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Physical and psychological conditions of parental chronic illness, parentification and adolescent psychological adjustment

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ABSTRACT

Objective: We examined the differential predictive powers of physical and psychological impacts of parental physical illness, as well as both instrumental and emotional aspects of parentification, on adolescent distress.

Design: Forty-seven parents with chronic physical illness and 132 adolescent children completed separate questionnaires that measured parental health conditions and adolescents' parentification, peer attachment, and psychological distress.

Main findings: Ill parents' energy/fatigue level was not related to adolescent distress, but ill parents' emotional well-being was directly associated with adolescent distress. Adolescents' household responsibilities were not linked to their distress level; however, higher levels of emotional parentification appeared to affect their psychological adjustment. Higher quality of peer attachment was related to lower adolescent distress.

Conclusions: The results highlight the importance of addressing and fostering physically ill parents' psychosocial adjustment and emotional availability, restoring a sense of normalcy in family adaptation processes, and facilitating emotional support for adolescents, including positive parent-child relationship and peer attachment.

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Parental illness; parentification; peer relationship; distress; adolescent

Introduction

Approximately 10% of children worldwide grow up in households where a parent has been diagnosed with medical chronic illness (Sieh, Visser-Meily, & Meijer, 2013). According to the National Council on Disability, more than 6 million children in the United States had a parent with a disability (cited in Lu, 2015). Moreover, close to 1 million U.S. children ages 8 to 18 engaged in caregiving responsibilities for a parent with a chronic medical condition or disability (National Alliance for Caregiving & United Hospital Fund, 2005). However, these children are often invisible or neglected in clinical practices and research, and they receive limited attention and professional

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assistance (Bjorgvinsdottir & Halldorsdottir, 2014). Parental chronic illness is a stressful event for children and adolescents (Pedersen & Revenson, 2005). Emerging empirical studies have suggested that children and adolescents of chronically ill parents are at an increased risk for adjustment difficulties and psychosocial problems (Chen, 2017; Pakenham & Cox, 2014).

Several ecological systems-based theories, including Rolland's (1999) family systems model and Hocking and Lochman's (2005) transactional stress and coping model for child adjustment to parental chronic illness, suggest that parental illness characteristics (e.g. type of illness, severity, presence of disability, onset, course, etc.) affect child and adolescent adjustment through various family adaptation processes. Furthermore, Sieh, Oort, Visser-Meily, and Meijer (2014) argued that the relationship between parental illness characteristics and family functioning is mediated by physical, social, emotional, and psychological impacts of an illness on ill parents. As ill parents' daily functioning is affected or altered by an illness and the demands associated with managing illness related activities, role and responsibility redistribution among family members is often needed. Some research has suggested such role reversal in children and adolescents, who have to take on more family responsibilities or assume a more adult-like role that are not congruent with their age, is associated with higher adjustment distress (Pakenham & Cox, 2015; Van Loon, Van de Ven, Van Doesum, Hosman, & Witteman, 2017). The purpose of this study aimed to examine the relationships between different aspects of impact on ill parents' functioning as a result of a chronic physical illness, role reversal, and adolescent distress. In addition, this study examined the potential role of extrafamilial support (i.e. peer attachment) in adolescent distress. This study focused on adolescent adjustment, as adolescents may be more cognitively aware of their parents' health conditions and may take more family responsibilities than younger children in the event of parental illness, making them more vulnerable to adjustment problems.

Impact of illness on ill parents

According to Sieh et al.'s (2014) modified transactional stress and coping model for children with parental chronic medical condition, which was based on the ecological systems model (Bronfenbrenner, 1979), parental illness affects ill parents' quality of life in various domains, including physical (e.g. body pain, fatigue, physical role limitations, etc.) and psychosocial (e.g. social isolation, emotional role limitations, depression, etc.) functioning. Furthermore, this model suggested that parental physical illness affects child adjustment through those physical and psychosocial impacts of an illness on ill parents.

Physical impairment

Parental chronic illness often leads to physical limitations of the ill parent, including low stamina and low mobility (Duryea, 2008). These physical impairments can affect an ill parent's functional independence, resulting in physical and emotional role restrictions (Chen & Fish, 2013; Rolland, 1999). Symptoms, such as pain and fatigue, are often experienced by those with chronic illness, and can significantly impact

familial functioning by affecting personal and social relationships between members (Janotha, 2011). However, the relationship between energy level of chronically ill parents and children's psychosocial adjustment has rarely been studied. Some limited research noted that parental fatigue is related to decreased parental self-efficacy, irritability and lack of patience for their children (Chau & Giallo, 2015). For example, Haynes-Lawrence and West (2018) found that parents with multiple sclerosis experiencing fatigue were often unable to engage or deal with behavioural issues exhibited by their children. Since research shows that parental engagement and support is positively correlated with decreased externalising behaviours, and positive self-esteem and adjustment (Hoskins, 2014), it is possible that low energy experienced by parents with chronic illness may significantly impact children's psychological adjustment.

