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Individual predictors of adolescent adjustment to maternal cancer: The role of perceived stress, coping, social support, attachment, and self-efficacy

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Abstract

Background: Cancer is among the leading causes of morbidity and mortality around the world. The National Cancer Registry of Ireland reported in 2015 that there were 9312 new cases of female cancers per year, breast cancer being the most common type diagnosed. Research has identified that parental cancer is a stressful situation that can have a strong impact on adolescents' lives; however, some adolescents can turn a negative event into a way of enhancing their skills and psychological resources. This variability needs to be explored further to identify how individual differences contribute to different adjustment experiences for adolescents whose mothers are diagnosed with cancer, namely differences in adolescent coping, self-efficacy, social support, life satisfaction, and attachment.

Aim: The objective of this study was to examine the relative impact of perceived stress, coping, perceived social support, maternal attachment, and self-efficacy on adolescent adjustment (mood and life satisfaction).

Method: Data was collected from 40 adolescents within 38 months of a maternal cancer diagnosis. They completed online questionnaires assessing perceived stress, coping, perceived social support, attachment, self-efficacy, and adjustment (life satisfaction, negative affect, positive affect, depression, and anxiety).

Results: Hierarchical regression analyses showed that perceived stress and coping were the strongest predictors of adjustment explaining variance on all adjustment indices. Maternal attachment, perceived social support, and self-efficacy were less powerful predictors of adjustment. The model, however, failed to explain any variance on depression and anxiety. Moderation analyses revealed that social support moderated the relationship between perceived stress and positive affect for adolescents with high levels of perceived social support.

Conclusions: Findings show that lower perceived stress and positive coping were the best predictors of adjustment in adolescents facing maternal cancer. Results suggest that adolescents could be screened for levels of perceived stress and coping style to identify adolescents who are at risk of poor adjustment when they are adjusting to maternal cancer.

KEYWORDS

adjustment, adolescence, maternal cancer, oncology

1. INTRODUCTION

Adolescent adjustment to parental cancer has been previously examined; however, the findings of such studies are conflicting, some suggesting difficulties for adolescents and others not identifying any such problems for young people. Previous research has suggested that youth who are facing parental cancer have difficulties adjusting, resulting in anxiety or depressed mood and lower social competence¹⁻⁴; other studies instead reported that adolescents can turn a negative event into a way of enhancing their skills and psychological resources.⁵ Individual and contextual characteristics can determine if a stressful experience such as parental illness becomes an opportunity for personal growth or not. Given the variability in adjustment to parental cancer, identifying factors that enhance adjustment is an important research endeavour.

The transactional model of stress⁶ provides a useful framework to examine adolescent adjustment to a stressful event such as parental cancer. Stressful experiences in the model are construed as person-environment transactions in which the impact of the stressor is mediated by the person's appraisal of the stressor and the coping resources at his or her disposal. Perception of stress as a threat elicits negative emotional states and maladaptive coping whereas perception of stress as a challenge is associated with more favourable coping and emotional responses. Both external factors (e.g., social support) and internal personal resources (e.g., self-efficacy) may influence this process. The model suggests that variation in these factors may account for individual differences in outcome to perceived stressful events.

While previous studies have shown that perceived stress and poor coping style is linked with poor adjustment in adolescents,⁷ there has been little research to date on the specific impact of general perceived stress on adjustment in adolescents who have a parent diagnosed with cancer. With regard to social support, general adolescent adjustment has been directly linked with high social support, as close relationships are crucial indicators of adjustment,^{8,9} and support from others was associated with positive affect and well-being.¹⁰⁻¹³ Social support has also been found helpful to adolescents who experience parental cancer.¹⁴ In addition to direct effects on adjustment, social support has been shown to buffer the relationship between perceived stress and psychological adjustment, and this moderating effect is mediated by problem-focused coping.^{12,13,15} This effect, referred to as the stress buffering hypothesis^{16,17} whereby high social support buffers the negative consequences of a stressor, has not been examined in the context of adolescents who experience parental cancer. Previous research has also found a reciprocal relationship between social support and positive coping¹⁸ and has shown that social support can reduce stress in university students.¹⁹ Social support may thus serve as a mediator of the relationship of coping and of perceived stress with adjustment in adolescence.

