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ORIGINAL PAPER

Childhood Abuse and Chronic Physical Health Conditions in Adulthood: A Longitudinal Analysis of Familial Support and Strain as Mediators

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Abstract
Parentally perpetrated childhood abuse is associated with physical health difficulties and familial support and strain may be possible mediators. Further, the associations among parentally perpetrated abuse in childhood, familial relationships in adulthood, and health may vary across age and gender. The current study examined familial support and strain over a 20-year period as mediators linking childhood abuse to chronic health conditions among adults, and examined gender and age as moderators. Using three waves of data from the study of Midlife Development in the United States (n = 2,377), results from a structural equation mediational model indicated that familial strain mediated the relationship between child abuse and chronic physical health problems for both men and women. On the other hand, familial support was not a mediator. Gender and age did not moderate any of the pathways. Continued relational stress over the life course appears to predict physical morbidity among adults who were abused in childhood. Clinicians may want to focus on familial strain when working with midlife and older men and women.

Keywords Childhood Abuse · Family Support · Family Strain · Physical Health · Chronic Physical Health

Chronic physical health problems are common and economically, personally, and socially burdensome. Millions of Americans have one or more chronic health conditions, defined as physical health problems that result in functional limitation, last at least one year, and require ongoing medical treatment (Center for Disease Control, N.D.). Such conditions cost an estimated 3.8 trillion dollars annually with approximately 3.4 trillion dollars being attributable directly to treatment (Center for Disease Control, N.D.). Consequently, it is imperative that areas of risk and resilience are identified to inform both prevention and intervention efforts, and familial relationships can be both sources of risk and resilience. Familial relationships can be characterized by people who are related by blood, adoption, kinship relationship or others who play a central role in an individual's life and does not include marital partner or friends (e.g., Walen & Lachman, 2000), and are areas of risk and resilience in relation to physical health. Recently, research has established contemporary (e.g., current day) familial relationships play a critical role in understanding adult health (Priest et al., 2018), yet longitudinal research among survivors of childhood abuse remains less well understood.

Childhood abuse is an established predictor of adult health over time with numerous theoretical models (e.g., Miller et al., 2011) and emerging empirical research (Fitzgerald & Notice, 2023; Renna et al., 2021) supporting the notion that childhood abuse influences physical health over time. From developmental and life course perspectives, early disruptions in a secure parent-child bond can have lifelong consequences related to attachment (Doyle & Cicchetti, 2017), including relationships with family members specifically (Kong, 2018; Wuest et al., 2010). Individuals embedded within stressful, violent, volatile, and chaotic families may be at enhanced risk for health problems due to accumulation of stress over time. Additionally, when considering familial relationships across the adulthood, it is critical to

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consider the role of gender. Women tend to be more central in adult familial relationships and experience both greater support and greater strain (Uhing et al., 2021), which may have implications for health (Fitzgerald, 2023). Likewise, as adults move through the life course they tend to report a greater number of health problems, and the associations between abuse and place within the family lifecycle may influence health across different places in the adult lifecycle (Fitzgerald & Notice, 2023). The objective of the current study is to examine the average levels of familial support and strain over a 20-year period as mediators linking the severity of parentally perpetrated childhood abuse to the number of chronic physical health problems over time. A second objective of the study is to examine age and gender as moderators of the longitudinal associations.

Theoretical Underpinnings

Proposed by Miller and colleagues (2011), the Biological Embedding of Childhood Adversity (BECAM) model integrates numerous theoretical perspectives that suggest that stressors, specifically adverse childhood experiences, increase the likelihood of physical morbidity in adulthood. Stress during sensitive periods of development (e.g., childhood) alters how biological systems function with a specific focus on the initiation and maintenance of inflammatory processes (Miller et al., 2011). Indeed, it has been shown that childhood adversity, including childhood abuse, is associated with increased inflammation among midlife adults (Renna et al., 2021). The inflammatory processes embedded from adversity are impacted by biopsychosocial factors across the life course, many of which are related to early adversity (e.g., lack of attachment relationships) and maladaptive behavioral coping (e.g., substance use, diet). In addition to inflammatory processes, other studies have found that childhood abuse potentiates neurobiological alterations including changes in brain structures (see Berens et al., 2017; van der Kolk, 2003 for reviews). While the BECAM model among other findings highlight that childhood abuse increases health problems in adulthood, it focuses largely on biological process with less of a focus on external factors known to influence health (Thoits, 2011).

