxes and their services are offered to all children who reside in the county free of charge. In the invitation letter, parents were informed about the study and that the survey would be used to individualise the visit at the PCHC. The letter included a web-link to the survey which was only available in Swedish. The study was approved by the Regional Ethical Review Board in Stockholm (Dnr 2015-228631).

In total, 13,493 surveys were submitted. Of these, 112 surveys were excluded because the participants had reported that they were the sole parent of the child since childbirth and 32 surveys were excluded because parents had completed the survey twice for the same child. We also excluded 504 surveys because they were completed by someone other than a parent or because information was missing on the main variables of interest. Thus, 12,845 children were included in the study, equivalent to a participation rate of 64.7% of the total population of 3-year-olds in the area.

Patient and Public involvement statement

Parents to children in the child health services in Stockholm were involved in the piloting phase of this study, where they provided feedback on questionnaires and the procedure in qualitative interviews and in a quantitative evaluation in writing. We do not plan to have parents involved in the dissemination of the results of the study.

Procedure

The survey included questions on sociodemographic background, children's development, behaviours and symptoms, parents' worries, and coparenting quality. Parents were encouraged to complete the survey together.

Measures

Outcome measure. The main outcome in the study was based on parental report of the Swedish version of the Strengths and Difficulties Questionnaire (SDQ) which has been successfully validated for preschool aged children (20). We used the total sum of scores from the four symptom subscales (SDQ Total Difficulties) ranging from 0 to 40.

Living arrangements. Living arrangement groups were based on parents' answers to the question "What does the child's family look like? The child lives with…". The options were: (a) intact family, (b) joint physical custody (about 50/50 in each parent's home), (c) living mostly with mother/father (collapsed here to living mostly with one parent), and (d) living only with mother/father (collapsed here to living only with one parent).

Coparenting quality. Coparenting was measured using a four-item scale inspired by the coparenting scale posited by McHale and Kuersten-Hogan (21). Parents were asked about their ability to cooperate, support each other, and confide in/trust each other**,** and the extent to which they experienced conflict related to their children**.** Items were rated on a 5-point scale from 1 (disagree completely) to 5 (agree completely). Higher scores indicated better coparenting. The scale showed good internal consistency (Cronbach's alpha = 0.79). Confirmatory factor analysis revealed an acceptable fit for the one factor model: comparative fit index (CFI) = 0.99; Tucker–Lewis index (TLI) = 0.98; root mean square error of approximation (RMSEA) = 0.066 (90% confidence interval = 0.056 – 0.076).

The coparenting scale was not normally distributed. Thus, for the regression analyses, we used a dichotomization with the 20th percentile as the cut-off. Coparenting quality of 16 and below was considered low while coparenting quality of 17 and above was considered high.

Background data on children and parents. We used the following background characteristics: child gender (girl/boy); responding parent (categorised as mother/father/both, where both included a few cases of same-sex parents); parents' age (categorized as 24 and younger/25 to 34/35 to 44/45 and older/not reported); parents' highest level of education (less than high school/high school/university (less than 3 years)/university (3 years or more)/not reported); and parent country of birth (reported for one or two parents and grouped as only Sweden/Sweden and other/only other/not reported).

Statistical analyses

Imputation was used for the coparenting scale if only one item was missing, and for SDQ if only one or two items per subscale were missing. We imputed the mean of the scale/subscale for the missing item(s).

Hierarchical regression models were estimated in three steps with the SDQ total score as the outcome and living arrangements as the exposure variable. Model 1 adjusted for child gender and whether the survey was filled in by the mother, father or both. Model 2 added parents' age, parental education and parent country of birth. In the fully adjusted Model 3, coparenting quality (high/low) was added to Model 2.

To investigate the possibility that coparenting quality moderated the association between family type and the SDQ total score for children, we estimated hierarchical regression models interacting family types and coparenting quality (dichotomised into high and low levels).

RESULTS

Background characteristics

Characteristics of children and parents are presented in Table 1. About 95% of the 3-year-olds lived with both parents, in intact families. Children in equal JPC constituted 2.6% of the total sample, while 1.2% of the children lived mostly with one parent and as many lived only with one parent. The sample included slightly more boys than girls in all family types. In intact families, most parents completed the survey together, while in other family types, mothers often completed the survey alone.

A university-level education of at least three years for mothers and fathers was more common in intact and JPC families compared with the other types of living arrangements, and these parents were also older. Parents of children living with only one parent (versus other living arrangements) were more likely to be born outside of Sweden.

Mental health problems and coparenting

Mental health problems according to SDQ for children in different family types are reported in Table 2. Fewer problems were reported for children in intact families followed by children in JPC. Children living mostly or only with one parent had more mental health problems. The highest level of coparenting quality was reported by parents in intact families and the lowest by parents of children living with only one parent.

The living arrangement groups were then divided into high-quality and low-quality coparenting for each family type. Fewer mental health problems were reported for children with parents with high-quality coparenting (see Table 2).

Multivariate modelling

Table 3 shows the results from linear regression models, which suggest that children living mostly or only with one parent, compared with those in intact families, had more mental health problems. However, children in JPC arrangements were not significantly different from those in intact families in terms of their mental health. When sociodemographic variables were adjusted for, in Model 2, the differences between those living only and mostly with one parent and those in intact families were largely attenuated. Coefficients remained significant, however, indicating that only some of the differences were explained by the background characteristics. In Model 3, after including coparenting, differences in child mental health based on any living arrangements were no longer significant, while low (versus high) coparenting quality was associated strongly with child mental health problems.

Next, to examine whether coparenting moderated the association between living arrangements and child mental health, we estimated the two interaction models shown in Table 4. With intact families with high coparenting quality as the reference group, the results suggest that children in all family types with low coparenting quality had more mental health problems compared to intact families with high coparenting. This also was true for children living mostly or only with one parent with high coparenting quality. After adjusting for all sociodemographic variables (Model 2), the magnitude of the associations decreased, but remained significant (with the exception of children living mostly with one parent with high coparenting quality). The largest effect sizes in the fully adjusted model were for children living mostly with one parent with low coparenting quality closely followed by those in intact families with low coparenting.

DISCUSSION

This cross-sectional study of 12,485 3-year-olds in Stockholm, demonstrated very similar mental health outcomes in children in JPC after parental separation compared with children in intact families, while children living mostly and only with one parent had more mental health problems, net of sociodemographic characteristics. These findings are consistent with another Swedish cohort of 3- to 5-year-olds (11) and studies on older children in Nordic countries (e.g., 12, 22, 23). The addition of coparenting quality in the analyses, however, changed the picture of how children's mental health is related to family type.

The findings in relation to coparenting quality

Once we accounted for coparenting quality, there were nothing but minimal differences in child mental health in different family arrangements. Schoppe-Sullivan & Weldon (24) have previously shown that coparenting quality may moderate the association between children's socioemotional development (such as self-control) and later externalizing behaviours. The impact of parental conflict on children's wellbeing is well established in the literature (19). A systematic review has, previously, concluded that coparenting is a key mechanism within the family system for child mental health outcomes following divorce (25). The results of our study suggest that coparenting quality is a determinant of children's mental health symptoms not only among children with separated or divorced parents, but also for those in intact families. Our study, hence, extends this literature by providing evidence that coparenting quality may be more important for young children's mental health than their family form per se.

Coparenting quality differed between parents in different post-divorce family types and among those still cohabiting, which may explain differences in how children fare across family forms. Indeed, prior research has found similar patterns related to parental conflict. In a longitudinal Swedish study, adults who had grown up in intact families characterized by serious disagreement, reported the lowest

level of psychological wellbeing, followed by those who had experienced parental conflict *and* parental divorce (26). Similarly, another Swedish study found that children who grew up with divorced parents had poorer psychological health as young adults, but parental conflict and economic hardship during childhood attenuated the association (27).

For children living with only one parent, there was still an association (though weaker) between family type and child mental health also in the group with high coparenting quality. It seems plausible that coparenting quality affects children less when one parent is the primary care giver and the need for cooperation between the parents is, thus, limited. Parenting quality of the primary care giver may, for these children, be of greater importance.

Currently, parenting interventions mainly focus on improving the quality of parenting children receive and primarily target mothers (28). Unfortunately, positive effects of such programs have not been extended to coparenting quality (29). Our results suggest that coparenting skills may be an important and distinct dimension that should be given more attention in parenting interventions and that such programs should be evaluated in terms of their impact on child wellbeing and mental health (30, 31).

We previously discussed whether children's wellbeing related to custody arrangements may be explained by socioeconomic status, by an increased closeness to the father in JPC, or by whether children experience a loss of social and economic resources. Earlier studies show that although these factors contributed to children's wellbeing, adjusting for them did not eliminate the differences in wellbeing between children living in different family types (2, 9, 11, 12, 23). By grouping family types according to coparenting quality, we may capture a large proportion of the unmeasured variance; these are differences between groups that have been unexplained in previous studies. The current study did not, however, address the potential interaction between good/poor parenting quality and children's temperaments. Schoppe-Sullivan & Weldon (24) showed that children with low self-control (low on the

effortful control temperament scale) were helped by a supporting coparenting environment. In this context, the risk of negative behaviours that typically follow such temperament was attenuated.

Methodological considerations

Compared to earlier studies examining JPC among very young children, this study has considerable advantages. First, the size of our sample of children in this living arrangement by far exceeds that of earlier studies. Second, these children live in about equal JPC, whereas JPC in other studies may be based on overnights or unequal distribution of time between the parents' homes. Furthermore, the inclusion of the coparenting measure contributes to the explanation of children's psychological health in different family types. We do, however, acknowledge that our assessment of coparenting quality was a modified tool of four items, inspired by McHale et al. (2000) and adapted to a community health care setting. One issue with our measure is that we may not capture the whole variance, as most families score rather high on the measure, and thus the measure needs further validation. Even so, factor analysis suggested that the internal validity was good. Third, more parents in the intact family settings assessed coparenting quality together, whereas one parent more often assessed coparenting in the non-intact families. To address this issue, we adjusted for whether the respondent was the father or mother or both parents. Finally, we successfully recruited a high percentage of the children in the general population to the study (65%), though we were not able to examine the differences between those who did and did not participate in the study.

It is important to note that the relation between children's mental health problems and coparenting quality is not causal. Having a toddler with behavioural problems may impact the coparenting relationship and parents' perceptions of their children's mental health may be influenced by their common abilities to handle the child. Further longitudinal studies are needed to determine the direction of this relation. Also, regarding causality, there is no information in this study about what

factors lead to better or worse coparenting quality. Sharing parental responsibilities has previously been shown to be associated with reduced workload (32), more time for leisure activities (33), and improved communication between parents (32, 34).

The results of this study show considerable differences in parental education between living arrangements, with two thirds of JPC mothers versus only one third in the "only with one parent" category having a university degree. This confirms assumptions of socioeconomic selection into living arrangements. It seems probable that other selection factors that were not included in our analysis, such as parental mental health and addictive problems, may have a similar distribution, thus causing residual confounding in the comparison between living arrangements.

Implications

This study does not support claims that JPC is psychologically harmful for preschool children in general. Our results, rather, indicate that the promotion of coparenting quality should be emphasized in policy and prevention of mental health for young children living with both parents as well as after parental separation. For children living with one parent only, interventions that focus on parenting skills and positive parenting behaviours should be given priority.

Conclusion

For the first time, we have shown that coparenting may explain a large part of the differences in child psychological problems between young children in different living arrangements, and explains *more than* the actual living arrangement. This study suggests that this construct is of importance for early mental health problems, particularly because coparenting quality is a health determinant that clinicians and social workers can target with interventions, regardless of the family situation.

FUNDING

This research was funded by The Wallenberg foundation (AH) and Forte (MB and EF; Dnr 2014-0843).

CONFLICTS OF INTEREST

None declared.

CONTRIBUTORS

MB, EF and AH initiated and funded this study and created the framework for the data collection and analysis together with KB. KB supervised the data collection and prepared the collected data for analysis. RS designed and performed all statistical analyses and wrote the first draft of the manuscript together with MB. All authors revised the draft and have approved of the final version.

ACKNOWLEDGEMENTS

Thanks to nurses at the Stockholm child health care centres and to the families that participated in this research project.

