

論 説

Impact of social capital and family structure on family functioning: Evidence from families with seven years children born preterm

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Abstract

The study investigated the influence of social capital and family structure on family functioning for families with seven years children who were born preterm (born <33 weeks gestation). The analysis used data from a completed randomized control trial conducted in Australia on preterm babies from 245 families. Subjective report of family functioning completed only by mothers was assessed using the Mc Master Family Assessment Device (FAD). We tested the hypothesis that family structure and social capital can play a significant mediator role for healthy family functioning for this unique group of families. The results revealed that significantly lower family functioning levels in several dimensions of the FAD; families with school aged children who born pre term faced neighbourhood problems and had a single parent family structure. Thus, for families with pre term children there were significant role of neighbourhood relations and family structure for healthy family functioning as a micro-unit.

Introduction

Families with preterm infants are undoubtedly faced with an increased range of choices

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about how they organise and manage their work and family responsibilities as these children have an increased mid to long term risk of developmental impairments [Tobey and Schraeder, 1990; Pinelli, 2000; Anderson and Doyel, 2003] and disability [Baitner et al., 2003; Brummelte et al., 2011]. Family environments for preterm infants may be different to those for full-term infants because these infants very often are at risk for medium-and long term physical, psychological, and behavioural impairments which require increased caretaking demands and stressors [O'Brien et al., 1999; Russell et al., 2007, Linden et al., 2015]. From a family system's perspective any difficult birth or physical disability (such as having a preterm baby) is expected to have an impact on all family members as well as the relationships between family members (Kazak, 1989). Although there are a rich body of theoretical studies for understanding the associations between social capital, family structure and family functioning [Bronfenbrenner, 1979; Lin, 2001; Sampson et al., 2002; Edwards et al., 2003; Hornberger et al., 2010], empirical studies on this area are relatively scarce. Although the family environment is one of the most important contexts for children's development, family functioning following the preterm birth of an infant has been a relatively neglected area of research-particularly during the child's early years. In a recent systematic review by Halliday et al. (2014) relationships between family functioning and health have been identified for overweight and obese children . He argued that obese children and adolescents were more likely to come from families with poor family functioning, but our understanding of how social capital and family structure have mediating effects on family functioning is limited. Understanding these factors is important due to the fact that family and family environment are inherently linked to the wellbeing of its member. Therefore, knowledge of how social connections and family structure influence family functioning is essential for policy researchers to promote beneficial role of community and family integration. Two recent studies [Treyvaud et al., 2014; Linden, 2015] showed that very preterm birth (born < 1250 gm) is associated with reduced family functioning with regards to problem solving, communication and affective response, as well as increased levels of parental anxiety and depression. These studies also indicated that at the age of seven years, parents of preterm girls may express higher levels of stress than those of preterm boys, although these studies only consider correlation without controlling for co-founding factors. The primary aim of this study thus was to investigate the effects of social capital and family structure on the family functioning of families with preterm infants during their early childhood. Families might be connected to several life domains such as home, school, job, society and community [Edwards et al., 2003; Hornberger et al., 2010]. In this study the concepts of social capital such as relationships with close relatives and neighbours and family structure e.g. single parent family vs. two parent family serves to shed further light on how improvised and disadvantages neighbourhood and family conditions impact the level of functioning within families for a unique groups of families who have seven years children

born premature.

Our study examined the cross-sectional relationship between an index of social capital and mothers' subjective perception of family functioning of families with children who were born preterm at their seven years of age using data from a randomized control trial (RCT) conducted in Australia. Extensive data were available on these children including several variables that parallel indicators of family and community social capital suggested by other literatures [Coleman, 1988], such as: 1) neighbourhood and social support, 2) the presence of two parents or parent-figures in the household, and 3) relatively fewer children in the household claiming family resources. This study tested the hypothesis that social capital and family structures are related to the family functioning of the families with preterm born children in multiple dimensions.

