PARENTING WHILST GROWING UP– UNDERSTANDING PARENTING STRESS AMONG ADOLESCENT MOTHERS WITH YOUNG CHILDREN IN SOUTH AFRICA

Katherine Morse[1], Jane Kelly[2], Kathryn Steventon Roberts[3], Janina Jochim[4], Lucie Cluver[5], Camille Wittesaele[6], Elona Toska[7]

Institutional Affiliation: University of Cape Town and University of Oxford

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[1] University of Cape Town, Cape Town, South Africa
[2] University of Cape Town, Cape Town, South Africa
[3] University of Oxford, Oxford, UK
[4] University of Oxford, Oxford, UK
[5] University of Oxford, Oxford, UK
[6] University of Oxford, Oxford, UK
[7] University of Cape Town, Cape Town, South Africa

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ABSTRACT (151 Words)

Parenting stress among adolescent parents in resource-scarce environments threatens the wellbeing of both parents and children. This study investigates the factors contributing to parenting stress among adolescent mothers in the Eastern Cape, South Africa, with the aim of informing parenting interventions for adolescent parents. Interviews with 931 adolescent mothers, investigated factors associated with parenting stress. Having multiple children, children with disabilities, children who cry frequently, and poor communication with adolescents' own caregivers significantly contributed to parenting stress. Support buying food and clothes for children, household food security, and enjoyment of children decrease parenting stress. The study underscores the need for parenting interventions that consider these challenges, including playful parenting skills, stress management, financial management, family planning for timing additional children, and positive inter-generational social support. Such interventions can improve the wellbeing of adolescent parents and their children, decrease harsh parenting, and contribute to ending violence against children through positive parent-child relationships.

Keywords: Adolescent parents; Interventions; Parenting stress; Resource-scarce environments; South Africa

PÉRIORITÉ ENVOYANT – COMPRENDRE LE STRESS PARENTAL CHEZ LES MÈRES ADOLESCENTES AVEC DE JEUNES ENFANTS EN AFRIQUE DU SUD

ABSTRAIT (151 Words)

Le stress parental chez les parents adolescents dans des environnements aux ressources limitées menace le bien-être des parents et des enfants. Cette étude examine les facteurs qui contribuent au stress parental chez les mères adolescentes du Cap-Est, en Afrique du Sud, dans le but d'informer les interventions parentaux pour les parents adolescents. Interviews avec 931 mères adolescentes, a étudié les facteurs associés au stress parental. Avoir plusieurs enfants, enfants handicapés, enfants qui pleurent fréquemment et une mauvaise communication avec les propres soignants des adolescents ont contribué de manière significative au stress parental. L'appui à l'achat de nourriture et de vêtements pour les enfants, la sécurité alimentaire des ménages et la jouissance des enfants réduisent le stress parental. L'étude souligne la nécessité d'interventions parentales qui tiennent compte de ces défis, y compris des compétences de parentalité ludiques, la gestion du stress, de la gestion financière, la planification familiale pour le temps d'accouplement d'enfants supplémentaires, et un appui social positif entre les générations. De telles interventions peuvent améliorer le bien-être des parents adolescents et de leurs enfants, réduire la sévérité parentale et contribuer à mettre fin à la violence à l'égard des enfants grâce à des relations positives parent-enfant.

Mots-clés: Parents adolescents; Interventions; Stress parental; Environnements aux ressources limitées; Afrique du Sud

INTRODUCTION

Adolescent childbearing in resource-constrained settings has been associated with worse health and well-being outcomes for adolescent mothers (Amongin et al., 2021; Steventon Roberts, Smith, et al. 2022) and their children (Fall et al., 2015; Steventon Roberts, Sherr, et al., 2022). Adolescent pregnancy and motherhood occur at the nexus of the developmental challenges of puberty and the transition to young adulthood alongside shifting social roles and responsibilities associated with parenting a child (Kagawa et al., 2017). Parenting in resource scarce environments adds to these challenges and complexities (Beasley et al. 2022) which may negatively impact the adolescent's mental and physical health, their prospects, and their relationship with their child (Roberts et al. 2021). This in turn puts the child's development and future wellbeing at risk (Steventon Roberts, Sherr, et al., 2022). Understanding the risk factors for parenting in adolescence and its impact on parental and child well-being is needed to design interventions aiming to support this group.

Parenting stress arises from the experience of being a parent at any age. It influences parenting behaviour, with increased stress leading to increases in harsh parenting (Ostberg and Hagekull 2000). Parents and children have complex interactions that may result in bi-directional causes of parenting stress (Ostberg and Hagekull 2000). For example, a child who cries frequently may cause a parent to be stressed but a stressed parent may also be intrusive or unresponsive to a child, causing their child to cry more frequently. Harsh parenting, or physically disciplining children, is associated with a variety of negative outcomes for the child and for the parent-child relationship (World Health Organisation [WHO], 2023). These complexities may be exacerbated for adolescent parents who are frequently in the position of co-parenting with their own parent or caregiver (Berry et al. 2021). Additionally, they must try to balance school progression, with their own and their children's developmental needs

(Ajayi et al., 2023; Branson et al., 2014), economic provision (Amongin et al. 2021) and the social and emotional parenting demands of having a child (Ajayi et al., 2023).