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Table 1. Characteristics of children and parents in different living arrangements

			Children's living arrangements							
	Total sample		Intact family		Joint physical custody		Mostly with one parent		Only with one parent	
Sociodemographic variables	n	%	n	%	n	%	n	%	n	%
Child gender										
Girl	6213	48.4	5897	48.3	163	49.1	75	49.7	78	49.1
Boy	6632	51.6	6306	51.7	169	50.9	76	50.3	81	50.9
Responding parent										
Female (mother)	5315	41.4	4848	39.7	199	59.9	126	83.4	142	89.3
Male (father)	1052	8.2	962	7.9	73	22.0	12	7.9	5	3.1
Two parents together [a]	6478	50.4	6393	52.4	60	18.1	13	8.6	12	7.5
Mother age (mean, SD) [b]	35.39	4.66	35.47	4.58	34.20	5.06	33.99	6.26	32.84	6.49
Father age (mean, SD) [c]	37.61	5.48	37.65	5.46	36.05	5.56	37.85	4.42	33.56	9.00
Mother highest level of education										
Compulsory	203	1.8	168	1.5	15	6.0	7	5.1	13	8.7
High school	2751	23.8	2528	23.0	85	34.0	65	47.4	73	49.0
University less than 3 years	1307	11.3	1238	11.2	35	14.0	16	11.7	18	12.1
University more than 3 years	7284	63.1	7075	64.3	115	46.0	49	35.8	45	30.2
Father highest level of education										
Compulsory	172	2.4	161	2.3	4	3.1	3	13.6	4	28.6
High school	2046	28.1	1984	27.9	52	40.6	5	22.7	5	35.7
University less than 3 years	902	12.4	879	12.3	17	13.3	6	27.3	0	0.0
University more than 3 years	4166	57.2	4098	57.5	55	43.0	8	36.4	5	35.7
Mother country of birth										
Sweden	7051	83.0	6716	82.9	171	90.5	81	86.2	83	76.1
Other	1440	17.0	1383	17.1	18	9.5	13	13.8	26	23.9
Father country of birth										
Sweden	4484	83.7	4374	83.7	89	90.8	14	87.5	7	46.7
Other	872	16.3	853	16.3	9	9.2	2	12.5	8	53.3
Coparenting quality										
High	10284	80.1	9989	81.9	190	57.2	58	38.4	47	29.6
Low	2561	19.9	2214	18.1	142	42.8	93	61.6	112	70.4

[a] Includes some same sex parents, [b] n = 9,028, [c] n = 5,697

Table 2. Total scores on Strengths and Difficulties Questionnaires (SDQ) and coparenting quality in relation to children's living arrangements (n=12,845)

			Children's living arrangements							
	Total sample		Intact family		Joint physical custody		Mostly with one parent		Only with one parent	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SDQ Total Difficulties										
Total sample	7.11	4.27	7.07	4.23	7.26	4.50	8.45	5.28	8.55	5.32
High coparenting quality	6.70	4.05	6.69	4.02	6.39	4.22	7.79	5.66	8.36	5.71
Low coparenting quality	8.76	4.72	8.78	4.70	8.42	4.61	8.86	5.01	8.63	5.18
Total score on coparenting quality	18.10	2.49	18.27	2.20	16.29	3.79	13.88	4.69	12.99	5.00

Table 3. Linear regression models of parental reports of the SDQ Total Difficulties by living arrangement, sociodemographic variables and coparenting quality (n=12,845)

	Model 1			Model 2			Model 3		
	B	95% CI		B	95% CI		B	95% CI	
Child gender									
Girl	ref			ref			ref		
Boy	0.78	0.64	0.93	0.78	0.63	0.92	0.75	0.60	0.89
Living arrangement									
Intact family	ref			ref			ref		
Joint physical custody	0.26	-0.21	0.72	0.09	-0,37	0,55	-0.37	-0,82	0,09
Living mostly with one parent	1.53	0,84	2,21	1.21	0,54	1,89	0.40	-0,27	1,07
Living only with one parent	1.64	0,97	2,31	1.01	0,34	1,67	0.02	-0,64	0,68
Respondent									
Mother	ref			ref			ref		
Father	0.34	0,06	0,62	0.47	0,19	0,75	0.49	0,22	0,77
Two parents together	0.31	0,16	0,47	0.43	0,27	0,60	0.59	0,43	0,75
Parent age									
35 to 44				ref			ref		
24 and younger				2.42	1,51	3,32	2.35	1,46	3,24
25 to 34				0.82	0,64	0,99	0.83	0,66	1,00
45 and older				-0.29	-0,84	0,26	-0.32	-0,86	0,22
Not reported				0.71	0,34	1,09	0.68	0,32	1,05
Parental highest level of education									
University (3 years or more)				ref			ref		
Less than high school				1.79	1,09	2,48	1.90	1,22	2,59
High school				0.72	0,53	0,91	0.68	0,49	0,87
University (less than 3 years)				0.47	0,23	0,71	0.42	0,18	0,66
Not reported				0.92	0,37	1,44	0.90	0,38	1,43
Parent country of birth									
Only Sweden				ref			ref		
Sweden/other				0.22	-0,09	0,53	0.08	-0,22	0,39
Only other				1.06	0,79	1,32	1.00	0,74	1,26
Not reported				-0.09	-0,44	0,26	-0.05	-0,39	0,29
Coparenting quality									
High							ref		
Low							2.05	1,86	2,23

Model 1 was adjusted for child's gender and respondent. Model 2 was also adjusted for parents' age, educational level, and country of birth. Model 3 was additionally adjusted for coparenting quality

Table 4. Linear regression models of parental reports of the SDQ Total Difficulties by living arrangement/level of coparenting quality and sociodemographic variables (n=12,845)

	Model 1			Model 2		
	B	95% CI		B	95% CI	
Living arrangement						
Intact family/ high coparenting	ref			ref		
Intact family /low coparenting	2.12	1,92	2,31	2.10	1,91	2,29
Joint physical custody/ high coparenting	-0.23	-0,83	0,37	-0.39	-0,98	0,21
Joint physical custody/ low coparenting	1.91	1,22	2,61	1.73	1,04	2,42
Living mostly with one parent/ high coparenting	1.27	0,19	2,35	0.95	-0,11	2,02
Living mostly with one parent/ low coparenting	2.42	1,56	3,27	2.11	1,26	2,95
Living only with one parent/ high coparenting	1.87	0,68	3,07	1.34	0,16	2,53
Living only with one parent/ low coparenting	2.18	1,40	2,96	1.52	0,74	2,30

Model 1 was adjusted for child's gender and respondent. Model 2 was also adjusted for parents' age, educational level, and country of birth

BMJ Paediatrics Open

THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY

Journal:	*BMJ Paediatrics Open*
Manuscript ID	bmjpo-2020-000657.R1
Article Type:	Original research
Date Submitted by the Author:	31-Aug-2020
Complete List of Authors:	Bergstrom, Malin; Centre for Health Equity Studies Salari, Raziye; Uppsala University, Department of public health and caring sciences Hjern, Anders; Centre for Health Equity Studies, ; Hognäs, Robin; Stockholm University, Public Health Bergqvist, Kersti; Centre for Health Equity Studies Fransson, Emma; Centre for Health Equity Studies
Keywords:	Child Psychology, Comm Child Health

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"THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY."

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Word count: 3081

ABSTRACT

Background Parental separation has been associated with adverse child mental health outcomes in the literature. For school aged children, joint physical custody (JPC) i.e. spending equal time in both parents' homes after a divorce, has been associated with better health and wellbeing than single care arrangements. Preschool children's wellbeing in JPC is less studied. The aim of this study was to investigate the association of living arrangements and coparenting quality with mental health in preschool children after parental separation.

Methods This cross-sectional population-based study includes 12,845 3-year-old children in Sweden. Mental health was measured by parental reports of the Strength and Difficulties Questionnaire (SDQ) and coparenting quality with a four-item scale. The living arrangements of the 642 children in non-intact families were categorized into JPC, living mostly with one parent and living only with one parent.

Results Linear regression models, adjusted for socio-demographic confounders, showed an association between increased mental health problems and living mostly and only with one parent (B=1.18; CI=0.37-2.00, and B=1.20; CI=0.40-2.00 respectively), while children in intact families versus JPC did not differ significantly (B=-0.11; CI=-0.58-0.36). After adjusting the analyses for coparenting quality, differences in child mental health between the post divorce living arrangements were however minimal while children in intact families had more mental health problems compared with JPC (B=0.70;CI=0.24-1.15). Factorial ANCOVA revealed that low coparenting quality was more strongly related to mental health problems for children in intact families and JPC compared to children living mostly or only with one parent.

Conclusions This study suggests that coparenting quality is a key determinant of mental health in preschool children and thus should be targeted in preventive interventions.

Key words Children, Divorce, Joint physical custody, Coparenting, Parental separation, Psychological problems

WHAT IS ALREADY KNOW ON THIS TOPIC:

- Parental separation is a common experience for children in high-income countries.
- Joint physical custody, where children share their time about equally between their parents' homes, has become an increasingly common living arrangement after parental separation.
- There is a dearth of empirical studies on child mental health in joint physical custody in the preschool age.

WHAT THIS STUDY HOPES TO ADD:

- We found similar mental health in three-year-old children in joint physical custody and intact families, while children living only and mostly with one parent had more mental health problems, net of sociodemographic characteristics.
- Once we accounted for coparenting quality, child mental health in the diverse living arrangements after parental divorce was very similar.
- Our results imply that coparenting is of major importance for understanding mental health problems that emerge early in life, and could be targeted with interventions in families with young children.

INTRODUCTION

Around 35% of Swedish children experience parental separation before reaching the age of 18 years, and previous studies have shown that the experience of parental separation is associated with adverse mental health outcomes in the short as well as the long term.(1, 2) During recent decades, parenting norms have changed in the Nordic countries, and sole custody among mothers has become less common than joint physical custody (JPC), where children share their time about equally between their parents' respective homes.(3-5) In Sweden, approximately 10% of all school children live in JPC arrangements.(3) JPC is also increasingly common even in countries with more conservative family values such as Germany and France.(6, 7)

Living arrangements and child wellbeing

A growing body of research has shown that living arrangements and contact with both parents is associated with post-divorce child wellbeing.(8) Most studies in the literature have suggested that school-aged children and adolescents in JPC fare better on several outcomes compared to children in single-parent arrangements.(9,10) JPC arrangements among preschool children has been much less studied. In a recent Swedish study (11), 3- to 5-year-olds who lived in JPC had fewer mental health problems compared to those living in single-parent arrangements. Similar findings were reported in a Nordic study on children aged 2-9 years.(12) Studies in contexts outside of the Nordic countries have shown similar but somewhat more diverse results.(13-15) Pruett, Ebling (14) found that overnight stays with the second parent were associated with advantages in social functioning and fewer psychological problems among girls. However, McIntosh and Smyth (13) found that generally the 2- to 3-year-olds who spent 35% or more time with their second parent, experienced more problems compared to their peers who has less contact with their second parent. Tornello, Emery (15) did not find any significant association between custody arrangements in socially and economically disadvantaged families and psychological problems at age 3, but nonetheless found fewer problems among 5-year-old children who had JPC versus single-parent arrangements at age 3.

Coparenting quality and child wellbeing

High-quality coparenting has been found to contribute to a positive emotional family climate and to affect child mental health and social adjustment positively.(16) Children whose parents work well together in childrearing issues are typically better off during early childhood, adolescence and adulthood.(17) The association between coparenting quality and child

wellbeing outcomes seems to be stronger than other characteristics of parental relationships, such as intimacy and love.(18) The lower levels of health and wellbeing observed among children with separated parents may thus hypothetically be linked to their parents' ability to amicably share the responsibilities of childrearing.(19) It is important to highlight that coparenting quality is a broader construct than parental conflict. Not only does coparenting include positive measures, it is conceptually distinct from the quality of parental relationships because it directly involves the children.(17)

The aim of this study was to investigate whether mental health in 3-year-old children is associated with their living arrangements after a parental separation, and whether parental coparenting quality moderates this association.

METHODS

Study population

The population of this study was sampled from a total population of 19,294 children in a defined geographical area in the Stockholm county, who were invited to a routine visit at the age of three years by the regional Preventive Child Health Care (PCHC) from December 2015 to May 2018. The PCHC is funded by regional taxes and their services are offered to all children who reside in the county free of charge. In the invitation letter, parents were informed about the study and that the survey would be used to individualise the visit at the PCHC. The letter included a web-link to the survey which was only available in Swedish. The study was approved by the Regional Ethical Review Board in Stockholm (Dnr 2015-228631) and parents to children in the PCHC were involved in the piloting phase of this study.

In total, 13,493 surveys were submitted. Of these, 112 surveys were excluded because the participants had reported that they were the sole parent of the child since childbirth and 32 surveys were excluded because parents had completed the survey twice for the same child. We also excluded 504 surveys because they were completed by someone other than a parent or because information was missing on the main variables of interest. Thus, 12,845 children were included in the study, equivalent to a participation rate of 66.6% of the total population of 3-year-olds in the area.

Patient and Public involvement statement

Parents to children in the child health services in Stockholm were involved in the piloting phase of this study, where they provided feedback on questionnaires and the procedure in qualitative interviews and in a quantitative evaluation in writing. We do not plan to have parents involved in the dissemination of the results of the study.

Procedure

The survey included questions on sociodemographic background, children's development, behaviours and symptoms, parents' worries, and coparenting quality. Parents were encouraged to complete the survey together.

Measures

Outcome measure. The main outcome in the study was based on parental report of the Swedish version of the Strengths and Difficulties Questionnaire (SDQ) which has been successfully validated for preschool aged children.(20) We used the total sum of scores from the four symptom subscales (SDQ Total Difficulties) ranging from 0 to 40.

Living arrangements. Living arrangement groups were based on parents' answers to the question "What does the child's family look like? The child lives with…". The options were: (a) intact family, (b) joint physical custody (about 50/50 in each parent's home), (c) living mostly with mother/father (collapsed here to living mostly with one parent), and (d) living only with mother/father (collapsed here to living only with one parent).