Emotional well-being

Although the psychological characteristics of a physical illness are often considered invisible or secondary, the impact of physical illness on chronically ill parents' emotional and psychological well-being has been well documented in the literature (Sieh, Dikkers, Visser-Meily, & Meijer, 2012). For example, research has found a common concurrence of physical illness and depression (Kang et al., 2015; Steck et al., 2007). Moreover, previous studies found that chronically ill parents' psychological well-being was strongly related to children's psychosocial well-being. Lower levels of parental well-being were related to poorer child outcomes, including increased psychological distress, diminished self-esteem and poor social functioning (Armistead, Klein, & Forehand, 1995; Lewis & Hammond, 1996).

Some theoretical models (e.g. Armistead et al.'s child adjustment to parental illness model) and empirical studies (Lewis & Hammond, 1996) suggested that parental illness affects child internalising problems by operating through parental depressive symptoms (Steele, Forehand, & Armistead, 1997). According to Pakenham and Cox (2012a), chronically ill parents' psychological and emotional states may affect family functioning (e.g. emotional availability, parent-child relationship, family conflicts, etc.), which in turn mediates the effects onto child and adolescent adjustment. For example, Schmitt et al. (2008) reported that depression in a parent with cancer was a significant predictor of impaired familial functioning, which related to internalising problems in their children. Similarly, children's psychological functioning was significantly correlated with parental depression and caregiver strain in Visser-Meily et al.'s (2005) study involving children of parental stroke.

Parentification

According to the family systems model, families go through different phases in their life cycle and each new phase posits a potential threat to its organisation (Minuchin, 1974). When facing new challenges, families have to adapt or alter family patterns in order to preserve the system (Rolland, 1999). To meet the demands of parental physical illness, families often have to redistribute roles and functions among family members (Ashen, 1985). Children and adolescents of parents with chronic physical illness often take on extra responsibilities within their household (Grabiak, Bender, & Puskar,

2007). When a child takes on a parental role within the family, it is considered parentification. The term *parentification*, which was introduced by family systems theorists (Minuchin, Montalvo, Guerney, Rosman, & Schumer, 1967), has been used interchangeably with alternative terms such as *adultification*, *spousification*, *role reversal*, and *young caregivers* in the literature (cited in Hooper & Wallace, 2010).

Research has found that parental functional impairment and energy have a large effect on childhood parentification. Duryea (2008) reported that children whose mothers felt more burdened by their illness reported higher levels of parentification. Similarly, higher levels of parental disability, disease severity and parental mental health problems were found to be related to higher youth caregiving in several studies (Ireland & Pakenham, 2010; Kallander et al., 2018; Pakenham & Bursnall, 2006; Pakenham & Cox, 2012b).

The parentification process can take two routes, instrumental or emotional caregiving. Instrumental parentification relates closely to household responsibilities and logistical support (e.g. grocery shopping, cooking, house cleaning, etc.), where emotional parentification leads to children providing affective modulation or support to their ill parent (i.e. helping parents and siblings modulate affectively; Earley & Cushway, 2002). The literature has suggested that it is important to differentiate between types of parentification to allow for greater understanding of their specific effects of different roles and responsibilities on children and adolescents (Hooper & Wallace, 2010). Some research suggested that emotional parentification, compared to instrumental parentification, appears to be more closely related to children's emotional distress and psychosocial adjustment (Hooper & Wallace, 2010). When children are thrust into confidant or problem-solving roles for their parents, healthy emotional development may be disrupted, leaving children vulnerable for psychological problems, including anxiety and depression (Fitzgerald, 2005).

Peer relationship

While the family ecological system has a significant impact on children's psychological distress and functioning, according to Bronfenbrenner's (1979) ecological model the ecological systems outside the family environment can also significantly affect children's psychological adjustment. The support from children's school and social environments may be especially important when the stability of family systems is under attack due to parental chronic illness. For example, research has suggested that positive peer relationships may serve as a protective factor against adverse family relationships (Criss, Pettit, Bates, Dodge, & Lapp, 2002). Peer relationship is recognised as one of the most salient and important features of adolescence (Brown & Larson, 2009), and it is related to mental health and psychological adjustment (La Greca & Harrison, 2005). Peers may serve as confidants with whom children can talk about their life challenges and provide psychological support (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007). However, there is a dearth of research observing the relationship between peer relationships and psychosocial functioning among children and adolescents of chronically ill parents.