The biobehavioral family model (Wood, 1993; Wood et al., 2021) suggests that to fully understand physical morbidity it is necessary to consider the systemic context in which the patient is embedded (Priest et al., 2018; Woods et al., 2020). Familial relationships are central to adult life, have a significant influence on health (Fitzgerald, 2023; Robles et al., 2014; Thoits, 2011), and can influence the nature and course of physical illness (Wood et al., 2021). It has been found that familial relationships have positive and negative dimensions that are independent of each other rather than being defined by one spectrum. Familial relationships are dimensional, and positive and negative interactions can exist simultaneously (Wood et al., 2021). Positive exchanges can include warmth, affection, and support, while negative exchanges include hostility, criticism, and contempt (Walen & Lachman, 2000; Wood et al., 2021). Positive and negative exchanges are theorized to have a physiological effect which then contribute to increases or decreases in physical morbidity (Robles et al., 2014; Wood et al., 2021). These propositions, however, have yet to be tested longitudinally among adults who experienced abuse in childhood.

Childhood Abuse and Chronic Health Conditions

It is recognized that childhood abuse is a public health issue that leaves adults vulnerable to physical health morbidity (Sachs-Ericsson et al., 2007; 2011). For example, childhood abuse has been linked to specific areas of physiological dysfunction including cardiovascular problems (e.g., blood pressure), metabolic issues (e.g., low-density lipoprotein), inflammation (e.g., C-creative protein), and HPA axis dysfunction (Priest et al., 2018; Renna et al., 2021). These problems may help explain the higher rates of specific health problems found among adults who were abused in childhood. Child abuse has been linked to numerous physical health diagnoses including arthritis, cardiovascular disease, high blood pressure, chronic bronchitis, back problems, migraine headaches, bowel disease, chronic fatigue syndrome, stroke, and cancer (Afifi et al., 2016). Not surprisingly, childhood abuse has been shown to leave adults vulnerable to reporting multiple chronic health conditions (Chartier et al., 2009; Springer, 2009). Research has also suggested that the relationship between childhood abuse and adult physical health may vary across gender. Studies have shown that women report greater experiences of childhood abuse (Fitzgerald et al., 2020) and are more likely to report multiple chronic health conditions (Chartier et al., 2007).

Childhood Abuse, Contemporary Family Relationships, and Health

Research has widely documented that childhood abuse contributes to chronic health conditions and contemporary relationships with family members, or present day relationships with family members (e.g., children, parents, siblings), may be a possible pathway. While the intersection of childhood abuse and marital partners have been established in relation to health (Fitzgerald, Spuhler, & Hamstra, 2021), it has become increasingly clear that familial relationships outside of marital partners have a significant influence on adult health (for review, see Thomas et al., 2017). For example,

Ryan and Willits (2007) found that stronger ties with family members were positively associated with subjective evaluations of physical health, and Woods et al. (2020) and Priest et al. (2018) found that familial relationships have a greater impact on health compared to marital partners. Moreover, family relationships and negative interactions have been linked to inflammation (Miller et al., 2014) and hypertension (Sneed & Cohen, 2014). These studies, however, have yet to consider the mediating role of contemporary family relationships in understanding the relationship between child abuse and physical health over time.

Not surprisingly, research has consistently shown that abuse in childhood is related to decreases in supportive interactions and increases in strained interactions with family members in adulthood (Whitbeck et al., 1991). Childhood abuse is an interpersonal betrayal and manifests in physical, emotional, and sexual ways that causes harm to the child. The impact of abuse may be amplified by others who knew that the abuse occurred but did not intercede, if the abuse was dismissed or downplayed following disclosures of abuse, or threats were used to prevent disclosure of the abuse. Consequently, relationships with family members including siblings and parents among others may be more strained and less supportive. Although contemporary familial relationships among adults who were abused in childhood remain understudied, existing findings are fairly consistent. Ebbert and colleagues (2019) found that childhood emotional abuse was associated with less familial support and greater familiar strain among midlife adults. Likewise, Kong and Martire (2019) found that adults who were abused in childhood by their parents reported less closeness with the perpetrating parents, but not the non-offending parent. Findings from the study of Midlife Development in the United States (MIDUS) have found parallel results. First, Salva and colleagues (2013) found that childhood emotional and physical abuse were associated with less emotional closeness to family members in adulthood. More recently, Kong and Moorman (2016) found that parentally perpetrated abuse in childhood was associated with fewer provisions of emotional support given to the perpetrating parent, which speaks to a reduced sense of familial obligation found among those with a history of maltreatment (Parker et al., 2018). Research has found that abuse perpetrated by parents influences contemporary familial relationships including less perceived closeness, greater perceived strain, reductions in the emotional and instrumental support provided, and less frequent interaction (Kong et al., 2019).