Coparenting quality. Coparenting was measured using a four-item scale inspired by the coparenting scale posited by McHale and Kuersten-Hogan.(21) Parents were asked about their ability to cooperate, support each other, and confide in/trust each other, and the extent to which they experienced conflict related to their children. Items were rated on a 5-point scale from 1 (disagree completely) to 5 (agree completely). Higher scores indicated better coparenting. The scale showed good internal consistency (Cronbach's alpha = 0.79). Confirmatory factor analysis revealed an acceptable fit for the one factor model: comparative fit index (CFI) = 0.99; Tucker–Lewis index (TLI) = 0.98; root mean square error of approximation (RMSEA) = 0.066 (90% confidence interval = 0.056 – 0.076). For the

ANCOVA analyses, we used a dichotomisation where coparenting quality of 15 and below was considered low while coparenting quality of 16 and above was considered high. Parents who had chosen the option 3 (neither agree or disagree) for at least one of the four items were thus dichotomised as reporting low coparenting quality.

Background data on children and parents. We used the following background characteristics: child gender (girl/boy); responding parent (categorised as mother/father/both, where both included a few cases of same-sex parents); mothers' and fathers' age presented as mean and standard deviations; mothers' and fathers' highest level of education (compulsory/high school/university (less than 3 years)/university (3 years or more)/not reported); and mothers' and fathers' country of birth (grouped as Sweden/other/not reported).

Statistical analyses

The scores were scaled up pro-rata for the coparenting scale if only one item was missing, and for SDQ if only one or two items per subscale were missing. Hierarchical regression models were estimated in three steps with the SDQ total score as the outcome, living arrangements as the exposure variable and JPC as reference. Model 1 adjusted for child gender and whether the survey was filled in by the mother, father or both. Model 2 added maternal education. In the fully adjusted Model 3, coparenting quality as a continuous measure was added to Model 2. To investigate the possibility that coparenting quality moderated the association between family type and the SDQ total score for children, we used factorial ANCOVA with children's living arrangement and coparenting quality (dichotomised into high and low levels) as factors and child gender, the survey being filled in by the mother and mother's education (at least three years of university education) entered as covariates.

RESULTS

Background characteristics

Characteristics of children and parents are presented in Table 1. About 95% of the 3-year-olds lived with both parents, in intact families. Children in equal JPC constituted 2.6% of the total sample, while 1.2% of the children lived mostly with one parent and as many lived only with one parent. The sample included slightly more boys than girls in all family types. In intact families, most parents completed the survey together, while in other family types, mothers often completed the survey alone. Separated mothers were slightly younger than those in intact families and fathers in single care families were younger than fathers in the other family

types. A university-level education of at least three years was most common for mothers and fathers in intact families and least common in families where the child only lived with one parent. More children to parents born outside of Sweden lived only with one parent compared with JPC. Data on father's educational level as well as on parents' country of birth was missing for a large part of the sample. Low coparenting quality was more common among parents who did not live together and in particular in families where the child only lived with one parent.

Table 1. Characteristics of children and parents in different living arrangements

			Children's living arrangements							
	Total sample (n=12845)		Intact family (n=12203)		Joint physical custody (n=332)		Mostly with one parent (n=151)		Only with one parent (n=159)	
Sociodemographic variables	n	%	n	%	n	%	n	%	n	%
Child gender										
Girl	6220	48.1	5903	48.0	163	48.5	75	49.7	79	49.1
Boy	6641	51.3	6313	51.4	171	50.9	76	50.3	81	50.3
Not reported	76	0.6	73	0.6	2	0.6	0	0.0	1	0.6
Responding parent										
Female (mother)	5342	41.3	4873	39.7	201	59.8	126	83.4	142	88.2
Male (father)	1058	8.2	968	7.9	73	21.7	12	7.9	5	3.1
Two parents together [a]	6519	50.4	6433	52.3	60	17.9	13	8.6	13	8.1
Not reported	18	0.1	15	0.1	2	0.6	0	0.0	1	0.6
Mother age (mean, SD) [b]	35.39	4.66	35.47	4.58	34.18	5.06	33.99	6.26	32.84	6.49
Father age (mean, SD) [c]	37.60	5.48	37.64	5.46	36.05	5.56	37.85	4.42	33.56	9.00
Mother highest level of education										
Compulsory	203	1.6	168	1.4	15	4.5	7	4.6	13	8.2
High school	2751	21.4	2528	20.7	85	25.6	65	43.0	73	45.9
University less than 3 years	1307	10.2	1238	10.1	35	10.5	16	10.6	18	11.3
University more than 3 years	7284	56.7	7075	58.0	115	34.6	49	32.5	45	28.3
Not reported	1300	10.1	1194	9.8	82	24.7	14	9.3	10	6.3
Father highest level of education										
Compulsory	172	1.3	161	1.3	4	1.2	3	2.0	4	2.5
High school	2046	15.9	1984	16.3	52	15.7	5	3.3	5	3.1
University less than 3 years	902	7.0	879	7.2	17	5.1	6	4.0	0	0.0
University more than 3 years	4166	32.4	4098	33.6	55	16.6	8	5.3	5	3.1
Not reported	5559	43.3	5081	41.6	204	61.4	129	85.4	145	91.2
Mother country of birth										
Sweden	7051	54.9	6716	55.0	171	51.5	81	53.6	83	52.2
Other	1440	11.2	1383	11.3	18	5.4	13	8.6	26	16.4
Not reported	4354	33.9	4104	33.6	143	43.1	57	37.7	50	31.4
Father country of birth										
Sweden	4484	34.9	4374	35.8	89	26.8	14	9.3	7	4.4
Other	872	6.8	853	7.0	9	2.7	2	1.3	8	5.0
Not reported	7489	58.3	6976	57.2	234	70.5	135	89.4	144	90.6
Coparenting quality										
High	11314	88.1	10972	89.9	218	65.7	70	46.4	54	34.0
Low	1531	11.9	1231	10.1	114	34.3	81	53.6	105	66.0

[a] Includes some same sex parents, [b] n = 9,028, [c] n = 5,697

Child mental health in relation to background characteristics

Mental health problems according to SDQ for children in different family types are reported in Table 2. Fewer problems were reported for children in intact families followed by children in JPC. Children living mostly or only with one parent had more mental health problems. Boys had more problems compared with girls and children of mothers with high educational levels suffered from less problems compared with those with less educated mothers.

Table 2. Mean values and standard deviations of the SDQ in relation to sociodemographic variables

	SDQ Total score		
	n	Mean	SD
Living arrangement			
Intact family	12203	7.07	4.23
Joint physical custody	332	7.26	4.50
Mostly with one parent	151	8.45	5.28
Only with one parent	159	8.55	5.32
Child gender			
Girl	6213	6.70	4.10
Boy	6632	7.50	4.39
Responding parent			
Female (mother)	5315	6.95	4.26
Male (father)	1052	7.30	4.34
Two parents together [a]	6478	7.21	4.27
Mother highest level of education			
Compulsory	203	8.72	5.56
High school	2751	7.67	4.53
University less than 3 years	1307	7.31	4.31
University more than 3 years	7284	6.77	4.04
Not reported	1300	7.41	4.45

[a] Includes some same sex parents

Multivariate modelling

Table 3 shows the results from linear regression models, which suggest that children living mostly or only with one parent, compared with those in JPC, had more mental health problems. However, children in intact families were not significantly different from those in JPC in terms of mental health. When sociodemographic variables were adjusted for, in Model 2, the differences between those living only and mostly with one parent and those in JPC were

attenuated. Coefficients remained significant, however, indicating that only some of the differences were explained by the background characteristics. In Model 3, after including coparenting quality, the differences between those living only and mostly with one parent and in JPC were no longer significant. Instead, differences between children in intact families and JPC became significant suggesting that children living in JPC showed fewer problems compared to children in intact families after controlling for coparenting quality.

Table 3. Linear regression models of parental reports of the SDQ Total Difficulties by living arrangement, sociodemographic variables and coparenting quality (n=12,845)

	Model 1				Model 2				Model 3			
	B	**95% CI**		***p***	**B**	**95% CI**		***p***	**B**	**95% CI**		***p***
Living arrangement												
Joint physical custody	Ref				Ref				Ref			
Intact family	-0.26	-0.72	0.21	0.283	-0.11	-0.58	0.36	0.643	0.70*	0.24	1.15	0.003
Living mostly with one parent	1.27*	0.45	2.09	0.002	1.18*	0.37	2.00	0.004	0.14	-0.66	0.93	0.735
Living only with one parent	1.38*	0.58	2.19	0.001	1.20*	0.40	2.00	0.003	-0.25	-1.03	0.54	0.537
Child gender												
Girl	Ref				Ref				Ref			
Boy	0.78*	0.64	0.93	0.000	0.78*	0.63	0.93	0.000	0.74*	0.60	0.88	0.000
Respondent												
Female (mother)	Ref				Ref				Ref			
Male (father)	0.34*	0.06	0.62	0.019	-0.37	-0.96	0.22	0.220	-0.38	-0.95	0.20	0.199
Two parents together a	0.31*	0.16	0.47	0.000	0.37*	0.21	0.53	0.000	0.60*	0.45	0.75	0.000
Mother's highest level of education												
University (3 years or more)					Ref				Ref			
Compulsory					1.92*	1.32	2.51	0.000	1.99*	1.42	2.57	0.000
High school					0.88*	0.69	1.07	0.000	0.80*	0.62	0.98	0.000
University (less than 3 years)					0.56*	0.32	0.81	0.000	0.52*	0.28	0.76	0.000
Not reported					1.07*	0.53	1.60	0.000	1.06*	0.54	1.58	0.000
Coparenting quality									-0.45*	-0.48	-0.42	0.000

[a] Includes some same sex parents

* $P < .05$

----------Figure 1 in about here----------

Factorial ANCOVA

The factorial ANCOVA analysis revealed a significant interaction effect for children's living arrangement by coparenting quality $F(3, 12\,834) = 3.770$, $p < .01$. Post hoc comparisons

yielded no significant differences between children's living arrangement, while low coparenting quality was associated with more mental health problems. As shown in Figure 1, high quality coparenting was strongly associated with fewer mental health problems for children living in intact families and joint physical custody. For children living mostly or only with one parent this difference was smaller and not statistically significant at the $p<0.05$ level. In addition, children living in JPC fared better than children in intact families when coparenting quality was low.

Sensitivity analyses

As sensitivity analyses, we used multiple imputation (MI) to impute missing values on SDQ and coparenting scale (imputed at item level), as well as mother education (compulsory and high school had to be combined to run the MI). The regression analyses and estimated marginal means in the ANCOVA model revealed the same pattern of results (not shown).

DISCUSSION

This cross-sectional study of 12,845 3-year-olds in Stockholm, demonstrated very similar mental health outcomes in children in JPC after parental separation compared with children in intact families, while children living mostly and only with one parent had more mental health problems, net of sociodemographic characteristics. These findings are consistent with another Swedish cohort of 3- to 5-year-olds (11) and studies on older children in the Nordic countries.(e.g., 12, 22, 23) The addition of coparenting quality in the analyses, however, changed the picture of how children's mental health is related to family type.

The findings in relation to coparenting quality

Regardless of family type, children with parents with low quality coparenting relationships had more mental health problems than their counterparts in families where parents reported high coparenting quality. Schoppe-Sullivan & Weldon (24) have previously shown that coparenting quality may moderate the association between children's socioemotional development (such as self-control) and later externalizing behaviours. The impact of parental conflict on children's wellbeing is well established in the literature.(19) A systematic review has previously concluded that coparenting is a key mechanism within the family system for child mental health outcomes following divorce.(25) The results of our study suggest that coparenting quality is a determinant of children's mental health symptoms not only among children with separated or divorced parents, but in particular for those in intact families. Our

study, hence, extends this literature by providing evidence that coparenting quality may be more important for young children's mental health than their family form per se.

Coparenting quality differed between parents in different post-divorce family types and among those still cohabiting, which may explain differences in how children fare across family forms. An interesting finding was that fewer child mental health problems were reported in low coparenting quality families when parents shared custody in two separate homes than as an intact family. Indeed, prior research has found similar patterns related to parental conflict. In a longitudinal Swedish study, adults who had grown up in intact families characterized by serious disagreement, reported the lowest level of psychological wellbeing, followed by those who had experienced parental conflict and parental divorce.(26) Similarly, another Swedish study found that children who grew up with divorced parents had poorer psychological health as young adults, but parental conflict and economic hardship during childhood attenuated the association.(27)

Coparenting quality played a lesser role for children living mostly or only with one parent. It seems plausible that coparenting quality affects children less when one parent is the primary care giver and the need for cooperation between the parents is, thus, limited. Parenting quality of the primary care giver may, for these children, be of greater importance.