The present study

Guided by the ecological systems model and family ecological frameworks, this study examined the effects of parental illness on youth adjustment by examining the relationships between physical and psychosocial impacts of a chronic physical illness on ill parents, instrumental and emotional parentification, and adolescent distress. Sieh et al.'s (2014) model particularly highlighted the importance of addressing the impacts of illness on ill parents' daily functioning, rather than focusing on the illness itself, in order to understand the pathways in which parental illness affects adolescent adjustment. However, few empirical studies have addressed the effects of parental illness on adolescents through the lens of parental functional impairment in both physical and psychosocial domains. This study measured ill parents' energy/fatigue level and emotional well-being to represent the physical and psychological impacts of an illness on ill parents, respectively. To further close the gap in the literature, this study examined both instrumental and emotional aspects of parentification to differentiate their potential effects on adolescent adjustment. Lastly, little research is known about how extrafamilial support or relationships may mediate adjustment difficulties experienced by adolescents of ill parents. We examined the role of adolescent peer attachment in dealing with parental chronic illness in this present study.

We hypothesised that chronically ill parents' health conditions, including both physical and emotional functioning, would be associated with adolescents' psychological distress. In addition, higher levels of instrumental and emotional parentification would affect adolescents' distress. Finally, adolescents with positive peer attachment would have lower levels of psychological distress.

Method

Participants

We included middle and high-school aged adolescents who lived with at least one parent with a chronic illness in this study. The sample of this study included 132 (80 male and 52 female) adolescents from 47 families. Most families consisted of married parents (61.7%), and 10 families were counted as single parent household (21.3%). Adolescents' mean age was 14.38 ($SD = 2.03$). The majority of the adolescents identified as Asian and Pacific Islander (48.5%) or White/Caucasian (43.9%). Parental primary illness included multiple sclerosis (19.1%), Type I diabetes (6.4%), Type II diabetes (19.1%), chronic pain (25.5%), cancer (17.0%) and others (e.g. asthma, cardiovascular disease/heart disease, fibromyalgia, lupus, Lyme disease and Crohn's disease) (14.9%). The demographic characteristics of the sample are presented in Table 1.

Measures

Parental health

Physical and emotional impacts of an illness on ill parents were assessed by the *Energy/Fatigue* (4 items) and *Emotional Well-being* (5 items) subscales of the Medical Outcome Study Questionnaire Short-Form Health Survey (MOS SF-36; Ware &

Table 1. Demographic characteristics of sample.

	n (%)	*M* (*SD*)
Adolescents	132	
Gender		
Male	80 (60.6)	
Female	52 (39.4)	
Age		14.38 (2.03)
Grade level		
6th	19 (14.4)	
7th	22 (16.7)	
8th	14 (10.6)	
9th	24 (18.2)	
10th	22 (16.7)	
11th	16 (12.1)	
12th	13 (9.8)	
Other	2 (1.5)	
Race/ethnicity		
Asian and Pacific Islander	64 (48.5)	
Black/African American	8 (6.1)	
White/Caucasian	58 (43.9)	
Mixed/biracial/multicultural	2 (1.5)	
Ill parents	47	
Gender		
Male	24 (51.0)	
Female	23 (49.0)	
Age		42.59 (5.39)
Martial status		
Single	10 (21.3)	
Cohabited	2 (4.3)	
Married	29 (61.7)	
Separated	1 (2.1)	
Divorced	4 (8.5)	
Widowed	1 (2.1)	
Household income (US Dollar)		
$20,000 or under	2 (4.3)	
$20,001–35,000	13 (27.7)	
$35,001–75,000	21 (44.7)	
$75,001–100,000	8 (17.0)	
$100,000 and over	1 (2.1)	
Other	2 (4.3)	
Parental primary diagnosis		
Multiple sclerosis (MS)	9 (19.1)	
Type I diabetes	3 (6.4)	
Type II diabetes	9 (19.1)	
Chronic pain	10 (25.5)	
Asthma	2 (4.3)	
Cancer	8 (17.0)	
Cardiovascular disease	1 (2.1)	
Fibromyalgia	1 (2.1)	
Lyme disease	1 (2.1)	
Lupus	1 (2.1)	
Crohn's disease	1 (2.1)	