Personal resources are also brought to bear in stress transactions. Self-efficacy has been linked to better adjustment outcomes, specifically with mood,²⁰ life satisfaction,²¹ and well-being in adolescent populations.²² The extent to which it impacts adjustment of adolescents who have a parent diagnosed with cancer thus warrants attention.

Parental attachment and parent-adolescent relationships are relevant for adolescent adjustment as this allows them to acquire life skills such as self-confidence and independence,²³ and the quality of the relationship can impact on adolescent experiences of parental cancer.²⁴

The impact of parental cancer can also vary according to the gender of adolescents as well as the type of cancer diagnosis and the gender of the ill parent. Research studies found that adolescent girls who witness their mothers' breast cancer perceived the illness as a threat with an uncertain outcome and were worried, overwhelmed, and experienced disturbances in their sleep patterns, appetite, depression, sadness, and dizziness or pain.^{1,5,25} Boys can be more reserved about their feelings and reports more disruptive behaviours due to stress.^{26,27} Adolescents whose fathers were ill were at a higher risk of developing psychosocial difficulties than when mothers were ill; however, the study did not provide reasons for this difference.²⁸ On the other hand, other studies concluded that adolescents of women with breast cancer experienced little or no behavioural effects over an extended period.^{29,30} Gender differences in adjustment to paternal cancer thus warrants attention.

On the basis of the transactional model of stress, the objectives of this study were to examine the role and relative impact of perceived stress, coping, perceived social support, maternal attachment, and self-efficacy on adjustment (mood and life satisfaction) in adolescents who have a mother diagnosed with cancer.

The specific hypotheses are as follows:

1. Lower perceived stress will be associated with higher positive affect and life satisfaction and lower negative affect, anxiety, and depression;

2. More positive coping scores will be associated with higher positive affect and life satisfaction and lower negative affect, anxiety, and depression;
3. Higher perceived social support will be associated with higher positive affect and life satisfaction and lower negative affect, anxiety, and depression;
4. Higher maternal attachment will be associated with higher positive affect and life satisfaction and lower negative affect, anxiety, and depression; and
5. Higher self-efficacy will be associated with higher positive affect and life satisfaction and lower negative affect, anxiety, and depression.

A second aim of the study was to explore the mediating and moderating effects of social support in (a) the relationship between perceived stress and adjustment and (b) between coping and adjustment.

2 METHOD

2.1 Participants

Participants in this study were 40 adolescents who had a mother diagnosed with cancer in the previous 38 months in this study, consisted of nine male and 31 female adolescents between 13 and 23 years of age ($M = 16.78$, $SD = 2.19$) (Table 1). The study recruited participants between the age of 13 and 23. While there is no consensus across disciplines, “it seems now that twenty-five is the new eighteen” (Arnone³¹, p.48). This extension of adolescence is supported by neuroscience as it has been identified that the density of the neural connections between the amygdala and cortices, which deal with emotions and cognitions, have a continued maturation and growth into adulthood.^{31,32} The majority were Irish (77.5%), and their mothers had been diagnosed with different types of cancer, of which 82.5% had breast cancer. Participants were recruited over a year.

TABLE 1 Participant demographic characteristics

Variable	N	%
Gender		
Male	9	22.5
Female	31	77.5
Cancer type		
Breast	33	82.5
Colon	3	7.5
Gastrointestinal	2	5
Bowel	2	5
Country		
Ireland	31	77.5
International	9	22.5
Time since diagnosis		
0-12 months	25	62.5
13 - 25 months	12	30
26-38 months	3	7.5

Mothers of adolescents attending cancer support centres and breast cancer centres were approached, and adolescents were contacted directly through universities in Ireland and an international sample including University of Miami and cancer support centre in Costa Rica who had research links with the researchers. Researchers obtained permission to send emails to all registered students. Mothers were provided with information sheets about the study by post, followed by a telephone call with the principal researcher to determine if they thought their adolescents would have an interest in participating. Mothers (if adolescents were underage) and adolescents completed age-appropriate consent forms. The study was approved by the NUI Galway Research Ethics Committee. The adolescents who agreed to take part completed self-report questionnaires online that assessed sociodemographic data, levels of perceived stress, coping, perceived social support, maternal attachment, self-efficacy, depression, anxiety, positive affect, negative affect, and life satisfaction.