Currently, parenting interventions mainly focus on improving the quality of parenting children receive and primarily target mothers.(28) Unfortunately, positive effects of such programs have not been extended to coparenting quality.(29) Our results suggest that coparenting skills may be an important and distinct dimension that should be given more attention in parenting interventions and that such programs should be evaluated in terms of their impact on child wellbeing and mental health.(30, 31)

We have previously discussed whether children's wellbeing related to custody arrangements may be explained by socioeconomic status, by an increased closeness to the father in JPC, or by whether children experience a loss of social and economic resources. Earlier studies show that although these factors contributed to children's wellbeing, adjusting for them did not eliminate the differences in wellbeing between children living in different family types.(2, 9, 11, 12, 23) By exploring the interaction between coparenting quality and family types, we may capture a large proportion of the unmeasured variance; these are differences between

groups that have been unexplained in previous studies. The current study did not, however, address the potential interaction between good/poor parenting quality and children's temperaments. Schoppe-Sullivan & Weldon (24) showed that children with low self-control (low on the effortful control temperament scale) were helped by a supporting coparenting environment. In this context, the risk of negative behaviours that typically follow such temperament was attenuated.

Methodological considerations

Compared to earlier studies examining JPC among very young children, this study has considerable advantages. First, the size of our sample of children in this living arrangement by far exceeds that of earlier studies. Second, these children live in about equal JPC, whereas JPC in other studies may be based on overnights or unequal distribution of time between the parents' homes. Furthermore, the inclusion of the coparenting measure contributes to the explanation of children's psychological health in different family types. We do, however, acknowledge that our assessment of coparenting quality was a modified tool of four items, inspired by McHale et al. (2000). The scale was adapted to a community health care setting where survey items needed to be related to child wellbeing, suitable for discussion with the CHC nurse and possible for parents to complete together as well as individually. The four items represent the core dimensions of coparenting as stipulated by McHale and Feinberg.(21,32) Three of the items relate to aspects of the parental relationship that are important for children's feelings of security and cohesion; ability to cooperate, support each other, and confide in/trust each other. The fourth item address parents' conflict over the child, which instead disrupts children's security if it is intense or ongoing. Another issue with our measure is that we may not capture the whole variance, as most families score rather high on the measure, which may be related to self-serving bias due to the lack of anonymity. Parents who do not wish to discuss their coparenting relationship with the CHC nurse may be inclined to report high coparenting quality while those who are dissatisfied with the relationship instead may tend to score low. We acknowledge that the measure thus needs further validation. Even so, factor analysis suggested that the internal validity was good. More parents in the intact family settings assessed coparenting quality together, whereas one parent more often assessed coparenting in the non-intact families. To address this issue, we adjusted for whether the respondent was the father or mother or both parents. Finally, we successfully recruited a high percentage of the children in the general population to the study (67%),

though we were not able to examine the differences between those who did and did not participate.

It is important to note that the relation between children's mental health problems and coparenting quality is not causal. Having a toddler with behavioural problems may impact the coparenting relationship and parents' perceptions of their children's mental health may be influenced by their common abilities to handle the child. Further longitudinal studies are needed to determine the direction of this relation. Also, regarding causality, there is no information in this study about what factors lead to better or worse coparenting quality. Sharing parental responsibilities has previously been shown to be associated with reduced workload (33), more time for leisure activities (34), and improved communication between parents.(33, 35)

The results of this study show considerable differences in maternal education between living arrangements, with more mothers in intact families having a university degree versus separated mothers. There were high numbers of data missing on other potentially important socioeconomic covariates. Socioeconomic as well as other selection factors that were not included in our analysis, such as parent mental health and addictive problems, may hence cause residual confounding in the comparison between family types.

Implications

This study does not support claims that JPC is psychologically harmful for preschool children in general. Our results rather indicate that the promotion of coparenting quality should be emphasized in policy and prevention of mental health for young children living with both parents as well as after parental separation. For children living mostly or only with one parent, interventions that focus on parenting skills and positive parenting behaviours should be given priority.

Conclusion

This study shows that coparenting quality may explain a large part of the differences in child psychological problems between young children in different living arrangements, and explains more than the actual living arrangement. This construct seems to be of importance for early mental health problems, particularly because coparenting quality is a health

determinant that clinicians and social workers can target with interventions, regardless of the family situation.

FUNDING

This research was funded by The Wallenberg foundation (AH; Nr not applicable) and Forte (MB and EF; Dnr 2014-0843).

CONFLICTS OF INTEREST

None declared.

CONTRIBUTORS

MB, EF and AH initiated and funded this study and created the framework for the data collection and analysis together with KB. KB supervised the data collection and prepared the collected data for analysis. RS designed and performed all statistical analyses and wrote the first draft of the manuscript together with MB. All authors revised the draft and have approved of the final version.

ACKNOWLEDGEMENTS

Thanks to nurses at the Stockholm child health care centres and to the families that participated in this research project.

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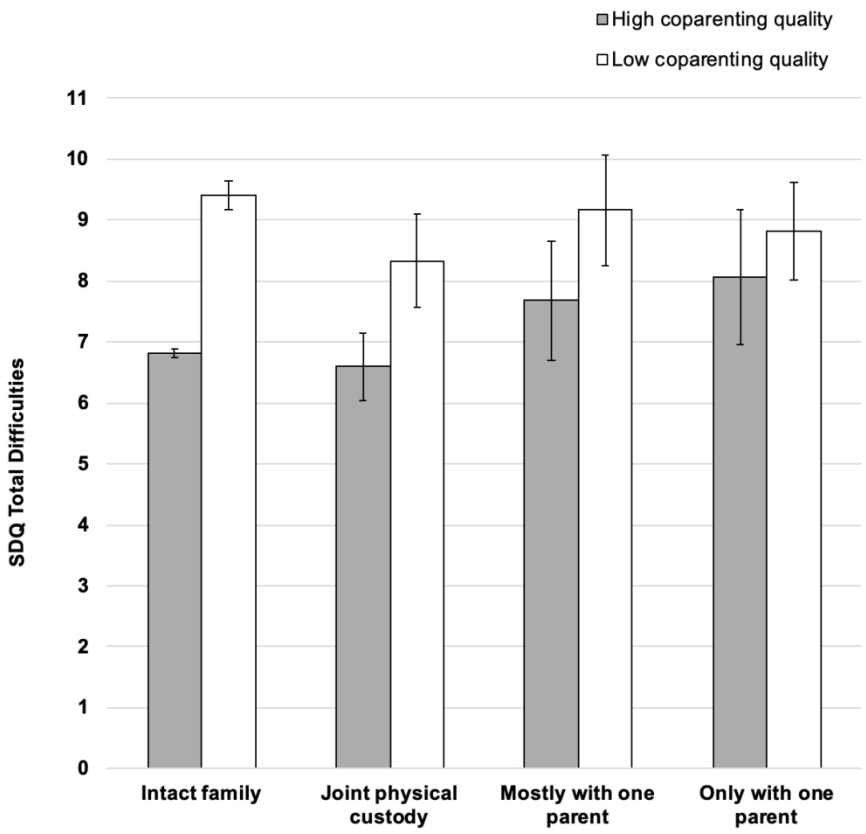

Figure 1
Estimated marginal means with error bars (95% confidence intervals) for children's living arrangements by coparenting quality

BMJ Paediatrics Open

THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY

Journal:	*BMJ Paediatrics Open*
Manuscript ID	bmjpo-2020-000657.R1
Article Type:	Original research
Date Submitted by the Author:	31-Aug-2020
Complete List of Authors:	Bergstrom, Malin; Centre for Health Equity Studies Salari, Raziye; Uppsala University, Department of public health and caring sciences Hjern, Anders; Centre for Health Equity Studies, ; Hognäs, Robin; Stockholm University, Public Health Bergqvist, Kersti; Centre for Health Equity Studies Fransson, Emma; Centre for Health Equity Studies
Keywords:	Child Psychology, Comm Child Health

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"THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY."

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Word count: 3081

ABSTRACT

Background Parental separation has been associated with adverse child mental health outcomes in the literature. For school aged children, joint physical custody (JPC) i.e. spending equal time in both parents' homes after a divorce, has been associated with better health and wellbeing than single care arrangements. Preschool children's wellbeing in JPC is less studied. The aim of this study was to investigate the association of living arrangements and coparenting quality with mental health in preschool children after parental separation.

Methods This cross-sectional population-based study includes 12,845 3-year-old children in Sweden. Mental health was measured by parental reports of the Strength and Difficulties Questionnaire (SDQ) and coparenting quality with a four-item scale. The living arrangements of the 642 children in non-intact families were categorized into JPC, living mostly with one parent and living only with one parent.

Results Linear regression models, adjusted for socio-demographic confounders, showed an association between increased mental health problems and living mostly and only with one parent (B=1.18; CI=0.37-2.00, and B=1.20; CI=0.40-2.00 respectively), while children in intact families versus JPC did not differ significantly (B=-0.11; CI=-0.58-0.36). After adjusting the analyses for coparenting quality, differences in child mental health between the post divorce living arrangements were however minimal while children in intact families had more mental health problems compared with JPC (B=0.70;CI=0.24-1.15). Factorial ANCOVA revealed that low coparenting quality was more strongly related to mental health problems for children in intact families and JPC compared to children living mostly or only with one parent.

Conclusions This study suggests that coparenting quality is a key determinant of mental health in preschool children and thus should be targeted in preventive interventions.

Key words Children, Divorce, Joint physical custody, Coparenting, Parental separation, Psychological problems

WHAT IS ALREADY KNOW ON THIS TOPIC:

- Parental separation is a common experience for children in high-income countries.
- Joint physical custody, where children share their time about equally between their parents' homes, has become an increasingly common living arrangement after parental separation.
- There is a dearth of empirical studies on child mental health in joint physical custody in the preschool age.

WHAT THIS STUDY HOPES TO ADD:

- We found similar mental health in three-year-old children in joint physical custody and intact families, while children living only and mostly with one parent had more mental health problems, net of sociodemographic characteristics.
- Once we accounted for coparenting quality, child mental health in the diverse living arrangements after parental divorce was very similar.
- Our results imply that coparenting is of major importance for understanding mental health problems that emerge early in life, and could be targeted with interventions in families with young children.

INTRODUCTION

Around 35% of Swedish children experience parental separation before reaching the age of 18 years, and previous studies have shown that the experience of parental separation is associated with adverse mental health outcomes in the short as well as the long term.(1, 2) During recent decades, parenting norms have changed in the Nordic countries, and sole custody among mothers has become less common than joint physical custody (JPC), where children share their time about equally between their parents' respective homes.(3-5) In Sweden, approximately 10% of all school children live in JPC arrangements.(3) JPC is also increasingly common even in countries with more conservative family values such as Germany and France.(6, 7)

Living arrangements and child wellbeing

A growing body of research has shown that living arrangements and contact with both parents is associated with post-divorce child wellbeing.(8) Most studies in the literature have suggested that school-aged children and adolescents in JPC fare better on several outcomes compared to children in single-parent arrangements.(9,10) JPC arrangements among preschool children has been much less studied. In a recent Swedish study (11), 3- to 5-year-olds who lived in JPC had fewer mental health problems compared to those living in single-parent arrangements. Similar findings were reported in a Nordic study on children aged 2-9 years.(12) Studies in contexts outside of the Nordic countries have shown similar but somewhat more diverse results.(13-15) Pruett, Ebling (14) found that overnight stays with the second parent were associated with advantages in social functioning and fewer psychological problems among girls. However, McIntosh and Smyth (13) found that generally the 2- to 3-year-olds who spent 35% or more time with their second parent, experienced more problems compared to their peers who has less contact with their second parent. Tornello, Emery (15) did not find any significant association between custody arrangements in socially and economically disadvantaged families and psychological problems at age 3, but nonetheless found fewer problems among 5-year-old children who had JPC versus single-parent arrangements at age 3.

Coparenting quality and child wellbeing

High-quality coparenting has been found to contribute to a positive emotional family climate and to affect child mental health and social adjustment positively.(16) Children whose parents work well together in childrearing issues are typically better off during early childhood, adolescence and adulthood.(17) The association between coparenting quality and child

wellbeing outcomes seems to be stronger than other characteristics of parental relationships, such as intimacy and love.(18) The lower levels of health and wellbeing observed among children with separated parents may thus hypothetically be linked to their parents' ability to amicably share the responsibilities of childrearing.(19) It is important to highlight that coparenting quality is a broader construct than parental conflict. Not only does coparenting include positive measures, it is conceptually distinct from the quality of parental relationships because it directly involves the children.(17)

The aim of this study was to investigate whether mental health in 3-year-old children is associated with their living arrangements after a parental separation, and whether parental coparenting quality moderates this association.

METHODS

Study population

The population of this study was sampled from a total population of 19,294 children in a defined geographical area in the Stockholm county, who were invited to a routine visit at the age of three years by the regional Preventive Child Health Care (PCHC) from December 2015 to May 2018. The PCHC is funded by regional taxes and their services are offered to all children who reside in the county free of charge. In the invitation letter, parents were informed about the study and that the survey would be used to individualise the visit at the PCHC. The letter included a web-link to the survey which was only available in Swedish. The study was approved by the Regional Ethical Review Board in Stockholm (Dnr 2015-228631) and parents to children in the PCHC were involved in the piloting phase of this study.

In total, 13,493 surveys were submitted. Of these, 112 surveys were excluded because the participants had reported that they were the sole parent of the child since childbirth and 32 surveys were excluded because parents had completed the survey twice for the same child. We also excluded 504 surveys because they were completed by someone other than a parent or because information was missing on the main variables of interest. Thus, 12,845 children were included in the study, equivalent to a participation rate of 66.6% of the total population of 3-year-olds in the area.