Sherbourne, 1992). Sample items for the Energy/Fatigue subscale include: 'Did you have a lot of energy?' and 'Did you feel tired'. Sample items for Emotional Well-being subscale include: 'Have you felt so down in the dumps that nothing could cheer you up?' and 'Have you felt calm and peaceful?' Parents rated each item on a 6-point scale, ranging from 1 (all of the time) to 6 (none of the time). The scores were weighted and transformed following the RAND 36-item Healthy Survey 1.0 scoring method (RAND Health Care, n.d.). A mean subscale score was obtained by averaging the

corresponding items. Higher scores represent less disability and higher functioning. In this study, the alphas were .64 and .86 for the *Energy/Fatigue* and *Emotional Well-being* subscales, respectively.

Psychological distress

To assess adolescent psychological distress, adolescent children completed the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977), a widely used 20-item measure of psychological problems on a continuum from well-being to depression (Siddaway, Wood, & Taylor, 2017). This measure has been used with adolescents in several studies (e.g. Ozer et al., 2009; Phillips et al., 2006). Sample items include: 'I had trouble keeping my mind on what I was doing', 'I felt fearful' and 'I felt lonely'. Each item is rated according to its frequency of occurrence using a 4-point Likert-type scale, ranging from 0 (*none of the time/rarely*) to 3 (*almost all the time/most*). Positive items were reverse scored. A mean score was obtained by averaging the 20 item responses, with higher scores representing higher levels of depressive symptomatology. Extensive support for the internal consistency and validity of the CES-D has been well documented in the literature (cited in Siddaway et al., 2017). The CES-D demonstrated good internal consistency in the current adolescent sample ($\alpha = .90$).

Parentification

Two aspects of parentification were assessed in this study: instrumental and emotional parentification at home.

Instrumental parentification. We developed a 22-item scale for this study to measure adolescent instrumental parentification by assessing their involvement in household chores and responsibilities. The items included in this scale were primarily selected and modified from the Children Helping Out: Responsibilities, Expectations and Support measure (Dunn, 2004), the Sibling Responsibility Questionnaire (Fishbein, 2010) and the scale used in Riggio, Valenzuela, and Weiser's (2010) study. In addition, we added items that were more specific to illness related caregiving activities, such as scheduling appointments for family members and caring for or looking after (e.g. washing, feeding, dressing) an adult family member. Adolescent participants indicated the frequency of involvement to each item, ranging from 1 (*never = I never perform this activity*) to 5 (*almost always = I perform this activity almost everyday or more than once a day*). Sample items include: 'do family members' laundry', 'prepare snacks and/or meals for family members', 'help a sibling with homework' and 'accompany family members to appointments' (e.g. doctor's visit, school meeting, etc.). A mean score of the 22 item scores was calculated, with higher scores representing high levels of instrumental parentification. The internal consistency alpha of .93 was obtained in this study.

Emotional parentification. The 10-item *Emotional Parentification* subscale of the Parentification Questionnaire-Youth Version (PQ-Y; Godsall & Jurkovic, 1995) was used to measure emotional parentification. Adolescent participants indicated their engagement in emotional caregiving responsibilities in their family by responding 0 (*no*) or 1

(*yes*) to each item. Sample items include: 'I often feel like a referee in my family', 'I often feel more like an adult than a child in my family' and 'I feel I'm asked too often to take care of some other family member'. A total score was calculated by adding up all 10 item responses, with higher scores indicating greater levels of 'destructive parentification' (Godsall, 1995). Adequate internal consistency and construct validity of the 20-item PQ-Y have been reported in the literature (Godsall, 1995; Green, 2001; cited in Fitzgerald, 2005). Moderate internal consistency reliability ($\alpha = .60$) of the 10-item *Emotional Parentification* subscale was reported in Fitzgerald's (2005) study. For this study, the internal consistency as measured by Kuder-Richardson reliability coefficient was .72.

Youth peer relationship. The 10-item *Trust* subscale of Peer Version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) was used to assess adolescents' relationship with their peers. This subscale was chosen because its items, which appear to focus on the strength of friendship, were more closely aligned with the purpose of this study than those of the other subscales of the IPPA. Sample items include: 'I can count on my friends when I need to get something off my chest' and 'my friends respect my feelings'. Adolescents rated their relationship with their peers on a 5-point scale, ranging from 1 (*almost never or never true*) to 5 (*almost always or always true*). Mean scores of the corresponding item responses were calculated, with higher scores representing higher levels of positive attachment and relationship with peers.