The study of Midlife Development in the United States (MIDUS) has yielded important findings related to social relationships and health (Alonso-Ferres et al., 2020; Woods et al., 2020) as well as the influence of childhood adversity on both health and familial relationships. Childhood adversity including abuse has been linked to numerous health problems including sleep problems (Greenfield et al., 2011), more negative evaluations of health (Fitzgerald et al., 2021), and a greater number of chronic health conditions (Fitzgerald & Notice, 2023). A select few studies have considered the intersection between childhood abuse, familial relationships and health. For example, Ferraro et al. (2016) examined mediators linking childhood abuse to health problems over the first two waves of the MIDUS data. They found that childhood abuse was linked to the development of new health problems over the 10 year period and familial support and strain mediated the association. More recently, Priest and colleagues (2018) found that family emotional climate (e.g., support and strain) was associated with more problematic hypothalamic–pituitary–adrenal axis (HPAA) functioning, which was then associated with physical health morbidity. Familial relationships characterized by high levels of demands, negative interactions, and greater stress elicit physiological responses that potentiate or maintain physical morbidity (Priest et al., 2018). An important next step is to integrate the third wave of data collection to discern whether childhood abuse continues to exert effects on physical health into later adulthood. Familial relationships are enduring over time, even among adults who have experienced childhood abuse and may lead to additional health problems over time.

The Current Study

The current study addressed a notable gap in the research by examining average reports of familial support and strain over a 20-year period as mediators linking parentally perpetrated child abuse to the number of chronic physical health conditions. It was hypothesized that childhood abuse would be positively associated with familial strain and negatively associated with familial support. Second, it was expected that familial strain, but not support, would be associated with adult physical health (Woods et al., 2020). Last, based on previous research, age and gender were examined as moderators (House et al., 1988; Walen & Lachman, 2000). In the current analysis, education, income, age, and marital status were controlled for due to their associations with adult physical health and familial relationships (Walen & Lachman, 2000; Woods et al., 2020).

Method

Data used in the current study are from the study of Midlife Development in the United States (MIDUS). The MIDUS study has been continually funded by John McArthur Research foundation since 1995 and includes three waves of

data. MIDUS 1 was first collected in 1995–1996 (N = 7,108) and follow up waves were collected from 2004 to 2006 (MIDUS 2) (N = 4,963), and 2013–2015 (MIDUS 3) (N = 3,294). The MIDUS study recruited a national sample of adults along with over samples of twins and those living in urban areas. All three waves of data collection included a telephone interview and self-administered questionnaire (SAQ). Participants were included in the current study if they (1) participated in all three waves of the MIDUS study and (2) reported on their history of childhood abuse, family support, strain, and chronic health conditions. Of the 3,294 participants who participated in MIDUS 3, the analytic sample included 2,337 adults. Attritional analysis regarding participation in the MIDUS study can be found in the following manuscripts by Radler and colleagues (Radler & Ryff, 2010; Song et al., 2021). Participant demographics are displayed in Table 1. The data used in the current study are de-identified and publicly available, so IRB permission was not necessary.

Measures

Childhood Abuse

Childhood abuse was measured using adult retrospective reports of childhood physical, severe physical, and emotional abuse. Physical abuse, severe physical abuse, and emotional abuse were each measured with two items: one for maternally perpetrated abuse and one for paternal abuse. The items began with the stem, "when you were growing up, how often were any of the things mentioned above done to you by …" and each response asked about how often their mother and father engaged in those behaviors (e.g., being insulted, slapped, and beat up). Items were assessed on a Likert-type scale ranging from 1 (*Often*) to 4 (*Never*). The six abuse items for maternal and paternal abuse were reverse coded and summed where higher scores reflect greater severity of abuse. Scores ranged from 6 to 24.