2.2 Predictor measures

The Perceived Stress Scale¹⁵ consists of 10 items on a five-point scale, ranging from 0 (*never*) to 4 (*very often*). An overall score is obtained by adding all responses. The Adolescent Coping Orientation for Problem Experiences (ACOPE)³³ is a 54-item self-report questionnaire to identify coping strategies employed by adolescents when managing problems and difficult situations. The scale is divided into 12 factors, but a total adolescent coping score may be obtained by adding the number circled by the respondents (*never* [1], *hardly ever* [2], *sometimes* [3], *often* [4], and *most of the time* [5]). Some items need to be reversed. Higher scores indicate more positive coping resources. Subscale scores are calculated by adding the numbers selected by respondents for all items in each of the 12 subscales.

The Perceived Social Support Questionnaire³⁴ provides information on the level (quantity) and types of support available from network members across key areas of social support. Each perceived social support (PSS) is scored separately with an overall total score. The range of scores is a minimum of 16 (all responses are awarded no) to a maximum score of 48 (all responses are awarded yes); however, if a respondent had no siblings, their maximum score would be reduced.

The Inventory of Parent and Peer Attachment³⁵ assesses adolescent perceptions of positive and negative affective and cognitive dimensions of the relationships with their parents and closest friends. It is a self-report questionnaire with a five-point Likert scale. The dimensions assessed are the following: degree of mutual trust, quality of communication, and the amount of anger and alienation. Only the mother scale was completed. The scale is scored by reverse scoring negatively worded items and then adding the response values in each section. Overall scores were calculated by adding the total trust and communication scores and subtracting from that sum the alienation raw scores. Higher scores indicate more secure attachment.

The General Self-efficacy Scale³⁶ is a one-dimensional scale that assesses a general sense of perceived self-efficacy to predict coping with daily hassles and adaptation to stressful events. The 10 items in the scale assess the strength of an individual's belief in their own ability to respond to new or difficult situations and the setbacks faced. Responses are made on a four-point scale and then added. Higher scores indicate higher levels of generalized self-efficacy.

2.3 Outcome measures

The Depression Anxiety and Stress Scales³⁷ is a self-report scale to achieve maximal differentiation between affective syndromes of depression, anxiety, and tension/stress. Respondents determine the extent to which they experienced each symptom in the previous week. The scale categorizes severity levels into normal, mild, moderate, severe, and extremely severe. Each scale contains seven items, split into subscales with similar content. Separate scores are calculated by adding the scores corresponding to each item. The affective syndromes depression and anxiety were the only ones utilized.

The Feelings and Emotions³⁸ positive and negative affect scale for children (PANAS-C) is a 30-item self-report to measure respondent's positive and negative affect in the past 2 weeks. Each respondent is asked to read several words that describe feelings and emotions and choose the most appropriate value on a five-item scale ranging from 1 (*not at all*) to 5 (*a lot*).

The Satisfaction with Life Scale³⁹ measures global cognitive judgments of subjective well-being and satisfaction with life. It is a short five-item instrument, and each question is rated on a seven-point scale ranging from strongly disagree to strongly agree. Overall scores obtained are put into different categories: very high score, high score, average score, slightly below average in life satisfaction, dissatisfied, and extremely dissatisfied.

Because of the international nature of this study, all scales were translated into Spanish except the PANAS C, which was already translated.⁴⁰ Both scales were analyzed separately as the PANAS C consists of 30 items and the PANAS in Spanish had 46 items.

2.4 | Statistical analyses

Data was input into SPSS Version 20. Data were prepared and screened for normality and reliability. Predictors of adolescent adjustment to maternal cancer were analyzed using hierarchical multiple regressions, moderations, and

mediation analyses. The software used was PROCESS for SPSS.⁴¹ The method of moderation and mediation with bootstrapping was chosen as it is more suitable for small samples ($N = 40$) as it makes no distributional assumptions.⁴¹ In the present study, the 95% confidence interval of the indirect effects was obtained with 1000 bootstrap samples.⁴²