Support of adequate psychometrics of the IPPA has been documented in the literature (Li, Delvecchio, Miconi, Salcuni, & Di Riso, 2014; Pace, San Martini, & Zavattini, 2011). An adequate internal consistency reliability was reported for Peer version ($\alpha = .92$) of the IPPA in Armsden and Greenberg's (1987) study. In the current study, the internal consistency alpha was .88 for the Trust subscale.

Procedure

This study is part of a larger, ongoing project that investigates the effects of parental health on children's functioning. After obtaining permission from the university institutional review board, the first author used a variety of methods, including flyers, online postings on social media, and emails to social agencies and organisations (e.g. National Association of Multiple Sclerosis) that serve patients with chronic illness, to recruit parents and adolescents as our research participants. The participant recruitment information was disseminated by the approved organisations through their publications and online announcement. Parents completed an online Parent Health Survey that asked their health status, and they were asked to provide their adolescent children's email addresses for the Youth Survey link to be sent. Adolescents completed a separate online questionnaire that asked their household responsibility, emotional role in the family, relationships with others, and psychological and educational states. Both Parent Heath Survey and Youth Survey were conducted via the SurveyMonkey online platform. Parent and adolescent participants were compensated with a $15 gift cards for participating in the study.

For the purpose of this study, only parents who indicated that they had been diagnosed with a physical illness were included in this study. In addition, only families that completed both Parent Health Survey and Youth Survey were included in the study, resulting in a sample of 47 ill parents and 132 adolescents from 47 families.

Data analyses

We use mixed linear modelling of STAT/SE version 15.0 to conduct multilevel regression analyses in order to answer our research questions. Due to the fact that adolescents were nested within the family in this study, we entered adolescents as Level 1 and the family as Level 2 in the following analyses. We first examined the role of ill parents' gender on adolescent distress level in Model 1. In the second model, we added parental illness variables, including parental energy and emotional well-being (Model 2). Model 3 concerned adolescent parentification variables (i.e. instrumental parentification and emotional parentification). Adolescent peer relationship was added to the Model 4 as a predictor.

Results

Several independent variables, including parental emotional well-being ($r = -.32$, $p < .001$), adolescent emotional parentification ($r = .29$, $p < .001$), and adolescent peer relationship ($r = -.42$, $p < .001$), had a significant correlation with adolescent distress (see Table 2), with a medium effect size. The results indicated that higher quality of parental emotional well-being, lower levels of adolescent emotional parentification, and higher levels of adolescent peer relationship were moderately associated with lower levels of adolescent distress. Parental energy was, however, correlated with adolescent distress at a marginally significant level ($r = -.17$, $p = .054$), with a small effect size.

About half of the correlations between the predictors were significant, ranging between small and medium effect size. A significantly large correlation was found between parental energy and parental emotional well-being ($r = .83$, $p < .001$), indicating that ill parents who had more energy and experienced less fatigue showed higher levels of emotional well-being. A large correlation between adolescent instrumental parentification and emotional parentification ($r = .56$, $p < .001$) indicated that adolescents who had to take on more household responsibilities tended to experience higher levels of emotional role reversal. Parental illness variables were associated with adolescent parentification, with the sizes of correlation ranged between small to medium. Parental energy level ($r = .48$, $p < .001$) and parental emotional well-being ($r = .38$, $p < .001$) had a moderate relationship with adolescent instrumental parentification, and they had a small relationship with adolescent emotional parentification; $r = .25$, $p = .004$ and $r = .19$, $p = .026$, respectively. A positive, although small, relationship was found between parental emotional well-being and adolescent peer relationship ($r = .23$, $p = .007$). Adolescents' age showed some small correlations with adolescent instrumental parentification ($r = .25$, $p = .004$) and emotional

Table 2. Correlations between adolescent age, distress, peer relationship, parentification and physical and emotional impacts of an illness on ill parents.

	1	2	3	4	5	6	7
1 Adolescent distress	–						
2 Parental energy	−.17†	–					
3 Parental emotional well-being	−.32***	.83***	–				
4 Adolescent instrumental parentification	.01	.48***	.38***	–			
5 Adolescent emotional parentification	.29***	.25**	.19*	.56***	–		
6 Adolescent peer relationship	−.42***	.12	.23**	.10	−.07	–	
7 Adolescent age	−.12	−.04	.06	.25**	.19*	.07	–
Range	.15–2.45	0–90	8–100	1.64–4.77	0–9	2.60–5.00	10–18
Mean	.70	33.33	51.79	2.97	3.49	4.19	14.38
SD	.46	25.82	28.58	.71	2.35	.58	2.03

$N = 131–132$.
†$p < .10$.
*$p < .05$.
**$p < .01$.
***$p < .001$.

parentification ($r = .19$, $p = .029$), indicating that older children tended to have more household chores and experienced higher levels of emotional role reversal.