LITERATURE REVEW AND THEORETICAL FRAMEWORK

Demographic factors associated with parenting stress include the number of children in the family (Ostberg and Hagekull, 2000) and acquisition of HIV after pregnancy (Rochat et al., 2018). Caregiver factors associated with parenting stress include criticism from a parent or caregiver about childrearing practices (Larson, 2004). Psychosocial factors associated with parenting stress include low social support (Ostberg and Hagekull, 2000; Roberts, Smith, et al., 2022); exposure to negative life events (Ostberg and Hagekull, 2000); exposure to crime (Rochat et al., 2018), community violence (Roberts, Smith, et al. 2022) and intimate partner violence (Larson, 2004). Early school dropout (lower educational attainment) is associated with higher parenting stress (Rochat et al., 2018). Anxiety, depression, and post-traumatic stress disorder are higher in adolescent mothers living with HIV than not living with HIV and higher amongst adolescent parents than amongst adolescents without children (Roberts, Smith et al., 2022). Finally, the child-oriented variable perception of the child as fussy or emotional (Ostberg and Hagekull, 2000) is associated with parenting stress. OBJOBJ Overall, there is limited evidence on parenting stress in adolescent mothers specifically.

There is growing evidence that parenting styles are inherited. Childhood trauma is linked to adult intimate partner violence and harsh parenting (Fulu et al., 2017). Early adversity can predict later mothering behaviour, and the more severely mothers rate their childhood maltreatment, the worse their children adjust (Lomanowska et al., 2017). It is well-established that harsh and inconsistent parenting can harm cognitive and social-emotional development of children (Kochanova et al., 2021) potentially contributing to those children becoming harsh parents (Boivin and Bierman, 2013). However, Neppi et al., (2009) found

that parenting styles persists across generations regardless of child behaviour. Lifelong benefits of positive parenting include learning, social participation, employment, and quality of life (Boivin and Bierman, 2013). Early socio-emotional skills aid lifelong psychological and social adjustment (Pulkkinen et al., 2011). Even a longitudinal study found that closeness between adolescents and their carers was later linked to closeness with their grandchildren (Mueller and Elder, 2003). Children of adolescent parents in resource-scarce environments may lack access to both physical and emotional resources that would develop resilience. They risk repeating the cycle of early pregnancy and insecure parenting (Scaramella et al., 2008) perpetuating intergenerational cycles. Adolescent parent interventions may break these cycles of adversity, accelerating positive outcomes for future generations.

Parenting interventions can improve the wellbeing of parents and their children (Ward et al. 2017) and contribute to achieving the Sustainable Development Goal (SDG) to "end all forms of violence against children" (WHO, 2016). A small quasi-experimental study in South Africa designed an after-school program for adolescent parents to teach positive parenting skills whilst supporting adolescent development. The program included information on HIV, financial management, and assertiveness. The study suggests future interventions should include the caregivers of adolescents to ensure a supportive home environment for new parenting behaviours (Berry et al., 2021).

Parenting for Lifelong Health (PLH) was adapted for parenting young children in South Africa. The intervention was shown to be successful for reducing the risk of child maltreatment in a small scale randomized controlled trial (RCT) in Cape Town, (Lachman et al., 2017). The program improved positive parenting behaviour and reduced child maltreatment. They also developed an adaptation of their parenting program for parents of teenagers in South Africa (Doubt et al., 2016). This program was similar to Berry et al. (2021) in that the parenting skills are complemented by general life skills and tailored for

implementation in resource scarce environment. Parenting topics cover positive parenting, conflict resolution and relationship building. Additionally, the parenting teenagers adaptation incorporates contextually relevant information about community safety, finances, and stress management (Mejia et al., 2016).

Thula Sana, a South African intervention for parents of young children, was shown to enhance maternal sensitivity and improve mother-to-infant bonding. An adaptation of this was piloted in a RCT in El Salvador for adolescent parents (Valades et al., 2021). The intervention had positive effects on maternal responsivity leading to children having better regulated behaviour and social orientation. There is a need for further development of parenting interventions that target adolescent parents and consider the unique and complex challenges they face parenting whilst growing up.

While there has been some progress on developing culturally and contextually relevant parenting programs for parents of young children in South Africa (Doubt et al., n.d.), there is substantial room for continued development, testing and scaling up. Adolescent parents are regularly overlooked in policy and programs, yet they are one of the more vulnerable parenting populations. This study aims to understand risk and protective factors for adolescent parenting stress -a first step towards identifying relevant components to include in interventions critical to responding to the needs of adolescent mothers and their children.