3 RESULTS

Descriptive statistics and reliability analyses were computed for all variables (Table 2). Adolescents reported average levels of life satisfaction, general self-efficacy, perceived stress, depression, and anxiety according to the range of scores of population samples provided by the scales themselves. Attachment levels were high. The coping score was below average. Positive affect and negative affect are above average, particularly negative affect, in both Spanish and English versions. A one-way between-groups analysis of variance was conducted to explore the impact of age (early, middle, and late adolescence) on perceived stress, coping, perceived social support, attachment, self-efficacy, life satisfaction, positive affect, negative affect, depression, and anxiety. There were no statistically significant differences between study variables by age group, so this variable was not included in the hierarchical regression analyses. Because of the imbalance in male and female participants, it was not really feasible to carry out analyses by gender.

TABLE 2 Descriptive analysis of study variables

Variable	Mean	Standard deviation	Cronbach Alpha
Perceived stress	18.8	5.4	0.68
Coping	160.4	21.1	0.4-0.74
Perceived social support	40.2	5.3	0.6-0.9
Social network	7.1	3.5	
Attachment	56	16.4	0.72-0.86
General self-efficacy	30.3	4.4	0.83
Satisfaction with life	24.1	6.7	0.87
Positive affect	38.8	9.0	0.92
Negative affect	39.8	11.3	0.87
Positive Spanish	73.67	6.15	0.59
Negative Spanish	51.7	15.7	0.91
Depression	10.5	7.9	0.83
Anxiety	7.5	6.1	0.63

Hierarchical multiple regressions (Table 3) were used to identify sets of variables that significantly predicted adjustment (mood and satisfaction with life). As this study is based on the transactional model of stress,⁶ perceived stress and coping were introduced at step 1. This is also supported by previous research, which suggests that parental cancer can be described as a stressor in adolescent lives.^{6,43-48} Social support was entered at step 2 alongside maternal attachment as quality of family relationships can be linked to availability of family as a source of support. Self-efficacy was entered at step 3.

Table 3 Hierarchical Multiple Regression of the Role of Perceived Stress, Coping, Perceived Social Support, Attachment, Self-efficacy on Positive Affect, Negative Affect and Life Satisfaction.

Predictors	Positive Affect				Negative affect				Satisfaction with life			
	B	F change	Adj R ²	Adj R ² ch	β	F change	AdjR ²	Adj R ² ch	β	F change	AdjR ²	Adj R ² ch
(1) Perceived stress Coping	-.313* .441*	6.73*	0.23		.443* .187	6.05*	0.21		-.393 .210	4.14*	0.14	
(2) Perceived social support Maternal attachment	.157 -.259	1.69	0.26	0.03	-.200 -.041	1.11	0.21	0.0	.325* .177	4.45*	0.28	0.14
(3)Self- efficacy	.407*	8.14*	0.38	0.12	-.030	.035	0.19	-0.02	.312*	4.5*	0.34	0.06

*P< 0.5

Predictors	Depression			Anxiety				
	β	F change	Adj R ²	Adj R ² ch	β	F change	Adj R ²	Adj R ² ch
(1)Perceived stress Coping	.336* -.076	2.377	0.07		.329* .136	2.89	0.09	
(2) Perceived social support Maternal attachment	-.197 .031	.705	0.05	-0.02	-.35* .181	2.58	0.16	0.07
(3)Self- efficacy	-.098	.304	0.03	-0.02	-.17	.988	0.16	0.00

*P< 0.5

The perceived stress and coping set accounted for a significant proportion of the variance in positive affect (23%), $F(2, 37) = 6.73, P = 0.003$. Perceived social support and maternal attachment entered in step 2 did not account significantly for any additional variance in positive affect. Self-efficacy in step 3 accounted for an additional 12% of variance in positive affect, $F(5, 34) = 5.808, P = 0.001$. Adolescents with higher levels of coping attachment and self-efficacy also have higher levels of positive affect.

The perceived stress and coping set accounted for a significant proportion of the variance in negative affect (21%), $F(2, 37) = 6.054, P = 0.005$. This means that higher stress lead to higher negative affect.