The results of MONOVA (Table 3) indicated that some study variables varied as a function of ill parents' gender, with ill mothers reported higher levels of energy and emotional well-being than did ill fathers in the sample, and adolescents of ill mothers reported marginally higher levels of distress than those of ill fathers. Adolescents' gender was not related to other predictors, except for a borderline significant correlation with parental energy level.

The results of multilevel regression analyses are presented in Table 4. We estimated an empty model, using only the random intercept and the family as the grouping variables. The intro-class correlation coefficient (ICC = .63) suggested that random children in the same random family shared about 63% of the variability in predicting adolescent distress.

We entered the gender of ill parents into Model I as a predictor of adolescent distress, while controlling for adolescents' gender and age. The gender of ill parents did not directly predict adolescent distress. Parental illness variables were entered into Model 2, and the results suggested that parental emotional well-being was significantly linked to adolescent distress level. Model 3 was used to test the effects of adolescent parentification variables, and the results revealed that adolescent emotional parentification added a unique contribution in explaining the variability in adolescent distress, in addition to parental emotional well-being. Lastly, Model 4 included adolescent peer relationship. Again, parental emotional well-being, adolescent emotional parentification, and adolescent peer relationship had a significant association with adolescent distress level. It was noted that gender of ill parents became a significant predictor in Model 3 and Model 4. We used Akaike Information Criterion (AIC) to determine the model fit of Model 1 to Model 4, and the results indicated that Model 4 was the best fit model and it improved from the empty model.

Overall, the results showed that parental emotional well-being, adolescent emotional parentification, and adolescent peer relationship were linked to youth distress level. The gender of ill parents might have an intricate relationship with adolescent distress level.

Table 3. MONOVA results of ill parents' and adolescents' gender differences on impacts of an illness on ill parents, parentification, adolescent peer relationship and adolescent distress.

	Ill parent's gender					Adolescent gender				
	Type III sum of squares	*df*	Mean square	*F*	Sig.	Type III sum of squares	*df*	Mean square	*F*	Sig.
Adolescent distress	.78	1	.78	3.793	.054†	.33	1	.33	1.568	.213
Parental energy	10,949.66	1	10,949.66	18.495	.000***	2370.64	1	2370.64	3.627	.059†
Parental emotional well-being	14,555.39	1	14,555.39	20.440	.000***	1333.09	1	1333.09	1.640	.203
Adolescent instrumental parentification	.96	1	.96	1.879	.173	.44	1	.44	.867	.353
Adolescent emotional parentification	1.21	1	1.21	.217	.642	4.41	1	4.41	.798	.373
Adolescent peer relationship	.67	1	.67	2.010	.159	.01	1	.01	.039	.844

†$p < .10$.
***$p < .001$.

Table 4. Results of multilevel regression analyses of study variables.

	Empty model		Model 1		Model 2		Model 3		Model 4	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Intercept	.76***	.06	.54†	.30	.73*	.29	.68*	.27	1.21**	.37
Level 1 variance	.13	.03	.12	.03	.10	.03	.07	.02	.04	.02
Level 2 variance	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Adolescent gender			.06	.06	.06	.06	.01	.06	.01	.06
Adolescent age			−.01	.01	−.00	.01	−.01	.01	−.01	.02
Gender of ill parent			.15 [−.08, .38]	.12	.21†	.11	.27**	.10	.30**	.09
Parental energy					.00 [−.00, .01]	.00	.00	.00	.00	.00
Parental emotional well-being					−.01** [−.02, −.00]	.00	−.01**	.00	−.01**	.00
Adolescent instrumental parentification							−.04 [−.17, .08]	.06	−.03	.06
Adolescent emotional parentification							.08*** [.05, .12]	.02	.08***	.02
Adolescent peer relationship									−.14** [−.27, −.01]	.07
AIC	123.35		126.60		121.91		103.90		100.93	

Note: Numbers in [] represent 95% of confidence intervals of fix effects. The AIC of Model 2 to Model 4 showed that the model fit improved when compared to the empty model.
†$p < .10$.
*$p < .05$.
**$p < .01$.
***$p < .001$.