DATA AND METHODS

STUDY DESIGN AND CONTEXT

In 2017-2019, we interviewed 931 adolescent girls who had had their first child between the ages of 10-19 years of age and were living with that child in the Eastern Cape of South Africa (Toska et al., 2022). This province has high numbers of adolescents bearing

children with 1.2 births per 1000 for 10–14-year-olds and 57.1 per 1000 for 15–19-year-olds (Barron et al., 2022). Additionally, 12.7% of the Eastern Cape population live in poverty (the highest provincial rate in the country) across the dimensions of health, education, living standards and economic activity (South Africa Gateway, 2017).

DATA COLLECTION

Voluntary informed consent was obtained from adolescents and their caregivers where adolescents were under 18 years of age. The questionnaire and consent forms were translated from English into isiXhosa, the language most spoken in the study area. The questionnaire was presented on a tablet allowing adolescents to answer sensitive questions privately. Interviews took up to 90 minutes to complete. Participants received a snack and small gift back with toiletries, stationery, and toys for their children. Participants could choose the interview location to ensure confidentiality- most were interviewed at home in a private space. Where participants reported violence or abuse, referrals were made following predetermined study protocols. Ethics approvals were obtained from the Universities of Oxford (R48876/RE001-2, SSD/CUREC2/12-21) and Cape Town (HREC 226/2017, CSSR 2013/4), Eastern Cape Departments of Health and Basic Education, and participating health and educational facilities. A trained Teen Advisory Group consulted on recruitment and data collection tools (Cluver et al., 2021). Data Collection and recruitment strategy is described in detail in previous papers, see for example Toska et al., (2022).

MEASURES

The survey consisted of various scales and measures to collect information about sexual reproductive health, relationships, parenting, mental health, and other relevant life experiences. All scales and measures were translated into isiXhosa. Adaptations were made for ease of translation and in consideration of the context of our participants and the aims of

the study. Recommendations for adaptations came from three sources. Some recommendations were made by field experts, based on their prior use of the scale in similar contexts in South Africa. Other recommendations came from the Teen Advisory Group or from research assistants, during piloting. Scales embedded in the survey and analysed in this paper were those relevant to experiences of parenting young children and relationships between the adolescents and their own parents or caregivers.

Adolescent's self-reported on their parenting of children via a revised version of the Parenting Stress Scale (Berry and Jones, 1995). The original scale consists of 18 items capturing both the strains and costs of parenting and the fulfilment and enjoyment of being a parent (Louie et al., 2017). The items together allow rewards to offset costs. The theoretical underpinning account for the bi-directional interactions of parents and children, i.e. stressed parents distress children, also distressed children stress parents.

The revised version of the Parenting Stress Scale used six of the original items relating to parenting stress and two relating to parenting enjoyment. A high score on the scale indicates high parenting stress. The adolescent was asked how much they agree with the statements expressing stress or enjoyment and answered on a five-point Likert scale from "strongly disagree" to "strongly agree". This scale has been used widely to measure parenting stress, including in lower- and middle-income countries (LMIC) such as Pakistan (Gulamani et al., 2013), and China (Cheung, 2000). It has been translated into at least 18 languages and performs similarly across a wide variety of cultures and contexts (Louie et al. 2017).

Adolescents self-reported on their experience of their relationship with their own parent or caregiver via two scales. The first consisted of five items selected and adapted from the Child-Parent Communication Apprehension Scale for use with Young Adults (C-PCA, YA) which originally had 12 items (Lucchetti et al., 2002). Adolescents rated their

communication with their caregiver on a 4-point Likert scale from "strongly disagree" to "strongly agree." A high score indicates comfortable caregiver communication. Finally, there were two full subscales of the well validated Alabama Parenting Questionnaire (Frick, 1991). The Positive Parenting subscale consists of six items and a high score indicates affirming words, actions & rewards from the caregiver. The Parental Monitoring subscale consists of 10 items and a high score indicates poor home rule setting and monitoring of social activities. This questionnaire has been used in prior studies in South Africa (Lachman et al., 2013). Adolescents selected statements on a five-point Likert scale from "never" to "always."

The World Health Organization (WHO) disability screener was used to detect child disabilities. The tool asks parents to compare his/her child to others in his/her age group, with specific regard to the child's physical and cognitive development and disabilities. The scale has been tested in settings with varying resource levels and cultural contexts (Lorencz 2013; Durkin et al., 1995). It has been used in studies in Pakistan, Bangladesh, and Jamaica (Durkin et al., 1994, Durkin et al., 1995), India (Singhi, 2007), rural South Africa (Christianson et al., 2002) and Kenya (Mung'ala-Odera et al., 2004). Whilst it has most commonly been tested on children in the 2-9 years category, it was adapted for testing amongst 1-year olds in a study in Benin (Koura et al., 2013). The tool has demonstrated strong reliability, and when tested on 6–9-year-olds in rural Pakistan produced reliability coefficients between 0.6 - 0.8. (Durkin et al., 1995).

