



Maternal Subjective Wellbeing and the Cognitive and Socioemotional Outcomes of 3- to 4-Year-Old Children in Nigeria

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Abstract

Evidence linking maternal subjective wellbeing (SWB) to early childhood development (ECD) is scarce. Subjective wellbeing measures an individual's negative and positive affect, life satisfaction, and optimism for the future. During ECD, growth occurs in family niches where a mother's physical, emotional, and mental wellbeing affects her child through processes that harness motor, cognitive, and socioemotional functioning. Few studies in Nigeria have examined the SWB of women and much less its association with ECD outcomes. This study examined the association of maternal and caregiver SWB with child literacy and cognitive and socioemotional indices. We posit that a primary caregiver's dissatisfaction with life and hopelessness may predispose their child to poorer developmental outcomes. We conducted a structural equation modeling using Stats 16 E and data from a nationally representative sample of Nigerian women 15 to 24 years and their focal child 3- to 4 years old ($N = 3176$). Findings suggest an average to a high level of SWB among the women. The SWB construct had a weak, inverse association with child outcomes. The weak direct path does not change when standardized or mediated by family investments such as early education, children's books, or stimulating activities with the child (total effects -0.04). The results also highlight the positive strength of the association of family investments and its robust path to child outcomes (total effects, 0.79 , $p < 0.001$). The study suggests that SWB is a weak proxy for mental health. Findings also underscore the need to invest in child development, child engagement, and family strengthening programs.

Keywords Maternal subjective wellbeing · Early childhood development · Family resources · Engagement with child · Early education

Highlights

- Nationally representative sample showed a high subjective wellbeing (SWB) level among mothers/caregivers aged 15–24 years old.
- Religion and educational level are associated with high levels of SWB.
- Maternal happiness, life satisfaction, and optimism have weak and inverse associations with child development outcomes.
- Investment in early education, children's books, and stimulating activities is associated with higher child development indices.

Subjective wellbeing (SWB) is defined as a combination of the eudemonic (positive functioning) and the hedonic

(happiness and life satisfaction) features of an individual's wellbeing (Diener, 1984; Keyes, 2006). Subjective wellbeing comprises positive affect, negative affect, and life satisfaction, and is the cognitive-judgmental or information appraisal-based aspect of wellbeing. Studies describe high levels of SWB as a state of complete mental health where an individual is flourishing (Howell et al., 2013; Keyes, 2002). Given the significance of maternal mental health and wellbeing and its impact on child development, it is essential to understand how measures of maternal SWB are associated with early childhood development. There is ample evidence that a mother's physical, emotional, and

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mental wellbeing will affect her child's development. During the early childhood developmental window, factors associated with low maternal SWB may predispose the child to adverse experiences (Black et al., 2017), and the outcomes are largely unknown in the context of sub-Saharan Africa (SSA). The number of studies focused on SWB in Nigeria or sub-Saharan Africa is few and far between (Addai et al., 2014; Botha et al., 2018; Tsai & Dzorgbo, 2012). Moreover, studies in other contexts have focused on components of the SWB construct, primarily life satisfaction and its influence on children's cognitive and non-cognitive skills (Nikolaou, 2017; Richter et al., 2018), and these have mainly been in Western and High-Income Countries (HIC).

The nascent level of research on maternal wellbeing in SSA points to the need for measures that can track the adverse consequences of poverty, stress, and other social determinants of mental health (Mnookin, 2016). The need for evidence is especially true for Nigeria's population of over 200 million people, where the burden of common mental health disorders, such as symptoms of anxiety and depression, is often underestimated (Abdulmalik et al., 2019). Pockets of research in Nigeria paint a gloomy picture of the prevalence of mental health problems among pre- and postpartum women, where an estimated 19–25% of women suffer from depression (Gureje et al., 2019). This study examined how maternal SWB, in a sample of Nigerian women, is associated with early childhood outcomes, specifically in the literacy-numeracy, cognitive, and socio-emotional domains. The SWB construct was included for the first time in the UNICEF Multiple Indicator Cluster Surveys (MICS) in Nigeria in 2016/2017 and provided a unique opportunity to examine its utility in a nationally representative sample (National Bureau of Statistics (NBS) & United Nations Children's Fund (UNICEF) 2017; Owumi & Eboh, 2021). More so, the SWB module was administered only to young men and women, 15 to 24 years old, whose reproductive, economic, and social decisions impact the future of Nigeria's children. This study could highlight disparities in the intergenerational impact of maternal wellbeing on child outcomes across the multi-ethnic and diverse socioeconomic groups of the country, and proffer pointers to improve outcomes.