Theoretical Background

Social capital and family functioning

Social capital refers to the quantity and quality of social connections that people can access through relationships [Lin, 2001, Edwards et al., 2003]. Coleman (1988) first hypothesized that the concept of social capital as those aspects of the social structure—personal relations and networks of relations—facilitate actions within the structure and emphasized that the benefits accrued from social connectedness in communities and within families impact the development and wellbeing of children. Theoretically, this social capital acts as an exo-system that may affect family functioning [Lin, 2001, Edwards et al., 2003]. In our study, we define 'social capital' as neighbourhood cohesion. In the field of psychology theories have focused on identifying direct and indirect pathways through which neighbourhood effects operate on children. Leventhal & Brooks-Gunn's (2000) model highlights that the associations between neighbourhood conditions and children's health may be indirect and operates through parental behaviours and family functioning. Adverse neighbourhood characteristics like lack of social support may increase parental stress, disrupt family functioning, and lead to negative effects on children's health (Conger et al, 1994; Elder et al, 1995). Conversely, strong neighbourhood cohesion may mitigate parental stress and strengthen family functioning, thus lead to positive associations with children's health [Conger et al, 1994; Elder et al, 1995].

Social ecology models have focused on the nested arrangement of family, school, neighbourhood, and community in which children grew up [Bronfenbrenner, 1979; Earls & Carlson, 2001; Eisenmann et al., 2008]. In these models, it has been suggested that family functioning may play two substantial roles: as a mediator that may transmit the effects of neighbourhood conditions on children's health, and as a moderator that may interact with neigh-

bourhood conditions to modify or buffer the effects of neighbourhood conditions on children's health.

The models reviewed above are complementary rather than conflicting. Regardless of the psychologically-or sociologically, these models point out that neighbourhood conditions may impact on children's health directly and indirectly. While there is a large body of empirical research examining the associations between neighbourhood conditions and children's health (Curtis, Dooley, & Phipps, 2004; Fagg et al., 2006, 2008; Franzini et al., 2009; Fortson & Sanbonmatsu, 2010), none of these studies examined the indirect pathways of which aspects of family functioning mediate between various dimensions of neighbourhood conditions and children's general health status (Sampson et al., 2002).

Family structure and family functioning

According to Pantin and colleagues (2003), the family structure has the greatest degree of influence over the various aspects of family functioning such as family conflict, cohesion, and communication are among the most powerful predictors of developmental outcomes. Olsen and Gorall (2003) in their "Circumplex model of marital and family system" explains how family functioning is characterized by the extent to which family members are emotionally bonded, effectively communicate emotions and information, and respond cooperatively and flexibly to problems.

Although theoretical research suggests that single-parent or cohabiting households are disadvantaged in most of the domains of family functioning compared to married-two-parent families (Thomson et al., 1994; Brown, 2004), there are little conclusive empirical evidences about effects of different family structure in family functioning. Some studies found significantly lower levels of family functioning in single parent households relative to two-parent households (Clark, Barrett, & Kolvin, 2000; Yeung & Chan, 2010) whereas others found none (Herzer et al., 2010; Hornberger, Zabriskie, & Freeman, 2010). In our study, we focus on assessing family functioning through different family structures e.g. one-vs two parent families and number of children under 5 years in a family unit.

Econometric model

Based on the theoretical concepts described above this study tested the hypothesis that perceptions of the family members on family functioning would diminish by the presence of social-and neighbourhood problems and the same for one parent families compared with two parent families. The study was cross-sectional in nature. The general form of econometric model used in this study is presented below:

Family Functioning_i

$$= \gamma \text{Social capital}_i + \mu \text{Family structure}_i + \beta' x_i + \mu_h + \varepsilon_i \quad (1)$$

where *Family Functioning_i* was the dependent variable which includes several dimensions of family functioning, *Social capital_i* were tested through two dummy variables which is 1 if families facing social-and neighbourhood and 0 for otherwise; *Family structure* variables represented by two variables, such as: one dummy variable which is 1 for one-parent family and 0 for two-parent family and a continuous variable for number of children in the household; x_i was a vector of control variables, representing socio-demographic information; μ_h was the unobserved location fixed effect; and ε_i was the error term. We tested a series of equations with all the different dimensions of family functioning as dependent variable which dependent on same sets of explanatory variables. The study used Ordinary least Square model (OLS model).