Patient and Public involvement statement

Parents to children in the child health services in Stockholm were involved in the piloting phase of this study, where they provided feedback on questionnaires and the procedure in qualitative interviews and in a quantitative evaluation in writing. We do not plan to have parents involved in the dissemination of the results of the study.

Procedure

The survey included questions on sociodemographic background, children's development, behaviours and symptoms, parents' worries, and coparenting quality. Parents were encouraged to complete the survey together.

Measures

Outcome measure. The main outcome in the study was based on parental report of the Swedish version of the Strengths and Difficulties Questionnaire (SDQ) which has been successfully validated for preschool aged children.(20) We used the total sum of scores from the four symptom subscales (SDQ Total Difficulties) ranging from 0 to 40.

Living arrangements. Living arrangement groups were based on parents' answers to the question "What does the child's family look like? The child lives with…". The options were: (a) intact family, (b) joint physical custody (about 50/50 in each parent's home), (c) living mostly with mother/father (collapsed here to living mostly with one parent), and (d) living only with mother/father (collapsed here to living only with one parent).

Coparenting quality. Coparenting was measured using a four-item scale inspired by the coparenting scale posited by McHale and Kuersten-Hogan.(21) Parents were asked about their ability to cooperate, support each other, and confide in/trust each other, and the extent to which they experienced conflict related to their children. Items were rated on a 5-point scale from 1 (disagree completely) to 5 (agree completely). Higher scores indicated better coparenting. The scale showed good internal consistency (Cronbach's alpha = 0.79). Confirmatory factor analysis revealed an acceptable fit for the one factor model: comparative fit index (CFI) = 0.99; Tucker–Lewis index (TLI) = 0.98; root mean square error of approximation (RMSEA) = 0.066 (90% confidence interval = 0.056 – 0.076). For the

ANCOVA analyses, we used a dichotomisation where coparenting quality of 15 and below was considered low while coparenting quality of 16 and above was considered high. Parents who had chosen the option 3 (neither agree or disagree) for at least one of the four items were thus dichotomised as reporting low coparenting quality.

Background data on children and parents. We used the following background characteristics: child gender (girl/boy); responding parent (categorised as mother/father/both, where both included a few cases of same-sex parents); mothers' and fathers' age presented as mean and standard deviations; mothers' and fathers' highest level of education (compulsory/high school/university (less than 3 years)/university (3 years or more)/not reported); and mothers' and fathers' country of birth (grouped as Sweden/other/not reported).

Statistical analyses

The scores were scaled up pro-rata for the coparenting scale if only one item was missing, and for SDQ if only one or two items per subscale were missing. Hierarchical regression models were estimated in three steps with the SDQ total score as the outcome, living arrangements as the exposure variable and JPC as reference. Model 1 adjusted for child gender and whether the survey was filled in by the mother, father or both. Model 2 added maternal education. In the fully adjusted Model 3, coparenting quality as a continuous measure was added to Model 2. To investigate the possibility that coparenting quality moderated the association between family type and the SDQ total score for children, we used factorial ANCOVA with children's living arrangement and coparenting quality (dichotomised into high and low levels) as factors and child gender, the survey being filled in by the mother and mother's education (at least three years of university education) entered as covariates.

RESULTS

Background characteristics

Characteristics of children and parents are presented in Table 1. About 95% of the 3-year-olds lived with both parents, in intact families. Children in equal JPC constituted 2.6% of the total sample, while 1.2% of the children lived mostly with one parent and as many lived only with one parent. The sample included slightly more boys than girls in all family types. In intact families, most parents completed the survey together, while in other family types, mothers often completed the survey alone. Separated mothers were slightly younger than those in intact families and fathers in single care families were younger than fathers in the other family

types. A university-level education of at least three years was most common for mothers and fathers in intact families and least common in families where the child only lived with one parent. More children to parents born outside of Sweden lived only with one parent compared with JPC. Data on father's educational level as well as on parents' country of birth was missing for a large part of the sample. Low coparenting quality was more common among parents who did not live together and in particular in families where the child only lived with one parent.

Table 1. Characteristics of children and parents in different living arrangements

			Children's living arrangements							
	Total sample (n=12845)		Intact family (n=12203)		Joint physical custody (n=332)		Mostly with one parent (n=151)		Only with one parent (n=159)	
Sociodemographic variables	n	%	n	%	n	%	n	%	n	%
Child gender										
Girl	6220	48.1	5903	48.0	163	48.5	75	49.7	79	49.1
Boy	6641	51.3	6313	51.4	171	50.9	76	50.3	81	50.3
Not reported	76	0.6	73	0.6	2	0.6	0	0.0	1	0.6
Responding parent										
Female (mother)	5342	41.3	4873	39.7	201	59.8	126	83.4	142	88.2
Male (father)	1058	8.2	968	7.9	73	21.7	12	7.9	5	3.1
Two parents together [a]	6519	50.4	6433	52.3	60	17.9	13	8.6	13	8.1
Not reported	18	0.1	15	0.1	2	0.6	0	0.0	1	0.6
Mother age (mean, SD) [b]	35.39	4.66	35.47	4.58	34.18	5.06	33.99	6.26	32.84	6.49
Father age (mean, SD) [c]	37.60	5.48	37.64	5.46	36.05	5.56	37.85	4.42	33.56	9.00
Mother highest level of education										
Compulsory	203	1.6	168	1.4	15	4.5	7	4.6	13	8.2
High school	2751	21.4	2528	20.7	85	25.6	65	43.0	73	45.9
University less than 3 years	1307	10.2	1238	10.1	35	10.5	16	10.6	18	11.3
University more than 3 years	7284	56.7	7075	58.0	115	34.6	49	32.5	45	28.3
Not reported	1300	10.1	1194	9.8	82	24.7	14	9.3	10	6.3
Father highest level of education										
Compulsory	172	1.3	161	1.3	4	1.2	3	2.0	4	2.5
High school	2046	15.9	1984	16.3	52	15.7	5	3.3	5	3.1
University less than 3 years	902	7.0	879	7.2	17	5.1	6	4.0	0	0.0
University more than 3 years	4166	32.4	4098	33.6	55	16.6	8	5.3	5	3.1
Not reported	5559	43.3	5081	41.6	204	61.4	129	85.4	145	91.2
Mother country of birth										
Sweden	7051	54.9	6716	55.0	171	51.5	81	53.6	83	52.2
Other	1440	11.2	1383	11.3	18	5.4	13	8.6	26	16.4
Not reported	4354	33.9	4104	33.6	143	43.1	57	37.7	50	31.4
Father country of birth										
Sweden	4484	34.9	4374	35.8	89	26.8	14	9.3	7	4.4
Other	872	6.8	853	7.0	9	2.7	2	1.3	8	5.0
Not reported	7489	58.3	6976	57.2	234	70.5	135	89.4	144	90.6
Coparenting quality										
High	11314	88.1	10972	89.9	218	65.7	70	46.4	54	34.0
Low	1531	11.9	1231	10.1	114	34.3	81	53.6	105	66.0

[a] Includes some same sex parents, [b] n = 9,028, [c] n = 5,697

Child mental health in relation to background characteristics

Mental health problems according to SDQ for children in different family types are reported in Table 2. Fewer problems were reported for children in intact families followed by children in JPC. Children living mostly or only with one parent had more mental health problems. Boys had more problems compared with girls and children of mothers with high educational levels suffered from less problems compared with those with less educated mothers.

Table 2. Mean values and standard deviations of the SDQ in relation to sociodemographic variables

	SDQ Total score		
	n	Mean	SD
Living arrangement			
Intact family	12203	7.07	4.23
Joint physical custody	332	7.26	4.50
Mostly with one parent	151	8.45	5.28
Only with one parent	159	8.55	5.32
Child gender			
Girl	6213	6.70	4.10
Boy	6632	7.50	4.39
Responding parent			
Female (mother)	5315	6.95	4.26
Male (father)	1052	7.30	4.34
Two parents together [a]	6478	7.21	4.27
Mother highest level of education			
Compulsory	203	8.72	5.56
High school	2751	7.67	4.53
University less than 3 years	1307	7.31	4.31
University more than 3 years	7284	6.77	4.04
Not reported	1300	7.41	4.45

[a] Includes some same sex parents

Multivariate modelling

Table 3 shows the results from linear regression models, which suggest that children living mostly or only with one parent, compared with those in JPC, had more mental health problems. However, children in intact families were not significantly different from those in JPC in terms of mental health. When sociodemographic variables were adjusted for, in Model 2, the differences between those living only and mostly with one parent and those in JPC were

attenuated. Coefficients remained significant, however, indicating that only some of the differences were explained by the background characteristics. In Model 3, after including coparenting quality, the differences between those living only and mostly with one parent and in JPC were no longer significant. Instead, differences between children in intact families and JPC became significant suggesting that children living in JPC showed fewer problems compared to children in intact families after controlling for coparenting quality.

Table 3. Linear regression models of parental reports of the SDQ Total Difficulties by living arrangement, sociodemographic variables and coparenting quality (n=12,845)

	Model 1				Model 2				Model 3			
	B	**95% CI**		***p***	**B**	**95% CI**		***p***	**B**	**95% CI**		***p***
Living arrangement												
Joint physical custody	Ref				Ref				Ref			
Intact family	-0.26	-0.72	0.21	0.283	-0.11	-0.58	0.36	0.643	0.70*	0.24	1.15	0.003
Living mostly with one parent	1.27*	0.45	2.09	0.002	1.18*	0.37	2.00	0.004	0.14	-0.66	0.93	0.735
Living only with one parent	1.38*	0.58	2.19	0.001	1.20*	0.40	2.00	0.003	-0.25	-1.03	0.54	0.537
Child gender												
Girl	Ref				Ref				Ref			
Boy	0.78*	0.64	0.93	0.000	0.78*	0.63	0.93	0.000	0.74*	0.60	0.88	0.000
Respondent												
Female (mother)	Ref				Ref				Ref			
Male (father)	0.34*	0.06	0.62	0.019	-0.37	-0.96	0.22	0.220	-0.38	-0.95	0.20	0.199
Two parents together a	0.31*	0.16	0.47	0.000	0.37*	0.21	0.53	0.000	0.60*	0.45	0.75	0.000
Mother's highest level of education												
University (3 years or more)					Ref				Ref			
Compulsory					1.92*	1.32	2.51	0.000	1.99*	1.42	2.57	0.000
High school					0.88*	0.69	1.07	0.000	0.80*	0.62	0.98	0.000
University (less than 3 years)					0.56*	0.32	0.81	0.000	0.52*	0.28	0.76	0.000
Not reported					1.07*	0.53	1.60	0.000	1.06*	0.54	1.58	0.000
Coparenting quality									-0.45*	-0.48	-0.42	0.000

[a] Includes some same sex parents

* $P < .05$

----------Figure 1 in about here----------

Factorial ANCOVA

The factorial ANCOVA analysis revealed a significant interaction effect for children's living arrangement by coparenting quality $F(3, 12\,834) = 3.770$, $p < .01$. Post hoc comparisons

yielded no significant differences between children's living arrangement, while low coparenting quality was associated with more mental health problems. As shown in Figure 1, high quality coparenting was strongly associated with fewer mental health problems for children living in intact families and joint physical custody. For children living mostly or only with one parent this difference was smaller and not statistically significant at the $p<0.05$ level. In addition, children living in JPC fared better than children in intact families when coparenting quality was low.

Sensitivity analyses

As sensitivity analyses, we used multiple imputation (MI) to impute missing values on SDQ and coparenting scale (imputed at item level), as well as mother education (compulsory and high school had to be combined to run the MI). The regression analyses and estimated marginal means in the ANCOVA model revealed the same pattern of results (not shown).

DISCUSSION

This cross-sectional study of 12,845 3-year-olds in Stockholm, demonstrated very similar mental health outcomes in children in JPC after parental separation compared with children in intact families, while children living mostly and only with one parent had more mental health problems, net of sociodemographic characteristics. These findings are consistent with another Swedish cohort of 3- to 5-year-olds (11) and studies on older children in the Nordic countries.(e.g., 12, 22, 23) The addition of coparenting quality in the analyses, however, changed the picture of how children's mental health is related to family type.

The findings in relation to coparenting quality

Regardless of family type, children with parents with low quality coparenting relationships had more mental health problems than their counterparts in families where parents reported high coparenting quality. Schoppe-Sullivan & Weldon (24) have previously shown that coparenting quality may moderate the association between children's socioemotional development (such as self-control) and later externalizing behaviours. The impact of parental conflict on children's wellbeing is well established in the literature.(19) A systematic review has previously concluded that coparenting is a key mechanism within the family system for child mental health outcomes following divorce.(25) The results of our study suggest that coparenting quality is a determinant of children's mental health symptoms not only among children with separated or divorced parents, but in particular for those in intact families. Our

study, hence, extends this literature by providing evidence that coparenting quality may be more important for young children's mental health than their family form per se.