The Emotionality, Activity and Shyness Temperament Questionnaire -Short (EAS-S) measures temperament across four dimensions and the emotionality subscale (teariness, anger) was used in this analysis (Buss and Plomin, 1984; Mathiesen and Tambs, 1999). The questionnaire invites parents to rate their child on a 5-point Likert scale ranging from 1 (not very typical/characteristic) to 5 (very typical/characteristic). A higher score indicates greater emotionality. The measure has been predominantly tested in North American contexts with

few examples in LMICs. However, there is one example of its usage in a temperament and happiness study of children in India (Holder et al., 2012)

DATA ANALYSIS

Data analysis was conducted using STATA-18. Exploratory and confirmatory factor analysis were used to check that all items on relevant scales were suitable for this sample and these results are included in supplementary materials. Descriptive statistics were computed for the sample of adolescents. Bivariate and multivariate analysis was used to model contributors to variation in parent experiences of stress measured via items from the Parent Stress Scale. Multivariate regression models were nested by categories of variables grouped by demographic, caregiver-adolescent relationship, psychosocial and child-oriented variables. The likelihood ratio test was used to confirm that models were significantly different to each other. P-value significance was set at $p < 0.05$.

RESULTS

DESCRIPTIVE

Adolescents (n=931) were aged between 12- 23 years at the time of the interview. One quarter (25%, n = 233) of adolescents had been pregnant before the age of 16 years, see figure 1 for the full distribution. Thirteen percent of adolescents aged 18 or older had had one or two additional children. A quarter were living with HIV (27%, n = 251). Just over one quarter lived in a rural area (29%, n = 270).

[Insert Figure 1]

Most adolescents, 94% (n = 875), live with their biological parents or other female relatives. Very few (6%; n = 56), lived with other male relatives or caregivers, with their partner or alone. Three quarters (77%; n = 717) of adolescents said that they were anxious or

careful about what they say to their caregivers and most (94%; n = 875) reported strong house rules and social monitoring. Approximately 29% (n = 875) reported that their caregiver always or almost always rewarded them for positive behaviour.

Most homes (93%; n = 866) received at least one welfare grant although 7% did not receive any grants. Food security, measured by three meals per day for the past week, was reported by 71% of adolescents (n = 661). Almost no adolescents reported frequent drug or alcohol use (to the extent that it affected walking, talking, or remembering) (n = 6). Very few reported domestic violence or arguments (7%; n = 65) or other types of violence or abuse.

Parent stress scores ranged from 6-30 where a score of 6 represents scoring "strongly disagree = 1" on all six stress items and a score of 30 represents scoring "strongly agree = 5" on all six stress items; mean = 22.2, SD = 5.9. 15%; n = 141 adolescents strongly agreed with all stress items. See Figure 2 for the full distribution.

[Insert Figure 2]

BIVARIATE REGRESSION

Bivariate regressions were run on the adapted Parent Stress Scale. There were several variables that we expected to be significant, based on the literature; however, they were not significant in this analysis. Demographic variables that did not significantly contribute to parent stress were the number of people living in the house, $p = 0.74$, living in a rural area, $p = 0.23$, number of childcare grants received, $p = 0.82$, age of the child at the time of the interview, $p = 0.26$, and age of the adolescent at first pregnancy, $p = 0.41$. Caregiver variables that did not significantly contribute to parent stress were the parental monitoring sub-scale, $p = 0.06$, and the positive parenting sub-scale, $p = 0.12$, and who the caregiver is by gender $p = 0.73$, or by biological/not biological relationship, $p = 0.92$. Social variables that did not contribute to parenting stress were exposure to sexual, physical, or emotional violence or a

combination of these, p = 0.37, domestic violence, p = 0.26, drug or alcohol use, p = 0.16 and HIV status, p = 0.57.

Variables that did significantly contribute to parent stress are detailed in Table 1. Amongst demographic variables: older participants reported less stress and participants with more children reported more parenting stress. Amongst caregiver variables: participants who reported higher anxiety talking with caregivers also reported more parenting stress. Among the psychosocial variables: participants who reported mental distress also reported more parenting stress. Participants with food security (3 meals per day for the last week) reported less parenting stress. Participants with wider circles of support with buying things for children reported less parenting stress. Child variables: participants with a child who had a disability as detected on the WHO disability screener, also reported more parenting stress. Participants with frequently emotional children reported more parenting stress. Finally, reporting enjoyment of children via the two items from the parent experiences scale, was associated with less parenting stress.

[Insert Table 1]

MULTIVARIATE REGRESSION

There were no changes to direction of variable relationships to parent stress, with additions of variable blocks, indicating that there were no mediation effects. Results are shown in Table 2. In model 1 the demographic variables were added. Together they explain little of the variation in adolescent parent stress and neither are significant at $p < 0.05$. In model 2 the caregiver communication variables are added. The single item “anxious or careful when talking to my caregiver or parent” adds significantly to the model explanation of variation at $p < 0.001$ and the remaining communication items have a small contribution at $p = 0.06$. A likelihood ratio test showed that there was a significant difference between models