Table 1 Characteristics of the analytic sample

	N (%) / *M* /SD)
Race	
White	2208 (94.5%)
Black	55 (2.4%)
Native American	5 (0.2%)
Asian or Pacific Islander	8 (0.3%)
Other	25 (1.1%)
Multiracial	16 (0.7%)
Marital Status	
No	603 (25.8%)
Yes	1732 (74.1%)
Gender	
Male	1033 (44.2%)
Female	1,304 (55.8%)
Education	
High School or Less	647 (27.69%)
Some College but no Bachelors	641 (27.42%)
Bachelor's Degree	534 (22.8%)
Some Grad School but no Degree	81 (3.5%)
Master's Degree	298 (12.8%)
Professional Degree	134 (5.7%)
Age	55.05 (11.19)
Income	77,475.50 (61,625.39)

Note. Sample characteristics are drawn from MIDUS 2

Familial Support

Current support from family members, not including spouse, were assessed using four items. The items were rated on four point scale ranging from 1 (*A lot*) to 4 (*Not at all*). Example item included "Not including your spouse or partner, how much do members of your family really care about you." The four items were reverse coded and averaged. Higher scores reflect greater perceptions of familial support. We took reports of familial support from MIDUS 1, 2, and 3 and averaged them together to create a mean level of family support over a twenty year period. Internal consistency for the family support variable ranged between 0.80 and 0.84 in the three waves of the MIDUS study.

Familial Strain

Current strain from family members not including marital partners was measured with four items rated on a four-point scale. Scoring options range from 1 (*Often*) to 4 (*Never*). Items were reverse coded and averaged such that higher scores are indicative of greater levels of familial strain. An example item included "Do they criticize you?" Participants' reports of family strain at MIDUS 1, 2 and 3 were averaged to provide a mean score of familial strain over the twenty-year study period. Internal consistency for the family support variable ranged between 0.78 and 0.80 in the three waves of the MIDUS study.

Chronic Health Conditions

The MIDUS study asked participants whether or not (yes/no) they had any of 29 health conditions (e.g., thyroid disease). A composite variable was created by summing the number of health conditions endorsed. Chronic health conditions were measured at both the MIDUS 2 (covariate) and MIDUS 3 (outcome variable). The number of chronic conditions at MIDUS 1 was also examined as a covariate and the results were not meaningfully different.

Covariates (Measured at MIDUS 2)

Age

Age was assessed in two ways. In the gender based model, age was entered as a continuous variable. In the SEM models examining age, participants were divided into two cohorts: younger (aged 59 and younger) and older (age 60 and over).

Income

Income was measured with a single item where respondents reported their household income with values ranging from 0 to 300,000 or more.

Education

Education was measured using an ordinal variable ranging from 1 (No schooling or some grade school) to 12 (PhD or other professional degree).

Marital Status

Participants responded to one question assessing their current marital status and responses were 0 = unmarried, 1 = married. Unmarried participants were either single, separated, divorced, or widowed.

Gender

Gender was coded as 1 = male and 2 = female.

Statistical Analysis

A multi-step approach was undertaken to examine the mediating effect of contemporary family support and strain linking childhood abuse to chronic physical health conditions. The first step was to examine the descriptive results stratified across gender including means, correlations, and standard deviations. Next, structural equation models were fit using a path analysis. Models that have a CFI and TLI value above 0.90, RMSEA value below 0.08, and non-significant chi-square test indicate acceptable model-data fit. To examine gender differences, a multiple group analysis was employed with gender serving as the grouping variable. The models were then statistically compared by holding each of the paths in the male and female model to be equal and conducting a chi-square difference test. If the test was significant, then gender moderated the pathway. To examine the indirect effects in the male and female models, bootstrapping procedures were used, which yield a point estimate and 99% bias corrected confidence interval.

Results

Bivariate statistics are displayed in Table 2 stratified across gender and in Table 3 the correlations stratified across age are presented. Regarding the prevalence rates of childhood abuse, 75% of the sample reported mild (e.g., rarely abused) to moderate levels (sometimes abused) of parental abuse, defined by scores between 7 and 12, 21.4% reported moderate to severe (often) abuse or scores between 13 and 18, and the final 3.6% reported severe abuse with scores of 18 to 24.