Coparenting quality differed between parents in different post-divorce family types and among those still cohabiting, which may explain differences in how children fare across family forms. An interesting finding was that fewer child mental health problems were reported in low coparenting quality families when parents shared custody in two separate homes than as an intact family. Indeed, prior research has found similar patterns related to parental conflict. In a longitudinal Swedish study, adults who had grown up in intact families characterized by serious disagreement, reported the lowest level of psychological wellbeing, followed by those who had experienced parental conflict and parental divorce.(26) Similarly, another Swedish study found that children who grew up with divorced parents had poorer psychological health as young adults, but parental conflict and economic hardship during childhood attenuated the association.(27)

Coparenting quality played a lesser role for children living mostly or only with one parent. It seems plausible that coparenting quality affects children less when one parent is the primary care giver and the need for cooperation between the parents is, thus, limited. Parenting quality of the primary care giver may, for these children, be of greater importance.

Currently, parenting interventions mainly focus on improving the quality of parenting children receive and primarily target mothers.(28) Unfortunately, positive effects of such programs have not been extended to coparenting quality.(29) Our results suggest that coparenting skills may be an important and distinct dimension that should be given more attention in parenting interventions and that such programs should be evaluated in terms of their impact on child wellbeing and mental health.(30, 31)

We have previously discussed whether children's wellbeing related to custody arrangements may be explained by socioeconomic status, by an increased closeness to the father in JPC, or by whether children experience a loss of social and economic resources. Earlier studies show that although these factors contributed to children's wellbeing, adjusting for them did not eliminate the differences in wellbeing between children living in different family types.(2, 9, 11, 12, 23) By exploring the interaction between coparenting quality and family types, we may capture a large proportion of the unmeasured variance; these are differences between

groups that have been unexplained in previous studies. The current study did not, however, address the potential interaction between good/poor parenting quality and children's temperaments. Schoppe-Sullivan & Weldon (24) showed that children with low self-control (low on the effortful control temperament scale) were helped by a supporting coparenting environment. In this context, the risk of negative behaviours that typically follow such temperament was attenuated.

Methodological considerations

Compared to earlier studies examining JPC among very young children, this study has considerable advantages. First, the size of our sample of children in this living arrangement by far exceeds that of earlier studies. Second, these children live in about equal JPC, whereas JPC in other studies may be based on overnights or unequal distribution of time between the parents' homes. Furthermore, the inclusion of the coparenting measure contributes to the explanation of children's psychological health in different family types. We do, however, acknowledge that our assessment of coparenting quality was a modified tool of four items, inspired by McHale et al. (2000). The scale was adapted to a community health care setting where survey items needed to be related to child wellbeing, suitable for discussion with the CHC nurse and possible for parents to complete together as well as individually. The four items represent the core dimensions of coparenting as stipulated by McHale and Feinberg.(21,32) Three of the items relate to aspects of the parental relationship that are important for children's feelings of security and cohesion; ability to cooperate, support each other, and confide in/trust each other. The fourth item address parents' conflict over the child, which instead disrupts children's security if it is intense or ongoing. Another issue with our measure is that we may not capture the whole variance, as most families score rather high on the measure, which may be related to self-serving bias due to the lack of anonymity. Parents who do not wish to discuss their coparenting relationship with the CHC nurse may be inclined to report high coparenting quality while those who are dissatisfied with the relationship instead may tend to score low. We acknowledge that the measure thus needs further validation. Even so, factor analysis suggested that the internal validity was good. More parents in the intact family settings assessed coparenting quality together, whereas one parent more often assessed coparenting in the non-intact families. To address this issue, we adjusted for whether the respondent was the father or mother or both parents. Finally, we successfully recruited a high percentage of the children in the general population to the study (67%),

though we were not able to examine the differences between those who did and did not participate.

It is important to note that the relation between children's mental health problems and coparenting quality is not causal. Having a toddler with behavioural problems may impact the coparenting relationship and parents' perceptions of their children's mental health may be influenced by their common abilities to handle the child. Further longitudinal studies are needed to determine the direction of this relation. Also, regarding causality, there is no information in this study about what factors lead to better or worse coparenting quality. Sharing parental responsibilities has previously been shown to be associated with reduced workload (33), more time for leisure activities (34), and improved communication between parents.(33, 35)

The results of this study show considerable differences in maternal education between living arrangements, with more mothers in intact families having a university degree versus separated mothers. There were high numbers of data missing on other potentially important socioeconomic covariates. Socioeconomic as well as other selection factors that were not included in our analysis, such as parent mental health and addictive problems, may hence cause residual confounding in the comparison between family types.

Implications

This study does not support claims that JPC is psychologically harmful for preschool children in general. Our results rather indicate that the promotion of coparenting quality should be emphasized in policy and prevention of mental health for young children living with both parents as well as after parental separation. For children living mostly or only with one parent, interventions that focus on parenting skills and positive parenting behaviours should be given priority.

Conclusion

This study shows that coparenting quality may explain a large part of the differences in child psychological problems between young children in different living arrangements, and explains more than the actual living arrangement. This construct seems to be of importance for early mental health problems, particularly because coparenting quality is a health

determinant that clinicians and social workers can target with interventions, regardless of the family situation.

FUNDING

This research was funded by The Wallenberg foundation (AH; Nr not applicable) and Forte (MB and EF; Dnr 2014-0843).

CONFLICTS OF INTEREST

None declared.

CONTRIBUTORS

MB, EF and AH initiated and funded this study and created the framework for the data collection and analysis together with KB. KB supervised the data collection and prepared the collected data for analysis. RS designed and performed all statistical analyses and wrote the first draft of the manuscript together with MB. All authors revised the draft and have approved of the final version.

ACKNOWLEDGEMENTS

Thanks to nurses at the Stockholm child health care centres and to the families that participated in this research project.

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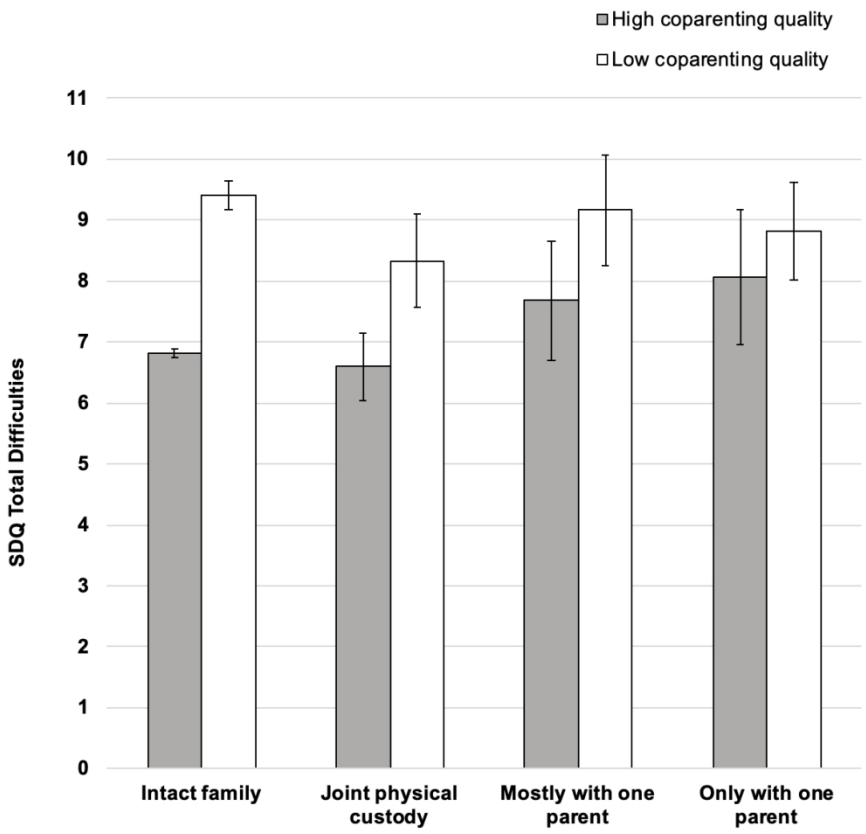

Figure 1
Estimated marginal means with error bars (95% confidence intervals) for children's living arrangements by coparenting quality

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THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY

Journal:	*BMJ Paediatrics Open*
Manuscript ID	bmjpo-2020-000657.R3
Article Type:	Original research
Date Submitted by the Author:	08-Mar-2021
Complete List of Authors:	Bergstrom, Malin; Centre for Health Equity Studies Salari, Raziye; Uppsala University, Department of public health and caring sciences Hjern, Anders; Centre for Health Equity Studies, ; Hognäs, Robin; Stockholm University, Public Health Bergqvist, Kersti; Centre for Health Equity Studies Fransson, Emma; Centre for Health Equity Studies
Keywords:	Child Psychology, Comm Child Health

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"THE IMPORTANCE OF LIVING ARRANGEMENTS AND COPARENTING QUALITY FOR YOUNG CHILDREN'S MENTAL HEALTH AFTER PARENTAL DIVORCE-A CROSS-SECTIONAL PARENTAL SURVEY."

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Word count: 3081

ABSTRACT

Background Parental separation has been associated with adverse child mental health outcomes in the literature. For school aged children, joint physical custody (JPC) i.e. spending equal time in both parents' homes after a divorce, has been associated with better health and wellbeing than single care arrangements. Preschool children's wellbeing in JPC is less studied. The aim of this study was to investigate the association of living arrangements and coparenting quality with mental health in preschool children after parental separation.

Methods This cross-sectional population-based study includes 12,845 3-year-old children in Sweden. Mental health was measured by parental reports of the Strength and Difficulties Questionnaire (SDQ) and coparenting quality with a four-item scale. The living arrangements of the 642 children in non-intact families were categorized into JPC, living mostly with one parent and living only with one parent.

Results Linear regression models, adjusted for socio-demographic confounders, showed an association between increased mental health problems and living mostly and only with one parent (B=1.18; CI=0.37-2.00, and B=1.20; CI=0.40-2.00 respectively), while children in intact families versus JPC did not differ significantly (B=-0.11; CI=-0.58-0.36). After adjusting the analyses for coparenting quality, differences in child mental health between the post divorce living arrangements were however minimal while children in intact families had more mental health problems compared with JPC (B=0.70;CI=0.24-1.15). Factorial ANCOVA revealed that low coparenting quality was more strongly related to mental health problems for children in intact families and JPC compared to children living mostly or only with one parent.

Conclusions This study suggests that coparenting quality is a key determinant of mental health in preschool children and thus should be targeted in preventive interventions.

Key words Children, Divorce, Joint physical custody, Coparenting, Parental separation, Psychological problems

WHAT IS ALREADY KNOW ON THIS TOPIC:

 Parental separation is a common experience for children in high-income countries.

 Joint physical custody, where children share their time about equally between their parents' homes, has become an increasingly common living arrangement after parental separation.

 There is a dearth of empirical studies on child mental health in joint physical custody in the preschool age.

WHAT THIS STUDY ADDS:

 We found similar mental health in three-year-old children in joint physical custody and intact families, while children living only and mostly with one parent had more mental health problems, net of sociodemographic characteristics.

 Once we accounted for coparenting quality, child mental health in the diverse living arrangements after parental divorce was very similar.

 Our results imply that coparenting is of major importance for understanding mental health problems that emerge early in life, and could be targeted with interventions in families with young children.

INTRODUCTION

Around 35% of Swedish children experience parental separation before reaching the age of 18 years, and previous studies have shown that the experience of parental separation is associated with adverse mental health outcomes in the short as well as the long term.(1, 2) During recent decades, parenting norms have changed in the Nordic countries, and sole custody among mothers has become less common than joint physical custody (JPC), where children share their time about equally between their parents' respective homes.(3-5) In Sweden, approximately 10% of all school children live in JPC arrangements.(3) JPC is also increasingly common even in countries with more conservative family values such as Germany and France.(6, 7)

Living arrangements and child wellbeing

A growing body of research has shown that living arrangements and contact with both parents is associated with post-divorce child wellbeing.(8) Most studies in the literature have suggested that school-aged children and adolescents in JPC fare better on several outcomes compared to children in single-parent arrangements.(9,10) JPC arrangements among preschool children has been much less studied. In a recent Swedish study (11), 3- to 5-year-olds who lived in JPC had fewer mental health problems compared to those living in single-parent arrangements. Similar findings were reported in a Nordic study on children aged 2-9 years.(12) Studies in contexts outside of the Nordic countries have shown similar but somewhat more diverse results.(13-15) Pruett, Ebling (14) found that overnight stays with the second parent were associated with advantages in social functioning and fewer psychological problems among girls. However, McIntosh and Smyth (13) found that generally the 2- to 3-year-olds who spent 35% or more time with their second parent, experienced more problems compared to their peers who has less contact with their second parent. Tornello, Emery (15) did not find any significant association between custody arrangements in socially and economically disadvantaged families and psychological problems at age 3, but nonetheless found fewer problems among 5-year-old children who had JPC versus single-parent arrangements at age 3.