1 and 2; $|^2$ (2) =104.36, p = 0.001 indicating that the addition of the caregiver communication variables improved the model. In model 3, mental distress is not significant; however, both food security and assistance buying things for children are significant at $p < 0.001$. Positive communication with caregivers is no longer significant in this model. The likelihood ratio test showed that there was a significant difference between models 2 and 3; $|^2$ (3) =77.21, p = 0.001 indicating that the addition of the psychosocial variables improved the model. In model 4, child-oriented variables are added including cumulative (across children) variables for children who cry easily and children with disabilities, both significantly increasing parent stress at $p < 0.001$; and parent enjoyment of children, which significantly decreases parent stress at $p < 0001$. The number of children is significant again in model 4 at $p < 0.0001$. The likelihood ratio test showed that there was a significant difference between models 3 and 4; $|^2$ (1) =119.40, p = 0.001 indicating that the addition of the child-oriented variables significantly improved the model. Overall, the ^{2} was highest for this final model indicating the relative importance of these child-oriented variables.

[Insert Table 2]

In model 5, betas are standardized to show the relative change in the parenting stress for a one-standard deviation change in the independent variable, while holding all other variables constant. Most variables show a small to moderate association with parent stress. The strongest associations are feeling anxious or careful when talking to a caregiver which increases parent stress, at $\beta = 0.25$, $p < 0.0001$ and crying children $\beta = -0.29$, $p < 0.0001$.

DISCUSSION

This study sought to develop understanding of adolescent parenting stress and use these insights to make recommendations towards a parenting intervention for adolescent mothers living in resource constraint settings in South Africa. This population group is

frequently underrepresented in policy development, community health and social interventions and program development. To date there is only one piloted intervention in South Africa, developed specifically for adolescent parents (Berry et al., 2021).

The number of children born to the mother significantly contributed to parenting stress among adolescent mothers, even when economic variables were controlled for. HIV status did not significantly contribute to parenting stress within this population. However, Rochat et al. (2018) indicate that the timing of HIV acquisition and diagnosis may be important. A more nuanced approach to analysis mapping pregnancy, mode of infection, time of diagnosis and time of interview, might detect this. The age of first pregnancy and the age at the time of interview did not contribute to parenting stress. There are several factors to consider when interpreting this finding. Firstly, adolescent mothers in this study almost always lived with their own parent or caregiver; effectively sharing or even being exempted from the demands of parenting young children. Secondly, we were not able to assess how parenting stress amongst adolescent mothers compared to levels of parenting stress amongst adolescent mothers. It is probable that a comparative study would show that adolescent parents do experience more parenting stress than older parents (Larson, 2004). There are known long term negative consequences for women who become mothers as adolescents, and for their children, so this finding does not negate the need for an adolescent targeted parenting intervention mothers (Amongin et al., 2021; Fall et al., 2015; Steventon Roberts, Sherr, et al., 2022; Steventon Roberts, Smith, et al., 2022).

The relationship between the caregiver or parent, and the adolescent mother is critically important to understanding parenting stress; however, not across all domains. Living with a caregiver who is not biologically related, is not the biological parent of the adolescent or is not female, did not contribute to parenting stress. Self-rated levels of feeling supported also was not associated with parenting stress. Monitoring of adolescent behaviour

and positive rewards for good behaviour did not have effects on the adolescents' parenting stress when parenting their own young children. Openness of communication is associated with parenting stress. Adolescents feeling anxious or cautious when communicating with their caregiver contributed 0.254 increase in the standard deviation of the parent stress variable. Parent or caregiver communication with adolescents should be explicitly supported during interventions. Given the likely co-parenting nature of the family unit, it is important that any new parenting skills taught to adolescents are also taught to their caregivers. Open and comfortable communication can better facilitate this and decrease parenting stress. Additionally, a Kenyan study showed that open and clear communication on sexual behaviour, family planning and HIV can positively contribute to adolescent development and protective sexual behaviours such as condom use (Muthengi et al., 2015).

Individual psychosocial factors including drug and alcohol use, mental illness, exposure to domestic violence or arguments and exposure to abuse did not significantly contribute to parenting stress in this study. It should be noted that that some of these variables had small numbers of adolescents affected, and this has likely impacted the analysis. However, the incidence and variance in this sample of mental illnesses was substantial enough to consider some conclusions. Adolescents with mental illnesses might be more disconnected from their children and rely on their own caregivers more heavily to fulfil parenting duties. It is possible that an observational study of parenting practices might detect differences in levels of harsh or intrusive parenting or absent parenting for adolescent mothers experiencing mental illnesses. Mental illness did significantly contribute to parenting stress in bivariate analysis but was not significant in the nested multivariate regression when economic factors and child-oriented factors were included. This underlines the relative importance of these variable groups for understanding adolescent parenting stress.