Results of Structural Equation Mediation Model Across Gender

The SEM model demonstrated good fit χ^2 (2) = 1.88, p = .52 CFI = 1, TFI = 1, RMSEA = 0. In both the male and female model, the association between support and number of chronic health conditions was non-significant, so the path was removed. Removal of the path did not decrease model-data fit as the difference test was not significant: χ^2 (2) = 1.88, p = .52. Results of the multiple group models stratified across age and gender are presented in Table 4. In the male model, childhood abuse was associated with poorer family functioning in adulthood. Higher levels of parental abuse in childhood were associated with less familial support (ß = −0.18, p < .001) and greater familial strain (ß = 0.22, p < .001). Additionally, childhood abuse severity was directly associated with a greater number of chronic

Table 2 Descriptive statistics of independent, mediating, and outcome variables for women and men

	1.	2.	3.	4.	*M* (*SD*) Female
1. Child Abuse		−0.28***	0.31***	0.12***	9.35 (3.53)
2. Familial Support	−0.21***		−0.52***	−0.16***	10.67 (1.32)
3. Familial Strain	0.26***	−0.39***		0.19***	6.26 (1.47)
4. Chronic Health Conditions	0.18***	−0.14***	0.14***		3.54 (3.21)
M (*SD*) Male	9.47 (3.41)	10.31 (1.44)	5.89 (1.36)	2.67 (2.68)	

Note. p < .001. Males = 1,033, female = 1,304. Women are presented above the diagonal and men below. Familial support and strain were mean scores of support and strain across MIDUS 1, 2, and 3. Childhood abuse was measured at MIDUS 1, and chronic health conditions were measured at MIDUS 3

Table 3 Descriptive statistics of independent, mediating, and outcome variables across age

	1.	2.	3.	4.	*M* (*SD*) Female
1. Child Abuse		−0.17***	0.23***	0.16***	8.98 (3.20)
2. Familial Support	−0.28***		−0.39***	−0.14***	10.79 (1.22)
3. Familial Strain	0.27***	−0.39***		0.23***	5.69 (1.28)
4. Chronic Health Conditions	0.14***	−0.14***	0.23***		3.70 (3.32)
M (*SD*) Male	9.81 (3.59)	10.37 (1.45)	6.31 (1.45)	2.87 (2.81)	

Note. $p < .001$. Younger Adults (59 and under) = 1,534, Older Adults (Age 60 and over) = 803. Older adults are presented above the diagonal and young adults below. Familial support and strain were mean scores of support and strain across MIDUS 1, 2, and 3. Childhood abuse was measured at MIDUS 1, and chronic health conditions were measured at MIDUS 3

Table 4 Direct effects of the structural equation mediational model stratified across gender and age

		Male		Female	
IV	DV	B	*b* (*SE*)	B	*b* (*SE*)
Childhood Abuse	Family Support	−0.18***	−0.07 (0.01)	-24***	−0.09 (0.01)
Childhood Abuse	Family Strain	0.22***	0.09 (0.01)	0.26***	0.11 (0.01)
Childhood Abuse	Chronic Health Conditions	0.08**	0.06 (02)	0.03	0.02 (0.02)
Family Strain	Chronic Health Conditions	0.08**	0.17 (0.05)	0.11***	0.24 (0.05)
		Younger Adults		Older Adults	
Childhood Abuse	Family Support	−0.18***	−0.07 (0.01)	−0.22***	0.05 (0.02)
Childhood Abuse	Family Strain	0.20***	09 (0.01)	0.26***	−0.09 (0.01)
Childhood Abuse	Chronic Health Conditions	0.03	0.02 (0.03)	0.06**	0.11 (0.01)
Family Strain	Chronic Health Conditions	0.11**	0.23 (0.08)	0.09**	0.18 (0.05)

Note. ** $p < .01$, *** $p < .001$

health conditions (ß = 0.08, $p < .01$). Greater familial strain was associated with a greater number of chronic health conditions (ß = 0.08, $p < .01$). The indirect effect from child abuse to chronic health conditions through familial strain was significant (ß = 0.024, 99% CI [0.002, 0.038]). Overall, the model explained 9.3% of the variance in familial support, 11.4% of family strain, and 33.2% of chronic health conditions. Regarding the covariates within the male model, the number of chronic health conditions (ß = 0.48, $p < .001$), marital status (ß = −0.06, $p = .02$), age (ß = 0.13, $p < .001$), and education (ß = −0.02, $p = .005$) were each associated with chronic health conditions at MIDUS 3. Adults who reported a greater number of chronic conditions, those who were unmarried, older adults, and those who reported lower levels of education reported more chronic health conditions. Likewise, adults who reported more chronic health conditions at MIDUS 2 also reported lower average levels of familial support (ß = −0.14, $p < .001$) as did those who were unmarried (ß = 0.09, $p = .007$) and younger adults (ß = 0.15, $p < .001$). On the other hand, education was not associated with levels of familial support (ß = −0.02, $p = .60$) In relation to family strain, those who reported a greater number of chronic health conditions experienced more (ß = 0.11, $p < .001$) and younger adults experienced less (ß = −0.20, $p < .001$), while those who were unmarried (ß = −0.06, $p = .07$) and more well educated (ß = 0.00, $p = .94$) did not experience significantly different levels of family strain.