Coparenting quality and child wellbeing

High-quality coparenting has been found to contribute to a positive emotional family climate and to affect child mental health and social adjustment positively.(16) Children whose parents work well together in childrearing issues are typically better off during early childhood,

adolescence and adulthood.(17) The association between coparenting quality and child wellbeing outcomes seems to be stronger than other characteristics of parental relationships, such as intimacy and love.(18) The lower levels of health and wellbeing observed among children with separated parents may thus hypothetically be linked to their parents' ability to amicably share the responsibilities of childrearing.(19) It is important to highlight that coparenting quality is a broader construct than parental conflict. Not only does coparenting include positive measures, it is conceptually distinct from the quality of parental relationships because it directly involves the children.(17)

The aim of this study was to investigate whether mental health in 3-year-old children is associated with their living arrangements after a parental separation, and whether parental coparenting quality moderates this association.

METHODS

Study population

The population of this study was sampled from a total population of 19,294 children in a defined geographical area in the Stockholm county, who were invited to a routine visit at the age of three years by the regional Preventive Child Health Care (PCHC) from December 2015 to May 2018. The PCHC is funded by regional taxes and their services are offered to all children who reside in the county free of charge. In the invitation letter, parents were informed about the study and that the survey would be used to individualize the visit at the PCHC. The letter included a web-link to the survey which was only available in Swedish. The study was approved by the Regional Ethical Review Board in Stockholm (Dnr 2015-228631) and parents to children in the PCHC were involved in the piloting phase of this study.

In total, 13,493 surveys were submitted. Of these, 112 surveys were excluded because the participants had reported that they were the sole parent of the child since childbirth and 32 surveys were excluded because parents had completed the survey twice for the same child. We also excluded 504 surveys because they were completed by someone other than a parent or because information was missing on main variables of interest. Thus, 12,845 children were included in the study, equivalent to a participation rate of 66.6% of the total population of 3-year-olds in the area.

Patient and Public involvement statement

Parents to children in the child health services in Stockholm were involved in the piloting phase of this study, where they provided feedback on questionnaires and the procedure in qualitative interviews and in a quantitative evaluation in writing. We do not plan to have parents involved in the dissemination of the results of the study.

Procedure

The survey included questions on sociodemographic background, children's development, behaviours and symptoms, parents' worries, and coparenting quality. Parents were encouraged to complete the survey together.

Measures

Outcome measure. The main outcome in the study was based on parental report of the Swedish version of the Strengths and Difficulties Questionnaire (SDQ) which has been successfully validated for preschool aged children.(20) We used the total sum of scores from the four symptom subscales (SDQ Total Difficulties) ranging from 0 to 40.

Living arrangements. Living arrangement groups were based on parents' answers to the question "What does the child's family look like? The child lives with…". The options were: (a) intact family, (b) joint physical custody (about 50/50 in each parent's home), (c) living mostly with mother/father (collapsed here to living mostly with one parent), and (d) living only with mother/father (collapsed here to living only with one parent).

Coparenting quality. Coparenting was measured using a four-item scale inspired by the coparenting scale posited by McHale and Kuersten-Hogan.(21) Parents were asked about their ability to cooperate, support each other, and confide in/trust each other, and the extent to which they experienced conflict related to their children. Items were rated on a 5-point scale from 1 (disagree completely) to 5 (agree completely). Higher scores indicated better coparenting. The scale showed good internal consistency (Cronbach's alpha = 0.79). Confirmatory factor analysis revealed an acceptable fit for the one factor model: comparative fit index (CFI) = 0.99; Tucker–Lewis index (TLI) = 0.98; root mean square error of approximation (RMSEA) = 0.066 (90% confidence interval = 0.056 – 0.076). For the ANCOVA analyses, we used a dichotomization where coparenting quality of 15 and below was considered low while coparenting quality of 16 and above was considered high. Parents

who had chosen the option 3 (neither agree or disagree) for at least one of the four items were thus dichotomized as reporting low coparenting quality.

Background data on children and parents. We used the following background characteristics: child gender (girl/boy); responding parent (categorized as mother/father/both, where both included a few cases of same-sex parents); mothers' and fathers' age presented as mean and standard deviations; mothers' and fathers' highest level of education (compulsory/high school/university (less than 3 years)/university (3 years or more)/not reported); and mothers' and fathers' country of birth (grouped as Sweden/other/not reported).

Statistical analyses

The scores were scaled up pro-rata for the coparenting scale if only one item was missing, and for SDQ if only one or two items per subscale were missing. Hierarchical regression models were estimated in three steps with the SDQ total score as the outcome, living arrangements as the exposure variable and JPC as reference. Model 1 adjusted for child gender and whether the survey was filled in by the mother, father or both. Model 2 added maternal education. In the fully adjusted Model 3, coparenting quality as a continuous measure was added to Model 2. To investigate the possibility that coparenting quality moderated the association between family type and the SDQ total score for children, we used factorial ANCOVA with children's living arrangement and coparenting quality (dichotomized into high and low levels) as factors and child gender, the survey being filled in by the mother and mother's education (at least three years of university education) entered as covariates. Due to small sample sizes the categories of children living mostly or only with one parent were collapsed in the sensitivity analyses.

RESULTS

Background characteristics

Characteristics of children and parents are presented in Table 1. About 95% of the 3-year-olds lived with both parents, in intact families. Children in equal JPC constituted 2.6% of the total sample, while 1.2% of the children lived mostly with one parent and as many lived only with one parent. The sample included slightly more boys than girls in all family types. In intact families, most parents completed the survey together, while in other family types, mothers often completed the survey alone. Separated mothers were slightly younger than those in intact families and fathers in single care families were younger than fathers in the other family

types. A university-level education of at least three years was most common for mothers and fathers in intact families and least common in families where the child only lived with one parent. More children to parents born outside of Sweden lived only with one parent compared with JPC. Data on father's educational level as well as on parents' country of birth was missing for a large part of the sample. Low coparenting quality was more common among parents who did not live together and in particular in families where the child only lived with one parent.

Table 1. Characteristics of children and parents in different living arrangements

			Children's living arrangements							
	Total sample (n=12845)		Intact family (n=12203)		Joint physical custody (n=332)		Mostly with one parent (n=151)		Only with one parent (n=159)	
Sociodemographic variables	n	%	n	%	n	%	n	%	n	%
Child gender										
Girl	6220	48.1	5903	48.0	163	48.5	75	49.7	79	49.1
Boy	6641	51.3	6313	51.4	171	50.9	76	50.3	81	50.3
Not reported	76	0.6	73	0.6	2	0.6	0	0.0	1	0.6
Responding parent										
Female (mother)	5342	41.3	4873	39.7	201	59.8	126	83.4	142	88.2
Male (father)	1058	8.2	968	7.9	73	21.7	12	7.9	5	3.1
Two parents together [a]	6519	50.4	6433	52.3	60	17.9	13	8.6	13	8.1
Not reported	18	0.1	15	0.1	2	0.6	0	0.0	1	0.6
Mother age (mean, SD) [b]	35.39	4.66	35.47	4.58	34.18	5.06	33.99	6.26	32.84	6.49
Father age (mean, SD) [c]	37.60	5.48	37.64	5.46	36.05	5.56	37.85	4.42	33.56	9.00
Mother highest level of education										
Compulsory	203	1.6	168	1.4	15	4.5	7	4.6	13	8.2
High school	2751	21.4	2528	20.7	85	25.6	65	43.0	73	45.9
University less than 3 years	1307	10.2	1238	10.1	35	10.5	16	10.6	18	11.3
University more than 3 years	7284	56.7	7075	58.0	115	34.6	49	32.5	45	28.3
Not reported	1300	10.1	1194	9.8	82	24.7	14	9.3	10	6.3
Father highest level of education										
Compulsory	172	1.3	161	1.3	4	1.2	3	2.0	4	2.5
High school	2046	15.9	1984	16.3	52	15.7	5	3.3	5	3.1
University less than 3 years	902	7.0	879	7.2	17	5.1	6	4.0	0	0.0
University more than 3 years	4166	32.4	4098	33.6	55	16.6	8	5.3	5	3.1
Not reported	5559	43.3	5081	41.6	204	61.4	129	85.4	145	91.2
Mother country of birth										
Sweden	7051	54.9	6716	55.0	171	51.5	81	53.6	83	52.2
Other	1440	11.2	1383	11.3	18	5.4	13	8.6	26	16.4
Not reported	4354	33.9	4104	33.6	143	43.1	57	37.7	50	31.4
Father country of birth										
Sweden	4484	34.9	4374	35.8	89	26.8	14	9.3	7	4.4
Other	872	6.8	853	7.0	9	2.7	2	1.3	8	5.0
Not reported	7489	58.3	6976	57.2	234	70.5	135	89.4	144	90.6
Coparenting quality										
High	11314	88.1	10972	89.9	218	65.7	70	46.4	54	34.0
Low	1531	11.9	1231	10.1	114	34.3	81	53.6	105	66.0

[a] Includes some same sex parents, [b] n = 9,028, [c] n = 5,697

Child mental health in relation to background characteristics

Mental health problems according to SDQ for children in different family types are reported in Table 2. Fewer problems were reported for children in intact families followed by children in JPC. Children living mostly or only with one parent had more mental health problems. Boys had more problems compared with girls and children of mothers with high educational levels suffered from less problems compared with those with less educated mothers.

Table 2. Mean values and standard deviations of the SDQ in relation to sociodemographic variables

	SDQ Total score		
	n	Mean	SD
Living arrangement			
Intact family	12203	7.07	4.23
Joint physical custody	332	7.26	4.50
Mostly with one parent	151	8.45	5.28
Only with one parent	159	8.55	5.32
Child gender			
Girl	6213	6.70	4.10
Boy	6632	7.50	4.39
Responding parent			
Female (mother)	5315	6.95	4.26
Male (father)	1052	7.30	4.34
Two parents together [a]	6478	7.21	4.27
Mother highest level of education			
Compulsory	203	8.72	5.56
High school	2751	7.67	4.53
University less than 3 years	1307	7.31	4.31
University more than 3 years	7284	6.77	4.04
Not reported	1300	7.41	4.45

[a] Includes some same sex parents

Multivariate modelling

Table 3 shows the results from linear regression models, which suggest, in model 1 controlling for child gender and respondent parent, that 3-year-olds living mostly or only with one parent, compared with those in JPC, had more mental health problems. However, 3-year-olds in intact families were not significantly different from those in JPC in terms of mental health. When maternal education was added, in Model 2, the differences between those living

only and mostly with one parent and those in JPC were attenuated. Coefficients remained significant, however, indicating that only some of the differences were explained by the background characteristics. In Model 3, after including coparenting quality, the differences between those living only and mostly with one parent and in JPC were no longer significant. Instead, differences between children in intact families and JPC became significant suggesting that children living in JPC showed fewer problems compared to children in intact families after controlling for coparenting quality.

Table 3. Linear regression models of parental reports of the SDQ Total Difficulties by living arrangement, sociodemographic variables and coparenting quality (n=12,845)

	Model 1				Model 2				Model 3			
	B	**95% CI**		***p***	**B**	**95% CI**		***p***	**B**	**95% CI**		***p***
Living arrangement												
Joint physical custody	Ref				Ref				Ref			
Intact family	-0.26	-0.72	0.21	0.283	-0.11	-0.58	0.36	0.643	0.70*	0.24	1.15	0.003
Living mostly with one parent	1.27*	0.45	2.09	0.002	1.18*	0.37	2.00	0.004	0.14	-0.66	0.93	0.735
Living only with one parent	1.38*	0.58	2.19	0.001	1.20*	0.40	2.00	0.003	-0.25	-1.03	0.54	0.537
Child gender												
Girl	Ref				Ref				Ref			
Boy	0.78*	0.64	0.93	0.000	0.78*	0.63	0.93	0.000	0.74*	0.60	0.88	0.000
Respondent												
Female (mother)	Ref				Ref				Ref			
Male (father)	0.34*	0.06	0.62	0.019	-0.37	-0.96	0.22	0.220	-0.38	-0.95	0.20	0.199
Two parents together a	0.31*	0.16	0.47	0.000	0.37*	0.21	0.53	0.000	0.60*	0.45	0.75	0.000
Mother's highest level of education												
University (3 years or more)					Ref				Ref			
Compulsory					1.92*	1.32	2.51	0.000	1.99*	1.42	2.57	0.000
High school					0.88*	0.69	1.07	0.000	0.80*	0.62	0.98	0.000
University (less than 3 years)					0.56*	0.32	0.81	0.000	0.52*	0.28	0.76	0.000
Not reported					1.07*	0.53	1.60	0.000	1.06*	0.54	1.58	0.000
Coparenting quality									-0.45*	-0.48	-0.42	0.000

[a] Includes some same sex parents

* $P < 0.05$

Figure 1. Estimated marginal means with error bars with 95% confidence intervals for children's living arrangements by coparenting quality.

----------Figure 1 in about here----------

Factorial ANCOVA

The factorial ANCOVA analysis revealed a significant interaction effect for children's living arrangement by coparenting quality $F(3, 12\ 834) = 3.770$, $p = 0.010$. Figure 1 shows the estimated marginal means for children's living arrangement by coparenting quality. Separate one-way ANCOVAs on low and high coparenting groups showed that the overall effect of family type was significant for the high coparenting group ($F(3, 11\ 307) = 2.83$, $p = 0.037$) and non-significant for the low coparenting group ($F(3, 1\ 524) = 2.11$, $p = 0.097$). To limit the number of post-hoc comparisons and in line with our main research question, we only tested the differences between JPC and other family types. In the high coparenting group, children in JPC showed fewer problems compared to those living only with one parent (mean difference = -1.44, $p = 0.020$). No significant differences were found between children living in JPC families and those in intact families or living mostly with one parent (mean difference = -0.21, and -1.06, $p = 0.458$, and 0.058, respectively).