Data and methods

The analysis of this article used data from a multicentre, randomised controlled trial where the role of docosahexaenoic acid (DHA) on various neurodevelopmental-and growth outcomes of children born preterm at their seven years corrected age had been tested. The initial trial which includes preterm infants which ran in 5 Australian perinatal centres and 657 preterm infants recruited in 2001-2005 and included preterm infants born before 33 weeks' gestation. There were 322 infants in the treatment group (preterm infants given DHA supplementation after birth till term corrected age) and 335 infants in control group (preterm infants given usual diet till term corrected age). To avoid the biasness of the results from econometric model coming from treatment-and control groups, this study utilizes data from only control group. These preterm babies were again followed up around seven years of age through a follow-up trial. The follow-up of seven years corrected age of participants of initial trial commenced on 2008 and end in 2013. The primary outcome of the follow-up trial was published elsewhere [Collins et al, 2015].

Measures

Dependent variable:

Mothers' reported perceived family functioning is the the outcome variable of this study. Family functioning is the extent to which family members are responding cooperatively and flexibly to problems and effectively communicate emotions and information [Epstein et

al., 1983; Miller et al., 1985; Olsen and Gorall, 2003] and in this paper we utilized the Family Assessment Device (FAD) questionnaire. The FAD questionnaire comprised of a 60-item self-reported questions to assess subjects' views of own family functioning [Epstein et al., 1983]. For the analysis, to maximise robustness of our estimation, we took the sub-sample from control group of RCT data where mothers completed the questionnaire (83.25%, n=245). Mothers responded to each question by selecting a response from a four-point Linkert scale (strongly agree/ agree/ disagree/ strongly disagree). After reverse recoding the response options of positively worded statements to indicate better functioning, we summed and converted scale scores to z scores. The scale correlates predictably with alternative measures of family functioning. The general functioning scale on the FAD measures structural, organizational and interaction patterns of the family and divided into seven sub-scales. This includes problem solving, communication, roles, affective responsiveness, affective involvement, behaviour control and general functioning among family members. The problem solving scale refers to the family's ability to resolve problem within and outside the family at a level which maintains effective family functioning. The communication scale refers to whether communication in the family is clear and direct or not. The roles scale assesses how families established behaviour for handling family tasks. Affective responsiveness refers to the ability of individual family members to respond to a range of situations with appropriate quality and quality of emotions. Affective involvement scale assesses the degrees which to which family members are interested in activities of other family members. Behaviour control refers to ways in which a family expresses standards of behaviours within family. Finally, general functioning was developed to assess overall health pathology.

Independent variables:

Family structure and social capital: In order to explore the relationship between family structure, social capital and perceived family functioning, several explanatory variables were used. The family structure in this study characterized essentially by two variables: Using mothers' reports on marital status, we constructed a dummy variable for two-parent household (intact family/ new marriage/ de facto) versus one parent household (single parent/ separated) and a continuous variable for the number of children in the family. Two parent household included 459 families whereas one parent household included 112 families in the dataset. There were 43.74% of families with 1 child in the sample followed by 26.42% who had two-and 11.84 % with 3 children and 18% families with four or more children.

Social capital is addressed through two dummy variables: dummy for facing social problem and dummy for neighbourhood cohesion. This information was collected from the Recent Life Events questionnaire. This scale was taken from a paper [Brugha et al, 1985]

Table 1: Items used for neighbourhood-and social problem

Social Problem (dummy variable 1=yes in any of the following factors; 0=no)	
1.	Have you or an immediate family member been subject to serious racial abuse, attack or threats? (Yes=1; no=0)
2.	Have you, or an immediate family member been subject to any abuse, attack or threat, perhaps due to you or someone close to you having a disability of any kind (i.e. a mental health problem, a learning disability or a physical problem)? (Yes=1; no=0)
3.	Have you, or an immediate family member been subject to any other form of serious abuse, attack or threat? (Yes=1; no=0)
Neighbourhood problem (dummy variable 1=yes in any of the following factors; 0=no)	
1.	Have you had any serious problem with a close friend, neighbour or relative? (Yes=1; no=0)
2.	Have you or an immediate member of your family been burgled or mugged? (Yes=1; no=0)
3.	Have you moved house (not through choice)? (Yes=1; no=0)
4.	Have you had any housing difficulties? (Yes=1; no=0)