In the female model, childhood abuse was associated with less familial support (ß = −0.26, $p < .01$) and greater familial strain (ß = 0.24, $p < .01$). Childhood abuse, however, was not directly associated with the number of chronic health conditions (ß = 0.03, $p = .30$). Average levels of familial strain over a 20 year period were associated with the number of chronic health conditions (ß = 0.11, $p < .001$). Regarding the covariates, women who reported a greater number of chronic health conditions at MIDUS 2 also reported lower levels of family support (ß = −0.17, $p < .001$) as did women who were married (ß = 0.17, $p < .001$) and older (ß = 0.17, $p < .001$). Education was not associated with familial support for women (ß = 0.02, $p = .57$). A similar pattern occurred with familial strain in women, but with signs in the opposite direction. Women who reported a greater number of chronic health conditions at MIDUS 2 (ß = 0.11, $p < .001$), were unmarried (ß = −0.13, $p < .001$), and older (ß = 0.29, $p < .001$) reported less family strain. Education (ß = 0.03, $p = .26$) was not associated with familial strain. Several covariates predicted the number of chronic health conditions at MIDUS 3, women who reported a greater number of chronic conditions (ß = 0.56, $p < .001$) and were older

(ß = 0.05, $p = .03$) reported more chronic health conditions. The indirect effect from child abuse to chronic health conditions through familial strain was significant (ß = 0.028, 99% CI [0.010, 0.049]). In the female model, 15.3% of the variance of family support, 20% of the variance in familial strain, and 37.3% of the variance in chronic health conditions was explained.

Gender as a Moderator

To examine whether gender moderated the direct pathways in the model, each of the paths were constrained to be equal across gender. The chi-square test was non-significant for each of the pathways including child abuse to chronic health conditions (χ^2 (1) = 2.88, $p > .05$), strain (χ^2 (1) = 2.75, $p > .05$) and support (χ^2 (1) = 2.16, $p > .05$). Likewise, the relationship between strain and chronic health conditions did not differ for men and women (χ^2 (1) = 2.18, $p > .05$).

Results of Structural Equation Mediational Model Across Age

Adults under the age of 60 were placed into the younger cohort and adults over the age of 60 were placed into the older cohort. In the young cohort, childhood abuse was negatively associated with familial support (ß = −0.18, $p < .001$) and positively associated with greater strain (ß = 0.20, $p < .001$). Childhood abuse, however, was not directly associated with the number of chronic health conditions (ß = 0.03, $p = .40$). Familial strain was associated with a higher number of chronic health conditions (ß = 0.11, $p < .001$). Regarding the covariates, marital status (ß = 0.15, $p < .001$) and gender (ß = 0.11, $p = .006$) predicted higher levels of familial support such that married adults and women reported higher levels of familial support. Education, however, was not significant (ß = 0.02, $p = .63$). Marital status (ß = −0.21, $p < .001$), gender (ß = 0.16, $p < .001$), and education (ß = 0.09, $p < .05$) each predicted family strain such that those who were unmarried, women, and those with more education experienced greater familial strain. The only covariate that predicted the number of chronic health conditions over time was education (ß = −0.07, $p < .05$) while gender (ß = −0.01, $p = .66$) and marital status (ß = 0.00, $p = .96$) did not predict future chronic health conditions. Overall, the model accounted for 11.5% of the variance in familial support, 13.8% of familial strain, and 43.5% of chronic health conditions. The indirect effects from childhood abuse to chronic health conditions through familial strain were measured next. The effect was significant (ß = 0.021, 99% CI [0.002, 0.048]) such that familial strain mediated the relationship between childhood abuse and chronic health conditions.