Next, separate one-way ANCOVAs on the four family types showed that high quality coparenting was associated with fewer mental health problems for children living in intact and JPC families ($F(1, 12\ 198) = 435.25$, $p < 0.001$, and $F(1, 327) = 9.40$, $p = 0.002$, respectively). For children living mostly or only with one parent this difference was smaller and not statistically significant ($F(1, 146) = 2.38$, $p = 0.125$ and $F(1, 154) = 0.54$, $p = 0.463$, respectively).

Sensitivity analyses

As sensitivity analyses, we used multiple imputation (MI) to impute missing values on SDQ and coparenting scale (imputed at item level), as well as mother education (compulsory and high school had to be combined to run the MI). The regression analyses and estimated marginal means in the ANCOVA model revealed the same pattern of results (not shown).

Furthermore, considering that (1) the overall pattern of results was very similar for children living mostly and only with one parent, and (2) the sample size was smaller in these two groups, we repeated all the ANOCVA analyses with these two family types grouped together.

The factorial ANCOVA analysis revealed a significant interaction effect for children's living arrangement by coparenting quality $F(2, 12\ 836) = 5.48$, $p = 0.004$. Separate one-way ANCOVAs on low and high coparenting groups indicated that the overall effect of family

type was significant for both high and low coparenting groups ($F(2, 11\ 308) = 4.12$, $p = 0.016$ and ($F(2, 1\ 525) = 3.05$, $p = 0.048$). Post-hoc comparisons showed that in the high coparenting group, children in JPC showed similar levels of problems to those living in intact families (mean difference = -0.21, $p = 0.458$), but fewer problems compared to those living mostly/only with one parent (mean difference = -1.23, $p = 0.008$). In the low coparenting group, children in JPC showed fewer problems compared to those living in intact families (mean difference = -1.10, $p = 0.018$), but did not differ significantly from children living mostly/only with one parent (mean difference = -0.687, $p = 0.222$). Separate one-way ANCOVA on children living mostly/only with one parent revealed a non-significant overall effect of the two coparenting levels ($F(1, 305) = 2.43$, $p = 0.120$).

DISCUSSION

This cross-sectional study of 12,845 3-year-olds in Stockholm, demonstrated very similar mental health outcomes in children in JPC after parental separation compared with children in intact families, while children living mostly and only with one parent had more mental health problems, net of sociodemographic characteristics. These findings are consistent with another Swedish cohort of 3- to 5-year-olds (11) and studies on older children in the Nordic countries.(e.g., 12, 22, 23) The addition of coparenting quality in the analyses, however, changed the picture of how children's mental health is related to family type.

The findings in relation to coparenting quality

Coparenting quality varied largely between the different family forms, with intact families reporting the highest quality and single care parents the lowest. When we adjusted for coparenting quality the differences in mental health between children in JPC and those living mostly or only with one parent disappeared. This finding confirms the conclusion of a systematic review describing coparenting as a key mechanism within the family system for child mental health outcomes following divorce.(24)

Interestingly, the differences between children in intact families and JPC instead became significant in this analysis, suggesting better mental health in children in JPC. This is surprising since JPC for young children has been questioned by scientists and child experts.(25) In the debate the frequent separations from the parents imposed by JPC have been assumed to harm children's ability to regulate stress and emotions as well as the security in their attachment relations.(25) A potential explanation for the positive outcome for children

in JPC may however be the positive prerequisites for parenting involved in this living arrangement, as described by parents of 1-4-year-olds in JPC in an interview study.(26) For young children's mental health, positive parenting practices and high quality in the parent-child relations are particularly important and the interviewed parents described improved parent-child relationships and increased satisfaction in parenting after their divorce.(26, 27) JPC allowed them to focus entirely on the child when together and they could make decision without having to compromise with a coparent. In a previous study of 3-5-year-olds, we found no differences in parent reported child mental health between JPC and intact families but could then not include information on coparenting quality or parental conflict. (11) It is however possible that this finding is an artefact and it needs to be confirmed in future studies.

The interaction analyses revealed significant interaction effects for living arrangement by coparenting quality for both the high and the low coparenting groups when the categories mostly/only with one parent were collapsed. When coparenting quality is high children in JPC and intact families show similar levels of problems and children in JPC have fewer problems compared with those living mostly/only with one parent.

For families with low coparenting quality the results were similar to those of the main analysis; children in JPC showed fewer problems compared to those living in intact families but did not differ significantly from children living mostly/only with one parent. Coparenting quality hence seems to be a determinant of children's mental health not only among children with JPC parents, but may be particularly troublesome in intact families. Obviously fights over the children and lack of support, trust and cooperation in the parental relationship influences the family atmosphere to a higher degree when parents live together, compared with when they have separate homes. Low coparenting quality may also hamper parent's individual relationships to the child and parental efficacy more in intact families. Indeed, prior research has found similar patterns related to parental conflict. In a longitudinal Swedish study, adults who had grown up in intact families characterized by serious disagreement, reported the lowest level of psychological wellbeing, followed by those who had experienced parental conflict and parental divorce. (28) Similarly, another Swedish study found that children who grew up with divorced parents had poorer psychological health as young adults, but parental conflict and economic hardship during childhood attenuated the association.(29)

We found high quality coparenting to be associated with fewer mental health problems for children living in intact and JPC families but not for children living mostly or only with one parent. Coparenting quality hence seems to play a lesser role for children when one parent is the primary care giver and the need for cooperation between the parents is limited. Parenting quality of the primary care giver may, for these children, be of greater importance.

We have previously discussed whether children's wellbeing related to custody arrangements may be explained by socioeconomic status, by an increased closeness to the father in JPC, or by whether children experience a loss of social and economic resources. Earlier studies show that although these factors contributed to children's wellbeing, adjusting for them did not eliminate the differences in wellbeing between children living in different family types.(2, 9, 11, 12, 23) By exploring the interaction between coparenting quality and family types, we may capture a large proportion of the unmeasured variance; these are differences between groups that have been unexplained in previous studies.

Currently, parenting interventions mainly focus on improving the quality of parenting children receive and primarily target mothers.(30) Unfortunately, positive effects of such programs have not been extended to coparenting quality.(31) Our results suggest that coparenting skills may be an important and distinct dimension that should be given more attention in parenting interventions and that such programs should be evaluated in terms of their impact on child wellbeing and mental health.(32, 33)

Methodological considerations

Compared to earlier studies examining JPC among very young children, this study has considerable advantages. First, the size of our sample of children in this living arrangement by far exceeds that of earlier studies and enables more detailed groupings. However, in some analyses the smallest groups were collapsed to gain power. Second, these children live in about equal JPC, whereas JPC in other studies may be based on overnights or unequal distribution of time between the parents' homes. Furthermore, the inclusion of the coparenting measure contributes to the explanation of children's psychological health in different family types. We do, however, acknowledge that our assessment of coparenting quality was a modified tool of four items, inspired by McHale et al. (2000). The scale was adapted to a community health care setting where survey items needed to be related to child wellbeing, suitable for discussion with the CHC nurse and possible for parents to complete together as

well as individually. The four items represent the core dimensions of coparenting as stipulated by McHale and Feinberg.(21,34) Three of the items relate to aspects of the parental relationship that are important for children's feelings of security and cohesion; ability to cooperate, support each other, and confide in/trust each other. The fourth item address parents' conflict over the child, which instead disrupts children's security if it is intense or ongoing.

Another issue with our measure is that we may not capture the whole variance, as most families score rather high on the measure, which may be related to self-serving bias due to the lack of anonymity. Parents who do not wish to discuss their coparenting relationship with the CHC nurse may be inclined to report high coparenting quality while those who are dissatisfied with the relationship instead may tend to score low. Furthermore, it seems quite probable that this tendency, leading to overadjustment, may explain the unexpected better mental health of children in JPC compared with children in intact families. We acknowledge that the measure thus needs further validation. Even so, factor analysis suggested that the internal validity was good. More parents in the intact family settings assessed coparenting quality together, whereas one parent more often assessed coparenting in the non-intact families. To address this issue, we adjusted for whether the respondent was the father or mother or both parents. Finally, we successfully recruited a high percentage of the children in the general population to the study (67%), though we were not able to examine the differences between those who did and did not participate.

It is important to note that the relation between children's mental health problems and coparenting quality is not causal. Having a toddler with behavioural problems may impact the coparenting relationship and parents' perceptions of their children's mental health may be influenced by their common abilities to handle the child. Further longitudinal studies are needed to determine the direction of this relation. Also, regarding causality, there is no information in this study about what factors lead to better or worse coparenting quality. Sharing parental responsibilities has previously been shown to be associated with reduced workload (35), more time for leisure activities (36), and improved communication between parents.(35, 37)

The results of this study show considerable differences in maternal education between livingarrangements, with more mothers in intact families having a university degree versus

separated mothers. There were high numbers of data missing on other potentially important socioeconomic covariates. Socioeconomic as well as other selection factors that were not included in our analysis, such as parent mental health and addictive problems, may hence cause residual confounding in the comparison between family types.

Implications

This study does not support claims that JPC is psychologically harmful for preschool children in general. Our results rather indicate that the promotion of coparenting quality should be emphasized in policy and prevention of mental health for young children living with both parents as well as after parental separation. For children living mostly or only with one parent, interventions that focus on parenting skills and positive parenting behaviours should be given priority.

Conclusion

This study shows that 3-year-olds in joint physical custody have better mental health than their counterparts who live mostly or only with one parent and that coparenting quality contributes to the understanding of early child mental health, not only in children with separated parents but also in intact families. Coparenting quality is hence an important health determinant that clinicians and social workers can target with interventions, regardless of the family situation.

FUNDING

This research was funded by The Wallenberg foundation (AH) and Forte (MB and EF; Dnr 2014-0843).

CONFLICTS OF INTEREST

None declared.

CONTRIBUTORS

MB, EF and AH initiated and funded this study and created the framework for the data collection and analysis together with KB. KB supervised the data collection and prepared the collected data for analysis. RS designed and performed all statistical analyses and wrote the first draft of the manuscript together with MB. All authors revised the draft and have approved of the final version.

ACKNOWLEDGEMENTS

Thanks to nurses at the Stockholm well-baby clinics and to the families that participated in this research project.

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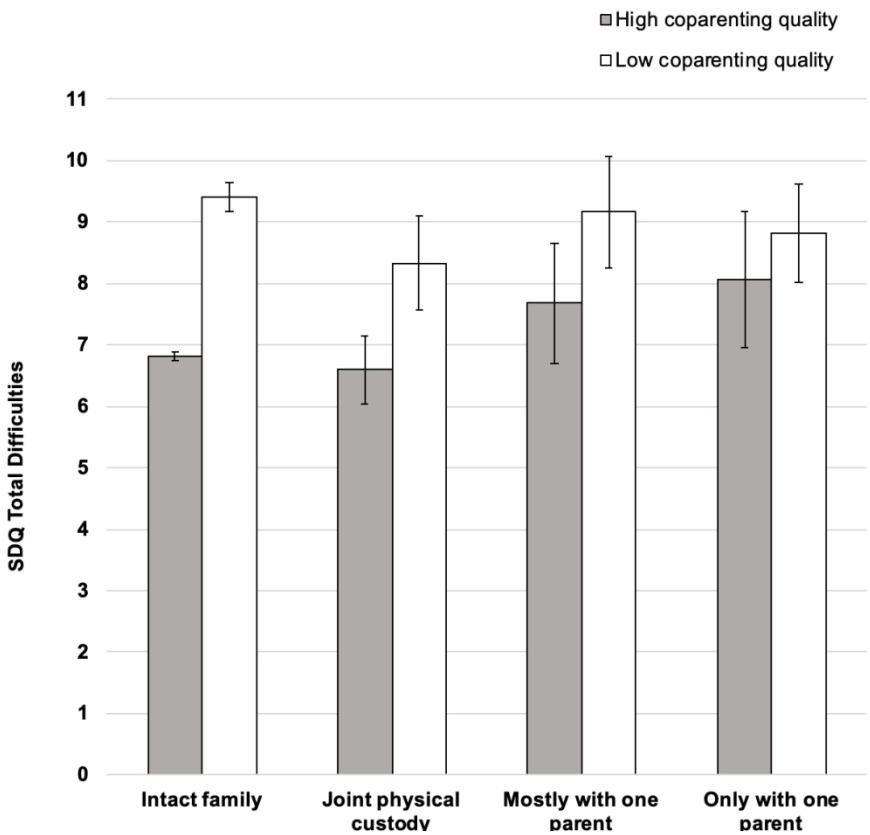
High coparenting quality
Low coparenting quality
SDQ Total Difficulties
11
10
9
8
7
6
5
4
3
2
1
0
Intact family
Joint physical custody
Mostly with one parent
Only with one parent