Table 2: Definitions and descriptive statistics for variables

Variable	Definition	Mean or %	Std. Dev.
Family Assessment sub-groups	4 points Linkert Scale (strongly agree/ agree/ disagree/ strongly disagree)		
Problem solving		1.738	0.329
Roles		2.030	0.348
Affective responsiveness		1.633	0.449
Affective involvement		1.839	0.400
Behaviour control		1.529	0.343
Communication		1.834	0.377
General functioning		1.529	0.343
Social Capital	dummy variable 1=yes households faced any social-or Neighbourhood problem (define in Table 1); 0=no		
Social problem		0.079	0.270
Neighbourhood problem		0.105	0.307
One parent family	If the family had single parent/separated (1=yes; 0=no)	0.018	0.385
Number of children in the Family	number	1.481	0.971
Maternal qualification	Year of education completed by mothers		
≤12 years		0.457	0.498
Certificate/ Degree/ higher degree		0.256	0.437
Maternal occupation	Mother's current employment (yes=1; 0=no)		
Professional		0.388	0.488
Trade/clerical/Labourer		0.309	0.462
Home duties		0.233	0.423
Student		0.023	0.150
Unemployed		0.006	0.081
Paternal occupation	Father's current employment (yes=1; 0=no)		
Professional		0.391	0.488
Trade/clerical/Labourer		0.460	0.499
Self-employed		0.009	0.099
Student		0.003	0.057
Unemployed		0.032	0.178
Race	Mother's race employment (yes=1; 0=no)		
Caucasian		0.931	0.254
Aboriginal		0.023	0.150
Asian		0.025	0.151
Age	Mothers' age at randomisation	31.007	5.106
Smoking/drinking	Mother smoked during pregnancy (yes=1; 0=no)	0.352	0.478

and it focused on recent life events (ie. those occurring in the last 12 months). It is intended to assist in the compilation of a social history. Respondents are asked to identify which of the events still affects them. From this scale we took the questions that were related to social problem (such as whether any family member subject to serious racial abuse, threat or attack) and to neighbourhood cohesion (such as any of the family member had any serious problem with a neighbour, had they moved house not through their choices, had they had any housing problems in the neighbourhood). Table 1 provides the definitions of social capital variables in detail.

Control variables: In the study we used a range of demographic and socio-economic variables in addition to treatment effect as control variables to rule out the spurious associations between our variables of interest and family function [Wong and Edwards, 2013]. These include: dummies for mothers' race, mothers' age, parental-education, occupation, and mothers'-smoking and drinking behaviour.

All statistical analyses were conducted using Stata 13.0 (Stata Corp, College Station, TX). P-values of 0.05 or less were considered statistically significant. Table 2 provides the definition, means and standard deviations of all variables.

Results:

Healthy vs unhealthy families

Epstein et al. (1983) and Miller et al. (1985) developed cut-off scores for each six dimensions of FAD questionnaire to differentiate between healthy and unhealthy families (ie. balanced functioning family vs poorly functioning family). Combining both theoretical and empirical objectives, families rated unhealthy whose mean scores in all sub-scales of FAD ranges between 1.85 and 2.11. Using these cut-off scores, from Table 3 it is evident that the percentage of unhealthy rating was not relatively high among the participants where mother answered the FAD questions, with the percentage of families rated as unhealthy from 6.35% in problem solving dimension to 28.22% in affective involvement dimension. Hence, overall the families in the sample were comparatively balanced functioning families except for problem solving dimension which indicates as mentioned before, refers to the family's ability to resolve problem within and outside the family at a level which maintains effective family functioning. Followed from this findings the next section of our analysis focused on the external and independent determinants which affects the family functioning.