The perceived stress and coping set of variables accounted for (14%) of the variance in satisfaction with life, $F(2, 37) = 4.137, P = 0.024$. Perceived social support and attachment accounted for an additional 14% of the variance in satisfaction with life, $F(4, 35) = 4.734, P = 0.004$. The addition of self-efficacy on the third step accounted for an additional 6% of the variance in satisfaction with life, $F(5, 34) = 5.065, P = 0.001$. Higher levels of coping, social support, and self-efficacy increased levels of life satisfaction. The study variables entered in the regression model—perceived stress and coping, $F(2, 37) = 2.377, P = 0.107$, perceived social support and maternal attachment, $F(4, 35) = 1.522, P = 0.217$, and self-efficacy, $F(5, 34) = 1.254, P = 0.306$ —failed to account for any significant proportion of the variance of depression. This was also true for anxiety—perceived stress and coping, $F(2, 37) = 2.894, P = 0.068$, perceived social support and maternal attachment, $F(4, 35) = 2.859, P = 0.038$, and self-efficacy, $F(5, 34) = 2.484, P = 0.051$ did not significantly explain any of the variance in anxiety.

Mediation did not emerge in any of the sets of analyses. Social support emerged as moderator of the relationship between perceived stress and positive affect. In this analysis, there were no main effects for both the predictor (perceived stress, $b = 0.45, t = -1.64, P > 0.05$) and the moderator (perceived social support, $b = 0.46, t = 1.54, P > 0.05$). These two effects, however, were qualified by an interaction effect between perceived social support and perceived stress ($b = -0.14, t = -2.67, P < 0.05$).

Analyses at three levels of the moderator (low, medium, and high) suggested that this interaction occurred at high levels of social support ($b = -0.14, t = -2.67, P < 0.05$) but not at medium or low levels (ie, perceived social support moderates the relationship between perceived stress and positive affect) (Figure 1).