Discussion

This study investigated the predictive powers of chronically ill parents' gender, physical and emotional impacts of a chronic illness on ill parents, adolescent parentification and peer relationship on adolescents' psychological distress. Ill parents' physical condition, as measured by their energy/fatigue level, did not appear to be linked to adolescent distress level. However, ill parents' emotional well-being was directly related to their adolescent children's distress. While adolescents' household responsibilities were not linked to distress level, higher levels of emotional parentification appeared to affect their psychological adjustment. Adolescent peer relationship appeared to be a protective factor as higher quality of peer relationship was associated with lower psychological distress. The overall results appeared to partially support the family ecological models of parental illness (Pedersen & Revenson, 2005; Sieh et al, 2014) and ecological systems theory (Bronfenbrenner, 1979), which suggest that illness characteristics (e.g. diagnosis, severity, functional impact of illness, etc.) may affect child and adolescent adjustment through individual and family mediators (e.g. family role redistribution, adolescent stress response, etc.). Our study revealed that certain characteristics and impacts of illness appear to affect adolescent adjustment more than some others, and different aspects of family role redistribution may be related to adolescent distress differently.

Our results are partially aligned with the literature suggesting that the severity and impact (e.g. disability and functional impairment) of parental illness may affect family processes, which predict child outcomes (e.g. Chen & Fish, 2013; Kotchick, Summers, Forehand, & Steele, 1997; Pedersen & Revenson, 2005; Steele et al., 1997). However, only psychological impact of parental illness was related to adolescent distress, and the physical impact of illness was not. It is important to note that the physical impact of illness was only assessed by the ill parents' energy/fatigue level in this study. Nonetheless, our results highlight the importance of addressing the psychological and emotional aspects of physical illness, which are often ignored or considered secondary to the more obvious physical impairments of illness. This is aligned with Razaz et al.'s (2016) study involving parents with multiple sclerosis, in which mental comorbidity was associated with an increased risk in children's development. Similarly, Steele et al. (1997) found that parental chronic illness affected children's internalising problems by operating through parental depression. According to Pakenham and Cox (2012a), chronically ill parents' psychological and emotional states may affect family functioning, which in turn mediates the effects onto youth adjustment.

Research has identified parentification as a common phenomenon in families experiencing parental chronic illness, primarily through theoretical assumptions and qualitative observations. Few studies (e.g. Pakenham & Cox, 2012a), however, have addressed the effects of parentification quantitatively. Our study quantified parentification and examined both instrumental and emotional aspects of parentification. The results of our study highlight the differential effects of instrumental and emotional parentification. As Thomas et al. (2003) pointed out that providing assistance with domestic duties is not equivalent to parenting or role reversal. Our study suggested that emotional parentification, compared to instrumental parentification (e.g.

household responsibilities), appears to play a more significant role in understanding children and adolescents' psychological distress and adjustment.

Social support from various sources is an important protective factor for children's psychological well-being in the event of parental chronic illness (Chi & Li, 2013; Pedersen & Revenson, 2005). Particularly, our findings are consistent with available, although limited, research addressing the role of extrafamilial (e.g. school, friends, etc.) social support in children's psychosocial adjustment as a result of parental physical (Kotchick et al., 1997) and mental illness (Grové, Reupert, & Maybery, 2015). Maintaining a positive connectedness and attachment with friends and peers, while facing the challenges and potentially increased family responsibilities at home derived from parental illness, may provide a sense of normalcy as a teen as well as a source of support for adolescents (cited in Lu, 2015).

Interestingly, the relationship between ill parents' gender and adolescent distress level varied depending on the model in the multilevel regression analyses. Ill parents' gender did not appear to affect adolescent distress when it served as the only predictor in the model, while controlling for adolescents' gender and age. In the following models that involved other independent predictors, gender of ill parents, however, became a significant predictor of adolescent distress. The mixed results appear to reflect the general conclusion in the literature suggesting that there is no direct, strong evidence linking the age and gender of children and ill parents with child and adolescent psychosocial outcomes (Chen, 2017). Possibly, other moderating and mediating variables (e.g. parent-child relationship, reduced household income and increased financial burden, etc.) are involved in the relationship between ill parents' gender and children's psychological adjustment (Sieh et al., 2014).

Our study extends previous knowledge, addressing the importance of differentiating different aspects of health conditions and parentification in understanding the effects of parental chronic illness on adolescents' psychological well-being. Especially, the results suggest that psychological and emotional functioning of ill parents, compared to their physical condition, had a more powerful impact on adolescents' psychological outcomes. The results are consistent with general consensus among researchers and clinicians considering instrumental parentification tends to have less detrimental impact than emotional parentification (citied in Hooper & Wallace, 2010).