In the older adult model, childhood abuse was associated with lower levels of family support (ß = −0.22, $p < .001$), higher levels of family strain (ß = 0.26, $p < .001$), and a greater number of chronic health conditions (ß = 0.06, $p < .01$). Familial strain was then associated with a greater number of chronic health conditions (ß = 0.09, $p < .01$) such that adults who reported higher levels of familial strain also reported a greater number of chronic health conditions nine years later. Regarding the covariates, both gender (ß = 0.18, $p < .001$) and marital status (ß = 0.15, $p < .001$) were associated with familial support where women and those who were married reported greater levels of familial support where education did not predict support (ß = −0.06, $p = .75$). A similar pattern emerged for family strain where gender (ß = −0.20, $p < .001$) and marital status (ß = 0.10, $p < .001$) were linked to family strain while education was not (ß = 0.01, $p = .81$). Women experienced more familial strain as did those who were not married. Regarding chronic health conditions, each of the covariates were significant where adults who were married (ß = −0.09, $p < .001$), women (ß = 0.18, $p < .001$), and less educated (ß = −0.06, $p = .004$) reported a greater number of chronic health conditions. The bootstrapped indirect effect from childhood abuse to chronic health conditions was significant (ß = 0.022, 99% CI [0.007, 0.040]). Overall, the model accounted for 12.4% of the variance in familial support, 14.7% of familial strain, and 33.5% of chronic health conditions.

Age as a Moderator

Next, age was examined as a moderator where the estimates from the younger and older model were constrained to be equal and if the model fit, defined by a significant chi-square test, then age moderates the pathway. None of the paths were moderated by participant age including abuse predicting chronic health problems (χ^2 (1) = 0.56, $p > .05$), support (χ^2 (1) = 0.36, $p > .05$), and strain (χ^2 (1) = 0.23, $p > .05$). Likewise, the path linking familial strain to chronic health conditions was also non-significant (χ^2 (1) = 2.36, $p > .05$).

Discussion

The current study examined the mediating role of average levels of familial support and strain over a 20-year period linking parentally perpetrated child abuse severity to chronic health conditions over time. Prior research has found that familial relationships, oftentimes the longest and most enduring, have a greater impact on adult health compared to romantic partners (Priest et al., 2018; Woods et al., 2020). Results of the multiple group mediational analysis indicated that childhood abuse has a dualistic impact on adult familial

relationships, but only familial strain negatively contributed to physical health over time, and the effects were similar for men and women and among older and younger adults. Although not statistically different across gender, the direct effect between childhood abuse and the number of chronic health conditions was significant for men whereas the same relationship was entirely accounted for by familial strain among women. Likewise, the direct effect from childhood abuse to chronic health conditions was also significant among older adults but not younger. These findings highlight possible evidence of gender and age specific pathways linking childhood abuse to chronic health conditions.

The most notable contribution of the current study is documenting that average levels of familial strain over a 20-year period was a mediator linking childhood abuse to chronic health conditions. These findings are consistent with prior research noting that childhood adversity is linked to physical health problems (Ferrero et al., 2016; Priest et al., 2018) and expands knowledge by examining average reports of strain over a 20-year period. While effect sizes were small in our study, research shows that even factors with small effect sizes can have a significant impact on people's health when scaled up to the population level (Carey et al., 2023). For example, despite diet and exercise being ubiquitously prescribed by physicians to promote physical health, the relationship between such health behaviors demonstrate small and often non-significant associations with health (e.g., Allen et al., 2006).

Prior research has been cross sectional (Priest et al., 2018) or have utilized a more limited timeframe (Ferrero et al., 2016). Adults who were abused in childhood experience a variety of negative neurobiological consequences (Mehta et al., 2023; van der Kolk, 2003) that increase physiological reactivity stemming from stressful interactions (Berens et al., 2017; Heim et al., 2000) such as that proposed by the BECAM model. Integrating the propositions of the BBFM, adults who were abused by their parents in childhood report more negative contemporary relationships with their family members (Kong & Moorman, 2016; Kong et al., 2019) and there may be continual physiological reactions that erode physical health (e.g., allostatic load) culminating in greater health problems over time. For example, strained familial interactions have been associated with greater HPA axis dysfunction (Priest et al., 2018) that can lead to long-term health problems. Family relationships and negative interactions have also been associated with inflammation (Miller et al., 2014) and hypertension (Sneed & Cohen, 2014).