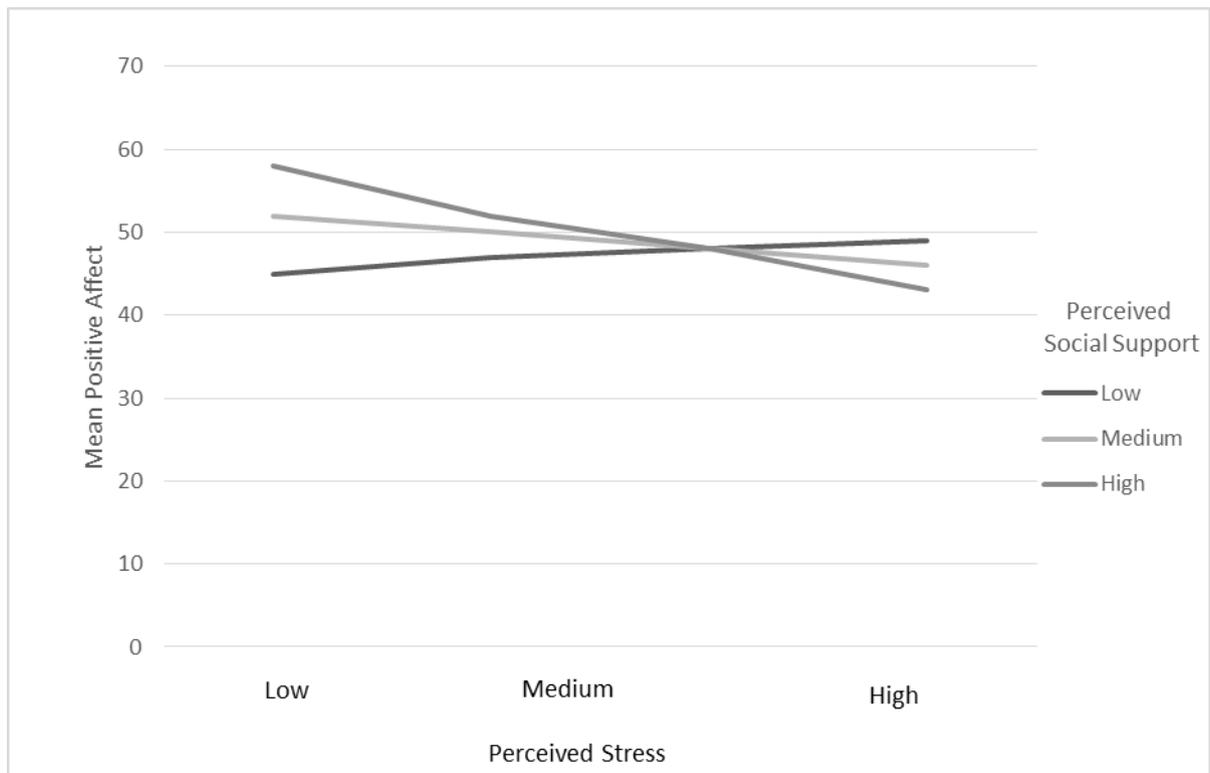


Figure 1. Moderating effect of perceived social support in the relationship between perceived stress and positive affect.

3 DISCUSSION

This study used the transactional model of stress and coping as a framework⁶ to identify predictors of adolescent adjustment to maternal cancer only. The original design was targeted at mothers only, given that it is a very sensitive topic which additionally included minors, it was anticipated that recruitment might prove challenging, so it was decided that the research focus on one gender. Perceived stress and coping together explained variance in positive and negative affect, highlighting the importance of assessing stress appraisal and coping strategies when examining adjustment to maternal cancer. These findings are in line with previous research showing that perceived stress and maladaptive coping such as passive avoidance, rumination, resignation, and aggression were positively associated with adjustment problems (e.g., emotional distress); however, these studies were carried out in a general adolescent population.^{2,7} This study suggested that this is more significant for adolescents who experience maternal cancer; however, future research needs to evaluate if these findings are valid for adolescents experiencing cancer in their fathers. Studies identified that high global stress predicted both lower positive affect and higher negative affect at diagnosis and post-surgery in women with breast cancer.⁴⁹ Similar findings in the current study identified perceived stress as a predictor of affective states in an adolescent population faced with maternal cancer and suggest it may help to identify those at greater risk of adjustment difficulties. Previous research has also described a relationship between stress and negative emotions, which has been associated with ill health, higher mortality rates in people with chronic illness, depression, and other forms of psychopathology. This study, however, was not carried out with cancer patients.⁵⁰

Perceived stress and coping accounted for variance in life satisfaction, with lower stress and more positive coping linked to higher life satisfaction. This is in line with previous research that found that stress in adolescents, particularly social stress, correlated negatively with life satisfaction.⁵¹ However, this study did not include adolescents experiencing cancer in their fathers. Perceived stress and coping also explained the highest amount of variance on adjustment; however, they failed to significantly predict variance in depression and anxiety levels. This could suggest that stress and coping are not linked to depression and anxiety levels. However, this needs to be further evaluated as this study had several limitations such as the cross-sectional design and the small sample. It may also be that adolescents in this study reported low levels of

depression and anxiety as their mothers were not diagnosed with terminal cancers. Previous research has identified a relationship between stress, depression, and anxiety. Cancer patients and their families can experience depression and anxiety,^{2,3} which may suggest that the model failed to predict variance in anxiety and depression in this sample. This may also be because of the fact that levels of anxiety and depression in this sample were below clinical level. Given that mothers acted as gatekeepers in this study, it is possible to suggest that only those that were perceived by their mothers as coping and adjusting well with their diagnosis were recruited. Perceived stress, however, was not specifically measured in these studies. Therefore, further research is warranted to examine the impact of stress appraisal and coping strategies on distress in this adolescent group. Overall, the findings of this study show that adolescents who experience maternal cancer can be overwhelmed by developmental demands, cultural expectations, family demands, and illness demands. The qualitative exploration of adolescent coping mechanisms showed that adolescents' context and personalities determine the different coping mechanisms that adolescents used to cope with maternal cancer, including social support from family and friends as well as caring for their ill mothers and families. Other adolescents in this study found it useful to focus on succeeding at university, whereas others found it as a burden instead.⁵² Managing stress is therefore very important for adolescents who experience maternal cancer as this could help them enhance their adjustment at this demanding time.