Amongst the socio-economic variables, having access to the child grant, number of child grants per household and number of any grants per household did not impact parenting stress. Food security indicated by three meals per day for the last week, was important to decreasing parenting stress. Additionally having support to buy food and clothes for children from more people was also associated with decreasing parenting stress. Parenting challenges are exacerbated by living in poverty. Families living in poverty are at increased risk for family and community violence, lack of access to childcare and child development programs, health and nutrition problems and mental health issues (Beasley et al., 2022). All these impact on child development resulting in socio-emotional and cognitive delays. These delays often co-occur with problematic behaviours adding an additional level of strain on parents. Poverty has adverse effects on parental sensitivity and responsiveness and is associated with harsh parenting and insecure parent-child attachment (Wray, 2015). Parenting interventions for adolescent parents need to consider the impact of poor food security on the whole family. Interventions should include information about how to access community support services and assist to develop a family budgeting plan.

Finally, the child-oriented variables, crying children, child disabilities and parenting enjoyment; were added to the model. It is noteworthy that all child-oriented variables were significant in the multivariate regression emphasising the importance of the parent-child relationship to adolescent experiences of parenting stress. In particular, no children crying decreased parenting stress by 0.29 of a standard deviation on the Parenting Stress Scale, when other variables were held constant. Adolescent parenting programs need to both increase skills for managing the difficult or challenging behaviours concurrent with highly emotional children and children with disabilities. Concurrently they must build positive affect between the parent and their young child through playful parenting, so that the experience of parenting

is rewarding. This recommendation is supported by Berry and Jone's (1995) theory that the overall experience of parenting consists of a cost-benefit experience of stress and enjoyment.

Limitations

This analysis utilizes cross-sectional analysis of cohort data. As such there are limitations in terms of comparison with other populations. Whilst this study does establish the profile of parenting stressors for adolescent parents, it is unclear whether their levels of stress are higher than stress experienced by older parents. Additionally, there are known risk factors that have only small subgroups in this sample, such as young people affected by use of drugs or alcohol, mental illness, domestic violence, or other abuse.

The participants in this study were recruited from a single resource-scarce area in South Africa, experiencing poverty and disadvantage across multiple dimensions. As such, the findings should be applied cautiously to adolescents in other living environments. In particular, the economic variables so important to this sample may be less relevant in other contexts.

The study did not track the sequence and time proximity of sexual debut, first pregnancy, HIV diagnosis, and other disruptive subsequent events such as school exclusion. Understanding the incidence of these events may give a deeper understanding of adolescent parenting stress and indicate timepoints at which interventions may have more impact. Additional qualitative explorations may bring depth of understanding to this area.

Larson (2004) and Naidoo et al., (2021) make an interesting point about the framing of research that centres on childbearing during adolescence. Naidoo et al., (2021) notes that conceptualisation of teenage pregnancy in the research literature is generally pathologizing, emphasising the crisis of adolescent parenthood and the negative outcomes for the mother and child. Larson comments that whilst researchers continue to identify adolescent mothers

by their early childbearing experience, the adolescent mothers themselves do not necessarily have a deficit view of early parenthood and may well describe having children as positively contributing to their growth and maturation. Naidoo et al., (2021) notes that there is evidence of agency and resiliency in the narratives of adolescent mothers, and that they are responsible and committed in their roles as mothers. These findings underscore the need to include resilience-based frameworks to researching the social issues touched on by this study.

CONCLUSION

Adolescent parents in resource-scarce environments experience unique parenting challenges. An adolescent parent program must consider the adolescent mother's own developmental needs, the important co-parenting relationship with the adolescent's caregiver and the challenges of living in a resource-scarce environment. Developmental needs can be reflected in the inclusion of goal setting, emotional regulation, and support for continued education. The adolescent-caregiver relationship may be strengthened by teaching open communication skills and ensuring that the adolescent's caregiver and other co-parents, is also aware of any new parenting strategies. This relationship also provides a good context for discussing family planning and sexual and reproductive health. Resource scarcity can be acknowledged in the recommendations of activities to do with young children and by inclusion of a family budgeting session, such as that piloted in the Parenting for Lifelong Health for Teens, South African intervention for parents of adolescents (Cluver et al., 2020). Overall, the intervention should balance both teaching positive parenting behaviours and promoting enjoyable activities for adolescents to do with young children. As no such program is readily available for adolescents in South Africa this research points towards the development and upscaling of a contextually relevant adolescent parenting program which may have applications in other resource-scarce environments across low- and middle-income countries.

SUPPLMENTARY RESULTS

FACTOR ANALYSIS

Variables were examined prior to factor analysis to determine that items had sufficient sensitivity to generate variance in answers, generally SD > 1. Additionally, the correlation between items was viewed to ensure that the scale items belong together without excessive overlap, r = 0.3 to r = 0.6. Exploratory Factor Analysis (EFA) was used to determine the number of factors scales loaded on. A scree of the eigen values indicated the likely number of factors. This was then tested with confirmatory factor analysis (CFA). We identified weakly performing items by seeing if the alpha and inter-item correlation would improve by removing the item.