Social capital and family structure effects on family functioning, multivariate analysis

Table 4 presents the results of the multivariate analyses where we examined how familial ties to the exosystems, the various contexts in which these unique group of children's par-

Table 3: Distribution of healthy and unhealthy scores

Family functioning dimensions	Healthy		Unhealthy	
	N (%)	Mean score	N (%)	Mean score
problem solving	243(93.65)	1.711	19(6.35)	2.421
roles	229(80.25)	1.713	63(19.75)	2.535
affective responsiveness	264(89.94)	1.568	57(10.06)	2.483
affective involvement	206(71.78)	1.658	28(28.22)	2.298
behaviour control	248(83.59)	1.410	44(16.41)	2.073
communication	238(81.48)	1.728	54(18.52)	2.379
general functioning	243(82.01)	1.431	49(17.99)	2.171

Table 4: Family structure, social and neighbourhood status as predictors of family functioning: sub-sample of mothers' completing FAD

Variables (proportion, %)	Problem solving	roles	Affective respon- siveness	Affective involve- ment	Behaviour control	Communi- cation	General function- ing
Social capital							
-Social problem (6.55)	0.115* (0.045)	0.021 (0.748)	0.122 (0.065)	0.034 (0.200)	-0.039 (0.469)	-0.045 (0.339)	-0.039 (0.536)
-Neighbourhood problem (13.26)	0.098* (0.039)	0.171* (0.000)	0.138* (0.023)	0.128* (0.037)	0.037 (0.272)	0.096 (0.093)	0.064 (0.175)
Family structure							
-One-parent (19.61)	0.029 (0.585)	0.131* (0.009)	-0.011 (0.835)	0.139* (0.010)	0.025 (0.626)	0.132* (0.002)	0.025 (0.605)
-two-parent family †							
-No of Children	-0.043* (0.017)	0.023 (0.203)	-0.043 (0.288)	-0.006 (0.972)	-0.011 (0.577)	-0.025 (0.182)	-0.011 (0.552)
Hospital fixed effect	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes
Observations	245	245	245	245	245	245	245
R-squared	0.129	0.223	0.118	0.023	0.008	0.039	0.008

Note: Regression are controlled for treatment effect, mothers' age, primary language spoken at home, number of adults at home, parental education, occupation, Mothers' smoking and drinking behaviour;

Table presents marginal effects for the OLS models

p-values in the parentheses

† Reference group.

ents circulate, affect family functioning. The variables that we were interested to focus on were social network, neighbourhood, one-vs two parent families and number of children in the household. What is clear from Table 2 is that there are considerable variances in significance of different covariates in different dimensions of FAD questionnaire.

In the study we considered two variables such as social-and neighbourhood problems indicators for functional family. Out of seven dimensions, in four dimensions, such as: problem solving (p value 0.039), roles (p value<0.000), affective responsiveness (p value 0.023) and affective involvement (p value 0.037) the results suggested that family functioning worsen significantly with the presence of neighbourhood problem. In problem solving- (p

Table 5: Family structure, social and neighbourhood status as predictors of family functioning: subsample of very pre-term infants (birthweight > 1250 gm)

Variables (proportion, %)	Problem solving (p-value)	roles (p-value)	Affective responsiveness (p-value)	Affective involvement (p-value)	Behaviour control (p-value)	Communication (p-value)	General functioning (p-value)
Social capital							
-Social problem (6.55)	0.057 (0.680)	0.107 (0.383)	-0.092 (0.403)	-0.155 (0.282)	-0.040 (0.610)	-0.053 (0.687)	-0.040 (0.636)
-Neighbourhood problem (13.26)	0.045 (0.608)	0.204* (0.011)	0.198* (0.016)	0.189* (0.014)	0.122 (0.276)	0.146* (0.019)	0.122 (0.285)
Family structure							
-One-parent (19.61)	0.021 (0.845)	0.312* (0.033)	-0.039 (0.758)	0.093 (0.709)	-0.021 (0.729)	-0.031 (0.712)	-0.022 (0.818)
-two-parent family †							
-No of Children	-0.023 (0.564)	0.037 (0.191)	-0.032 (0.407)	0.019 (0.586)	0.022 (0.425)	0.002 (0.926)	0.021 (0.564)
Hospital fixed effect	yes	yes	yes	yes	yes	yes	Yes
Controls	yes	yes	yes	yes	yes	yes	Yes
Observations	111	111	111	111	111	111	111
R-squared	0.202	0.143	0.115	0.172	0.121	0.018	0.121

Note: Regression are controlled for treatment effect, mothers' age, primary language spoken at home, number of adults at home, parental education, occupation, Mothers' smoking and drinking behaviour;

Table presents marginal effects for the OLS models

† Reference group.

value 0.045) and affective involvement (p value 0.050) dimensions social problems also had a significant impact on family functioning. Secondly, in role- (p value 0.009) and affective involvement (p value 0.010) dimensions family functioning worsens significantly for one-parent family compared to two-parent family. The number of children in the family which was as an indicator of family structure was significant for problem solving (p value 0.017) dimension where it showed that family functioning improved with the presence of children fewer than six years of age in the household. There were no significant effect of either social capital or family structure on behaviour control and general functioning of the family.