Researchers have noted that there are chains of disadvantage that occur where stress in childhood leaves the individual more vulnerable to future stressors across the life course (Elder, 1998). Umberson et al., (2014) found that childhood adversity was associated with adult health through more negative marital interactions. Our findings extend research by documenting child abuse as a specific form of adversity and examine other sources of strained relationships (e.g., familial). This is conceptually meaningful because family members are most often the perpetrators or they were knowledgeable that the abuse occurred, but did not intercede. Families where abuse is occurring and is not addressed often place children in maladaptive roles (e.g., caretaker of abusive parents) that can be lifelong (Alexander et al., 2000; Wuest et al., 2010). The dysfunctional family structure is likely to remain consistent across the life course and family members will continue to be critical, hostile, and rejecting (Kong et al., 2019). As a result of ongoing familial stress over prolonged periods of time, adults who were abused in childhood are even more vulnerable to health problems. Healthcare providers should assess familial relationships and make appropriate referrals. High levels of strain over prolonged periods of time may be detrimental to health, but infrequent or temporary strain from family is less likely to have a long-term impact on health.

As expected, familial support was not associated with physical health problems (Woods et al., 2020). Because childhood abuse potentiates alterations in neurobiological functioning at developmentally sensitive time periods (van der Kolk, 2003), the effect of support may only have a negligible impact on adult health. For example, support may have a little effect on existing physiological dysregulation while strain increases such dysregulation. This is consistent with research on intimate partners, where strain but not support impact physical health among adults who were maltreated in childhood (Fitzgerald et al., 2021).

Limitations

Our study had numerous strengths, though it is not without limitations. First, reports of childhood abuse were retrospective and did not address child sexual abuse; future research should use prospective assessments of child abuse. A second limitation is that the measure of support and strain was non-specific such that the unique contributions of specific family members cannot be discerned; documenting the roles of specific family members could help identify which members play a more or less important role. Third, the number of chronic health conditions was the focus of the current study, but familial relationships may play a greater role for conditions associated with stress reactivity (e.g., immunological conditions) and less of a role in other conditions (e.g., neurological). Further, mediating pathways linking familial relationships to health conditions such as physiological factors (e.g., cardiac, endocrine) were not able to be examined in the study. Fourth, the sample was of predominantly White, middle class adults, therefore generalizability of our results

is limited. Moreover, while other studies have also found associations between family relationships and health using the MIDUS dataset (Woods et al., 2020), replication in other samples is needed to substantiate the generalizability of the results. Lastly, effect sizes for the indirect pathways were relatively small in the current study. While small effect sizes can be clinically meaningful and make a significant difference in clients' health (Carey et al., 2023), other points of intervention may be considered.

Directions for Future Research

The current study makes a notable advancement in understanding the role adult familial relationships play in understanding physical health, yet future research is needed. First, the current sample is predominantly White, middle class adults so future research needs to consider whether these findings generalize to other populations (e.g., racial minorities). Second, future research should consider specific physiological processes that increase physical morbidity over time. There is existing cross-sectional research (Woods et al., 2020), but these associations have yet to be examined longitudinally. Third, future research would be strengthened by examining relationship specific support and strain so that the relationship between perpetrators and non-perpetrators can be mapped onto support and strain in adulthood. Lastly, an interesting finding has emerged from our study showing that 75% of our national sample has reported mild to moderate levels of parental abuse. This is higher than national levels of abuse reported elsewhere (Brown et al., 2023), and may be of interest to researchers.

Clinical Implications

Findings from the study have significant implications for clinicians and family therapists. First, it is critical to recognize that historical family dynamics inform current relationships; therefore, assessment of historical relationships with family members is needed emphasizing potential histories of abuse. Common assessments used by family therapists (e.g., genograms) assess family dynamics (e.g., closeness, hostility), but abuse may or may not be included and we recommend explicitly inquiring about abuse. Second, findings would suggest the use of transgenerational models of therapy (e.g., Bowen family therapy) as historical dynamics (e.g., abuse) significantly shape current relationships and roles (e.g., caretaking as a source of validation; Wuest et al., 2010). Third, familial strain could serve as a point of intervention and should be targeted by clinicians. This may occur individually with therapists helping clients navigate the negative interactions with family members and helping clients determine whether the relationships are worthy of repair or if removing themselves is more appropriate (e.g., cutoff). Additionally, the findings promote conducting family therapy between adult children and their parents involving non-perpetrators, or perhaps with perpetrators of past abuse should there be no issues of harm and the adult survivor believes it would enhance their mental and relational health. Treatment would likely be particularly efficacious among adults with childhood abuse histories if focused on the reduction of negative interactions, as chronic and ongoing criticism, excessive demands, and other strained interactions could activate underlying traumatic wounds leading to physiological activation and maladaptive coping (e.g., substance use) that potentiate chronic health problems.

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