The adapted Parenting Stress Scale items mainly had SD > 1, however the two enjoyment items (items 4 and 8) did not show strong sensitivity. Correlations ranged between 0 and 0.7 with some positive and some negative results suggesting that the items were unlikely to load on one item. The EFA indicated that the items loaded on two factors, and this was confirmed, alpha = 0.81, inter-item correlation = 0.35. The correlation between the six worry items and the two enjoyment items was significant r = 0.19, p < 0.01, 95%CI [0.12 – 0.24]. Removing the enjoyment items from the scale improved the alpha to 0.86 and inter-item correlation to 0.5. The two removed items were summed into one variable indicating parent enjoyment. We recognise that this represents a substantive deviation from the original scale which combined costs and resources to indicate a net parenting benefit or loss. However, the parent enjoyment items continued to be used in the analysis maintaining the interplay between costs and benefits whilst allowing regression outcomes to focus on parenting stress. These results are summarised in Table S1.

[Insert Table S1]

The adapted Child-Parent Communication Apprehension Scale for use with Young Adults (C-PCA, YA) items had reasonable SD of > 0.9 indicating variability in answers. Correlations ranged between 0 and 0.8 suggesting that the items were unlikely to load on one factor. The EFA indicated that the items loaded on two factors, and this was confirmed, alpha = 0.77, inter-item correlation = 0.41. However, one item was alone on the second factor and removing it improved the alpha to 0.85, with inter-item correlation improving to 0.59. The removed item was used in analysis as a stand-alone item. These results are summarised in Table S2.

[Insert Table S2]

No adjustments were made to the Alabama Parenting Questionnaire, on any of the subscales. For the Parental Positive Compliments subscale, there was an interitem correlation = 0.66, alpha = 0.92. For the Monitoring subscale, there was an interitem correlation of 074, alpha = 0.95.

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Figure 1: Age at First Pregnancy (years)