Perceived social support was correlated with maternal attachment. Previous research has suggested that adolescents' attachment to their parents may have an impact on the quality of relationships they establish,⁵³ however, this study did not specify if there were differences between father and mother attachment. Adolescents in the general population who have more secure relationships with their parents tend to also establish secure relationships with their friends.⁵⁴ People with more secure attachments know that their actions, self-worth, and self-efficacy will reduce their distress and allow them to overcome obstacles.⁵⁵ This is relevant for this study as perceived social support and maternal attachment significantly accounted for variance in life satisfaction. Higher social support and higher attachment was associated with higher life satisfaction. This finding is akin to previous research, which reported a positive relationship between social support and well-being^{11,18,51,56,57}; however, this needs to be further evaluated in cancer research with adolescents experiencing cancer in their mother and father. The relationship between attachment and life satisfaction has been less explored in the literature, but some studies concluded that the quality of attachment relationships significantly contributed to adolescent global satisfaction with life, and they reported that parental attachment predicted more variance than did peer attachment.⁵⁸ While perceived quality of parent, child, and friendship relationships has been identified as crucial for adolescent adjustment⁹ when compared with stress and coping in this study, perceived social support and maternal attachment did not account for variance in positive affect, negative affect, depression, or anxiety. This contrasts with previous research that found that perceived social support was associated with life satisfaction directly and indirectly through positive affect and negative affect.¹⁰ Previous cancer research has found that the quality of the mother-adolescent relationship can suffer when mothers are dealing with breast cancer, and this can cause further adjustment problems for adolescents.⁵⁹ Findings in this study highlight the importance of including a variety of adjustment indices to fully assess relationships with social support; however, future research may provide more insights into the role of perceived social support and maternal attachment in adolescents whose mothers and fathers are diagnosed with cancer.

In this study, self-efficacy explained variance in life satisfaction. Findings in previous research identified a significant negative correlation between stress and self-efficacy, which lead to an improvement in people's well-being, because people with higher self-efficacy reported lower levels of stress.²² Self-efficacy was also a significant predictor of life satisfaction in adolescents;²¹ however, this was not cancer research. Self-efficacy in general had minimal effect on overall adjustment but did explain a small amount of variance on positive outcomes. This may be due to adolescents not being diagnosed with cancer themselves, as self-efficacy is an individual belief on the capability to perform a specific action to achieve a specific outcome; self-efficacy may need further exploration as previous research has found that people with higher self-efficacy report lower levels of stress.²²

While self-efficacy did not account for variance in negative affect, depression, or anxiety, this underscores the importance of inclusion of both positive and negative indices when examining predictors of adolescent adjustment. Mood can provide affective information to judge personal efficacy.²⁰ Mood can also influence a person's judgement of their personal efficacy; evaluation judgements can be altered if the information provided by the affective state is also changed, but this may only

be applicable with positive mood and not with negative mood, according to the findings of this study, which may be because of the limitation of the study design mentioned previously. Research findings have found a relationship between self-efficacy and negative moods—adolescents with low levels of self-efficacy had more anxiety and depression symptoms.⁶⁰ Research has also identified that low self-efficacy is related to more symptoms of anxiety and lower levels of subjective well-being.⁶¹ More cancer research is needed to corroborate the findings of this study.

This study found that social support moderated the relationship between perceived stress and positive affect. Social support acting as a moderator is known as the stress buffering hypothesis,⁶² which suggests that social support interacts with stress to protect people from the negative effects of stress on health and well-being. This study partially supports this theory as high levels of social support act as a buffer in the relationship between perceived stress and positive affect for those adolescents with high levels of social support, which means that this did not happen for adolescents with low levels of perceived social support. This finding emphasizes the importance of ensuring that adolescents who report stress have supportive relationships in their lives at the time of maternal cancer, because this can have a positive impact on their mood (positive affect). Previous research has suggested that adolescents experiencing parental cancer may be at a risk of isolation and lack support,³ and this can increase their vulnerability to the negative effects of stress; however, this research was not specific to maternal cancer. Medical illness was also identified as complex since a broad range of social support types may be needed for adjustment, whereas optimal types of social support were identified to adjust to other events that are perceived as controllable such as loss of assets. When stressful events involves the loss of a key source of social support such as a mother, support deficits will occur in the areas where support was previously provided by this person.⁶³ Even though mothers were not deceased, the illness may have deemed them to be less available for their adolescents or they may have experienced a general disruption of normal routines and roles.⁶⁴ The relevance of social support for adolescents dealing with a stressful situation such as maternal cancer cannot be underestimated.