Supplementary analysis with very pre-term infants

Following Treyvaud et al. (2014) and Linden (2015) works, for mothers' completed FAD questionnaire, we checked if the effect of social capital and family structure factors on family functioning could be different for children at seven years of age who born very pre-term (birth weight < 1250 gm). Results from Table 3 showed that similar to whole sample analysis, for children born very pre-term, out of seven dimensions, in four dimensions: roles (p value 0.011), affective responsiveness (p value 0.016), affective involvement (p value 0.014) and communication (p value 0.019) that family functioning worsen significantly with the presence of neighbourhood problem.

Discussion:

We analysed a large national sample from Australia of children at seven years of age born pre-term. We tested the relevance of social capital and family structure for explaining the variations in different aspects of mothers' perception of family functioning. To capture family functioning we used data from FAD questionnaire. Although the literature on the relationship between socio-economic, societal conditions and children's health is substantial and there exists literature on relationship between having a preterm child and parental stress [Treyvaud et al., 2014 and Linden, 2015], there has been less research on the aspects of relationships between social cohesion and family process for the families who have children born preterm.

Our results showed that out of seven dimensions of FAD questionnaire, in four dimensions (problem solving, roles, affective responsiveness and affective involvement) family functioning worsen significantly with the presence of neighbourhood problem. In problem solving and affective involvement dimensions social problems also had a significant impact on family functioning. Our findings regarding impact of one parent-vs two parent households resembled with those other literatures [Clark et al., 2000; Yeung and Chan, 2010]. The results from the current study suggest that even after seven years of having a preterm baby, single parent families facing problems in terms of how families established behaviour for handling family tasks (role dimension in FAD) and the ability of individual family members to respond to a range of situations with appropriate quality and quality of emotions (affective responsiveness dimension in FAD). A possible explanation with regard to this finding would be that as in one-parent families there was often no one to share responsibilities and decision-making thus parents might have less time to involve themselves more in role playing and in exhaustive involvement in other family matters.

The strengths of this study include the blinded randomization process of the clinical trial where the data has been collected, large representative sample size for Australia, the assessment of various aspects of family functioning, social and neighbourhood cohesions by using standardized tools and exploration of a variety of socio-economic determinants. Additionally, as the questionnaires used in the study represent individuals' own perceptions, in order to maximize the consistency of the results, we only include the sample where mothers' completed the questionnaires and this participation rate is high (83.25%). In terms of policy implications, this study confirmed the role of several exosystems such as neighbourhood cohesion and family structure on effective family functioning. Families with with seven years children who born pre term needs supports from the neighbourhood and close friends as well from partners within the families. The findings of this study demonstrate

the importance of exploring the mediating roles of social capital and family structure for efficient family functioning for different types of families with different health and social issues.

Nevertheless, there were some methodological limitations in our study. First limitation is that due to cross-sectional data, no causal relationship between variables could be drawn. Second, while only looking at mothers' view on family functioning increase the robustness of the analysis, research has shown that children also have important insights about their families and are able to identify problems within the family [Skinner et al., 1983]. As such, because of these two limitations, the assessment in the study was lacking the developmental changes in the family life cycle. Lastly, there might be other factors in the exosystems such as workplace as an important context affecting family functioning especially where the family have some special need [Marcie et al., 2006]. Further studies on how other exo-system ties strengthen or inhibit family functioning across different family types would be encouraged. Nevertheless, our findings suggested that with various external supports, parents and families of a preterm child could be helped to accommodate the challenges they needed to face for behavioural problems associated with pre-term birth which continue with age.

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