One main strength of this study lies in the use of multilevel analyses as grouping according to families, accounting for children within families generally sharing more similarities than those between families (Snijders & Bosker, 1999). In addition, this study included both parents and adolescents as key informants for respective data to reduce potential reporting biases by one reporter. Moreover, this study refined factors (e.g. parentification, impact of illness) that emerged as influential predictors in the literature to further explore their differential effects. In addition to familial factors, we also examined extrafamilial relations (i.e. peer attachment and support) in this study.

There are some limitations inherent in this study. Our sample size was small for the number of cases per illness diagnosis; therefore, we were unable to examine the effects of illness type. We used energy/fatigue level to represent physical impact of chronic illness in this study. The insignificant relationship between parental energy and adolescent psychological distress may have been due to the omission of other

aspects of physical impact, such as disability and illness (un)predictability and fatality. Future studies need to include various illness characteristics (e.g. diagnosis, duration and progressive course of illness, etc.) and dimensions of impact (e.g. functional impairment, physical restriction, time spent on managing illness related demands, etc.) in order to provide a comprehensive understanding of physical impact of a chronic physical illness on families and children. Also, in this study, we did not include the health status of the other parent, as well as the perceived support from the other parent, which may potentially alter the results. Other individual and family variables, such as ill parent's marital status, marital adjustment, birth order of the child, cognitive processes and coping methods of the child (e.g. appraisal of uncertainty, stress response, etc.), and family social and financial resources, which were not included in our analyses, might impact the results through different mechanisms (Chen, 2017; Pedersen & Revenson, 2005; Sieh et al., 2014). In this study, we used the CES-D scale to measure adolescent psychological distress. As this scale intends to measure psychological problems on a continuum from well-being to depression (Siddaway et al., 2017), it might not capture other aspects of emotional and psychological distress experienced by our adolescent participants (e.g. anxiety, social withdrawal and isolation, etc.). Further studies may use more comprehensive measures to address multiple aspects of emotional and psychological adjustment difficulties. The sample of this study consisted of primarily White and Asian participants living in the United States, which may limit the generalizability of the results. Further research needs to include a more comprehensive sample of parents and adolescents from diverse ethnic and racial groups to further examine whether different cultural groups respond to parental illness differently.

The findings of this study have some implications. Individuals with physical illness often experience comorbid emotional and psychological symptoms (cited in Pakenham & Cox, 2012a). Our study suggested that it is essential to assess chronically ill parents' psychological and emotional functioning, rather than simply focusing on the physical conditions of illness, when addressing the impact of parental physical illness on families and adolescent outcomes. Recommendations and interventions with an emphasis on promoting positive family functioning (e.g. parent-child relationship, communication, parenting, etc.) to support families living with parental illness have been documented in the literature (Carr & Springer, 2010; Sieh et al., 2012). Our findings further suggest that interventions should include fostering chronically ill parents' emotional availability and psychological adjustment, as the psychosocial functioning of ill parents has been viewed as a precursor to parental and family functioning (Armistead et al., 1995; Pakenham & Cox, 2012a). When addressing family functioning in interventions, emotional role reversal, in addition to the redistribution of family responsibilities, should be further assessed and discussed. Emotional parentification in adolescence may have a long-term impact on mental health (Schier, Herke, Nickel, Egle, & Hardt, 2015). Interventions should aim to facilitate adolescents' emotional support and restore a sense of normalcy. A skill-building intervention program developed by Rotheram-Borus, Lee, Gwadz, and Draimin (2001), based on cognitive-behavioural and social learning models, that focused on parents' coping with their illness and managing family issues and youth's problem solving skills and

adaptation to their parents' health conditions, is a promising model for designing an intervention.

Our findings suggest that the scope of interventions should extend beyond family functioning. Interventions should also address peer relationships and help adolescents maintain connected and form positive attachment with their friends. Online peer support programs designed for youths with parental mental illness (Rhys, Reupert, & Maybery, 2019) may be adapted to support children and adolescents of parents living with physical illness. Schools can also provide a source of emotional and instrumental supports for children and adolescents living with parental chronic illness. A review of interventions can be seen in Chen's (2017) article.

Disclosure statement

No potential conflict of interest was reported by the authors.

Ethical approval

The IRB review board at the City University of New York approved this research. We followed APA ethical guidelines when completing this paper. This paper is not currently under review at any other journal, and this research has not been published elsewhere.

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