The current study provides useful insight into predictors of adjustment in adolescents experiencing maternal cancer. It identified that perceived stress had an important explanatory role on positive and negative mood. This is an important finding as stress appraisal has not been explored previously with this group. While further research is needed to confirm these relationships, findings suggest that stress management may be more important than targeting enhancement of personal resources in adolescents who experience cancer in their mothers. Additionally, high levels of perceived social support for adolescents seem to help them cope better with the stress they experience, and this is important when they face challenging experiences such as maternal cancer.

5 | CONCLUSION AND CLINICAL IMPLICATIONS

The current study is an important contribution to existing knowledge of adolescent adjustment to parental cancer. It provides useful insights into possible psychological predictors of adolescent adjustment to maternal cancer. Specifically, those low in stress and high in positive coping, social support, and self-efficacy report better affective status and life satisfaction. Social support was found to moderate the relationship between stress and positive affect. Taken overall, stress and coping were the strongest predictors in the model. All variables, except for perceived stress, explained significant variance on positive indices of adjustment only.

While future research with larger samples is needed to confirm these findings, this study can inform the design of psychological interventions for adolescents, suggesting, for example, that strategies to minimize stress and enhance social support may be useful. It is therefore important for practitioners to evaluate adolescent levels of stress and perceived social support as these variables have a crucial role in the experience of adolescents. It may be useful to increase adolescent perceived social support to help them adjust with the additional stress of maternal cancer. The need for additional perceived social support may justify the use of group therapy and interventions for adolescents going through similar experiences. Adolescents experiencing maternal cancer can be supported, and policy needs to be put in place to provide a family-centred approach to cancer when mothers and fathers are diagnosed. Supports need to be in place for adolescents to help them adjust and cope as cancer can be a very stressful event that is likely to be due to developmental demands. Some adolescents will avail of services if these are offered to them, if they are provided with information, and access to these services is facilitated for them. Further research differentiating specific sources of stress could usefully inform the

design of interventions targeted at this population.

5.1 Limitations and recommendations for future research

This study had a cross-sectional design, and the modest sample size may influence generalization of the findings, and statistical analyses may have lacked sufficient power to detect more significant relationships. However, it provides useful preliminary data in this area as there has been limited examination of these variables in previous research. The majority of participants had maternal breast cancer diagnosis.

While there were no significant differences in adjustment due to cancer type, the experience of cancer can be affected by illness-specific variables, and these may vary because of cancer type, so the study may have not captured those differences. Future research may benefit from more specific comparisons of how cancer and its treatment can impact on adolescent adjustment and maternal and adolescent sociodemographics. Findings of this study are similar to previous research findings; however, some of the research on attachment, self-efficacy, and social support was not carried out in adolescent populations experiencing cancer in their mothers and fathers, which suggests the scope for further analysis with larger samples. Additionally, future research can focus on understanding the role of gender in the moderating effect of social support and stress for adolescents who experience cancer in their mothers and fathers.

Another limitation of this study was that most participants were female, thus the experiences of male adolescents are not fully captured in this study. However, it is important to note that there were no significant gender differences except in adolescent-mother attachment. The experiences of adjustment to maternal cancer need to be explored further for male adolescents to further understand them but also to be able to provide gender- and age-tailored interventions to support them and improve their adjustment in this stressful time.

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CONFLICT OF INTEREST

The authors have no conflict of interest to report.

AUTHORS' CONTRIBUTIONS

All authors had full access to the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Conceptualization, Leonor. R., AnnMarie. G. and Pat D.; Methodology, Leonor. R., AnnMarie. G. and Pat D.; Investigation, Leonor. R., AnnMarie. G. and Pat D.; Formal Analysis, Leonor. R., AnnMarie. G. and Pat D.; Resources, Leonor. R., AnnMarie. G. and Pat D.; Writing - Original Draft, Leonor. R., AnnMarie. G. and Pat D.; Writing - Review & Editing, Leonor. R., AnnMarie. G. and Pat D.; Visualization, Leonor. R., AnnMarie. G. and Pat D.; Supervision, Leonor. R., AnnMarie. G. and Pat D.; Funding Acquisition, Leonor. R., AnnMarie. G. and Pat D.

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