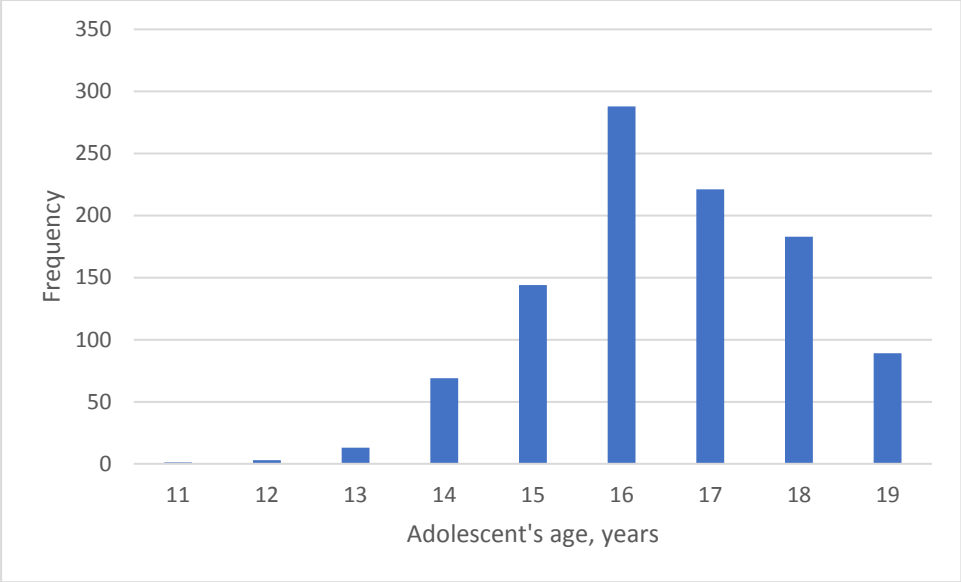

Figure 2: Categorical Distribution of Revised Parent Stress Scale

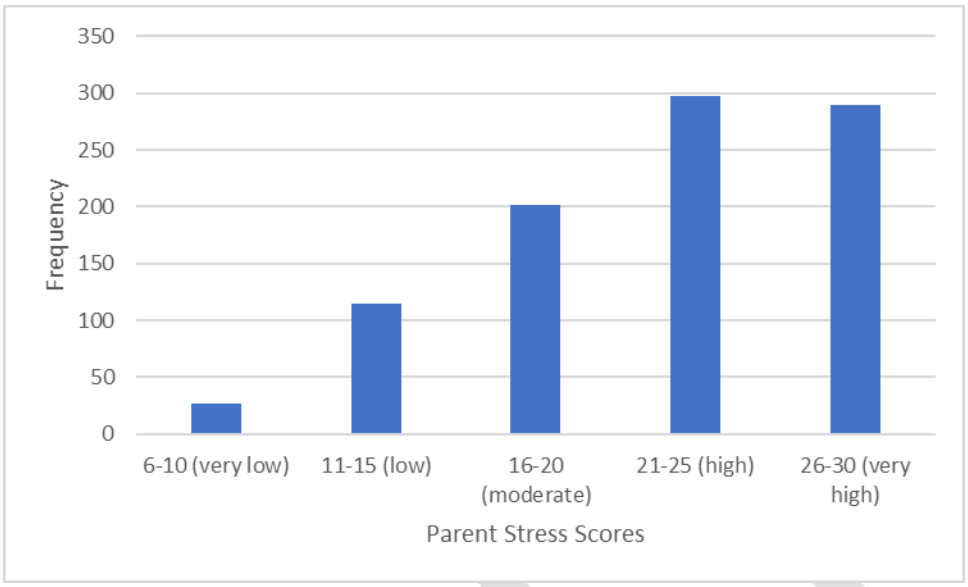

Table 1: Bivariate regression on parent stress, significant relationships only

IVs	β	95% CI	p	n	R^2
Demographic Variables					
Age of participant	0.25	0.03; 0.46	0.03	931	0.005
Number of children	1.55	0.31; 2.79	0.01	931	0.006
Adolescent Caregiver Relationship					
Anxious talking to caregiver	1.73	1.40; 2.05	0.001	931	0.11
Positive caregiver communication	-1.12	-0.24; -0.01	0.03	931	0.005
Psychosocial Variables					
No Mental Distress	-0.07	-0.13; -0.02	0.01	931	0.007
Poor Food Security	-0.32	-3.98; -2.37	0.001	931	0.06
Help with buying for child	-2.21	-2.79; -1.62	0.001	931	0.06
Child-oriented Variables					
No crying children	-0.30	-0.38; -0.22	0.001	931	0.06
Child with disability	1.70	1.02; 2.36	0.001	931	0.03
Enjoyment of children	0.92	0.61; 1.23	0.001	931	0.03

Table 2: Multivariate regression examining association between demographic, caregiver-adolescent relationship, psycho-social and child-oriented risk factors and parenting stress parent stress.

IVs	Model 1 - Demographic	Model 2 - Caregiver	Model 3 – Psycho-social	Model 4 - Child	Model 5 – Final with standardized beta
	β; 95%CI; p				β; p
Age of participant	0.17, [-0.05; 0.41], 0.13	0.16, [-0.06; 0.37], 0.15	0.05, [-0.15; 0.27], 0.59	-0.99, [-0.30; 0.10], 0.33	
Number of children	1.22, [-0.08; 2.530, 0.07	0.79, [-0.45; 2.03], 0.21	0.27, [-0.93; 1.46], 0.66	2.86, [1.50; 4.22], 0.001	0.14, 0.001
Anxious talking to caregiver		1.69, [1.37; 2.02], 0.001	1.47, [1.13; 1.80], 0.001	1.25, [0.94; 1.57], 0.001	0.25, 0.001
Positive carer communication		-0.11, [-0.21; 0.00], 0.06	-0.07, [-0.17; 0.06], 0.22	-0.10, [-0.20; 0.01], 0.06	-0.06, -0.05
No Mental Distress			-0.00, [-0.06; 0.06], 0.93	-0.15, [0.07; 0.04], 0.60	
Poor Food Security			-2.36, [-3.13; -1.58], 0.001	-1.64, [-2.38; -0.90], 0.001	-0.12, 0.001
Help with buying for child			-1.76, [-2.31; -1.21], 0.001	-1.44, [-1.98; -0.90], 0.001	-0.15, 0.001
No crying children				-0.37, [-0.45; -	-0.29, 0.001

				0.28], 0.001	
Child with disability				1.28, [0.64; 1.91], 0.001	0.11, 0.001
Enjoyment of children				0.90, 0.62; 1.17], 0.001	0.18, 0.001
n	931	931	931	931	931
R^2	0.01	0.11	0.18	0.28	0.28

Table S1: Summary of Parenting Stress Scale factor loadings (rotated), uniqueness and SD

Item	SD	Factor 1	Factor 2	Uniqueness	Outcome
1. I sometimes worry whether I am doing enough for my children	1.3	0.75	-0.04	0.44	Retain
2. The major source of stress in my life is my children.	1.4	0.67	0.13	0.54	Retain
3. I am very busy and have little free time because of my children.	1.5	0.57	0.23	0.59	Retain
4. I enjoy spending time with my children.	0.5	-0.32	0.71	0.40	Remove
5. Having children is too expensive.	0.9	0.71	-0.09	0.49	Retain
6. It is difficult to balance different responsibilities because of my children.	1.3	-0.71	-0.09	0.49	Retain
7. Having children means too few choices and too little control over my life.	1.2	0.78	0.14	0.37	Retain
8. I find my children enjoyable.	0.8	-0.33	0.72	0.39	Remove

Table S2: Summary of adapted C-PCA, YA factor loadings (rotated), uniqueness and SD

Item	SD	Factor 1	Factor 2	Uniqueness	Outcome
1. I am comfortable talking about sex and medication with my parents or caregivers.	1.3	0.52	0.43	0.54	Retain
2. I am relaxed with my parent or caregiver, I can talk to them openly.	0.9	0.85	-0.10	0.27	Retain
3. I have no fear in discussing problems with my parent or caregiver.	0.9	0.86	-0.10	0.25	Retain
4. I have no fear telling my parents or caregivers exactly how I feel.	0.9	0.85	-0.14	0.26	Retain
5. When I talk to my parent or caregiver I am anxious and careful about what I say (reverse coded).	0.9	0.13	0.52	0.72	Remove, but include in analysis independently