Subjective Wellbeing

Subjective wellbeing assesses an individual's evaluation of their life and highlights their satisfaction with their past and present, positive emotions, and outlook toward the future (Diener, 1984; Lim et al., 2017). Scholars suggest that mental health is a broad state of SWB (hedonic and eudaimonic), including the absence of common mental

disorders, and where the best mental state is when one is flourishing (opposite of languishing) and where there is no diagnosis based on the statistical manual of mental disorders, including depression (Diener et al., 2017; Keyes, 2002, 2006). Maternal Subjective Wellbeing (SWB) is conceptualized in terms of life satisfaction, overall happiness, and perception of a better future (National Bureau of Statistics NBS and United Nations Children's Fund UNICEF, 2022; (NBS & UNICEF, 2017) and is often linked to the quality of relationship with spouse/partner and infant temperament. Studies also indicate that high levels of SWB are associated with an increase in a country's wealth or gross domestic product (GDP) (Diener et al., 2017; Keyes, 2006). Although not the focus of this study, the suggested correlation between SWB and GDP somewhat contradicts Nigeria's reality. Indeed, while Nigeria's GDP rose in the past decade, the extremely low life expectancy for women (56 years) (Alloh & Regmi, 2017) and high rates of infant mortality (54.740 deaths per 1000 live births) in the last two years (Alloh et al., 2018; Izugbara & Wekesah, 2017) do not reflect the suggested association between economic performance and SWB.

The lives of most mothers, in the Nigerian context, are characterized by poverty, high costs of living, cultural practices such as early marriage, and limited opportunities for social mobility (Ekpenyong et al., 2019; Iheanacho et al., 2015). Research indicates that overall, women were likely to report higher levels of wellbeing than men. More specifically, gender differences have been observed regarding the effect of religion on the SWB of older male and female adults (Afolabi & Aina, 2014), where women were more likely to report higher scores on self-esteem and life satisfaction. This, oddly, was associated with lower levels of education and, subsequently, lower aspirations. Another study reported that a mother's estimation of her life satisfaction and subjective happiness predicted her involvement with her child and subsequently mitigated the child's behavioral problems (Brajsa-Zganec & Hanzec, 2014; Richter et al., 2018). Furthermore, the psychological wellbeing (encompassing happiness, peace, fulfillment, and life satisfaction) of a sample of postpartum mothers ($n = 258$) in Nigeria was significantly associated with emotional (social support), along with age and level of education (Adejuwon et al., 2018).

Evidence also points to the complexity of the composition of the Nigerian family and living arrangement, where the extended family culture and polygamy are still widespread practice. It is common, in the Nigerian setting, for women between the ages of 15 and 16 years to be married, often to older men, and bear children at an early age (Agunbiade & Udenkor, 2012; Jimoh et al., 2018; National Population Commission [Nigeria] & ICF, 2019). Research suggests that a mother's position within the polygynous

structure of the household also has implications for SWB and the health of the mother and, consequently, for child outcomes (Owoo, 2018). The observation made here may be influenced by culture and the gendered norms of Nigeria's patriarchal society in which women have to negotiate and frame their wellbeing in the context of their families (Makama, 2013) and where successful, ultimately filter the benefits to their offspring.

Early Childhood Outcomes

When children have physical contact with others, primarily loving contact from a mother/caregiver, their neural circuits are stimulated, and growth and positive gene transcription occur, shaping their sensory-motor functions and development (Cozolino, 2017; Monk et al., 2013). Children need this nurturing care in health, nutrition, security, responsive caregiving, and early learning to reach their development potential (Beatson et al., 2022; Engle et al., 2007). Household resources, social or economic, that parents and caregivers have are a strong determinant of stability and subsequent cognitive and emotional development in their children (Braveman et al., 2011; Ramdahl et al., 2018). A mother's physical, emotional, and mental wellbeing and satisfaction with life reflect on her ability to nurture and facilitate outcomes for her child (Radey & Mcwey, 2021; Richter et al., 2018). Not only does mothers' engagement benefit child development, but a meta-analysis that examined the various outcomes associated with father involvement showed statistically significant outcomes for children whose fathers are involved in their developmental processes (Jeong et al., 2019; Jeynes, 2015). Overall, all mothers in household circumstances that place them at risk for mental health and well-being problems may transmit further risk for adverse, long-term psychopathological outcomes for their children. In this study, we argue that factors affecting a mother's SWB will influence her resources, interactions with her child, and subsequently, early childhood development outcomes.

Theoretical framework

This study adapted the family stress theory (Conger et al., 1992) and the family investment model (Conger & Donnellan, 2007) to underscore the interplay of family circumstances, primarily maternal (subjective) wellbeing and resources, and their association with child development. The basic premise of the family stress model is that how parents experience and manage stressful conditions impacts their emotions and behavior and that parents' altered behavior may play a role in outcomes for their children (Conger et al., 1992, 1994). The family stress model (see Fig. 1) posits that the strain and pressure that result from

unconducive life circumstances are instrumental to mood and behavior changes among family members, primarily parents. Stressors alter the course of parents' lives and the quality of their interactions with their children and may result in lower cognitive, learning, emotional, and behavioral outcomes in children. While the family stress model has been used extensively in Western contexts, one study in Kenya (Kumar et al., 2018) to our knowledge integrated the model with the adverse childhood experiences framework (ACES) to highlight the association of adverse maternal experiences with child outcomes.

Additionally, the family investment model (Conger & Donnellan, 2007) posits that higher income and educational levels will predispose parents to more significant investments (substantial and interpersonal) made toward their children's developmental processes (see Figs. 2 and 3). Families' investments and economic capability are associated with parenting practices (Ramdahl et al., 2018). We also adapt the family investment model to posit that the resources invested toward child development (in this study, provision of play materials, children's books, or facilitating enrollment in early education) and the mother's ability and disposition to nurturing, involved parenting (number of stimulating activities with the child) will be associated with early childhood outcomes.

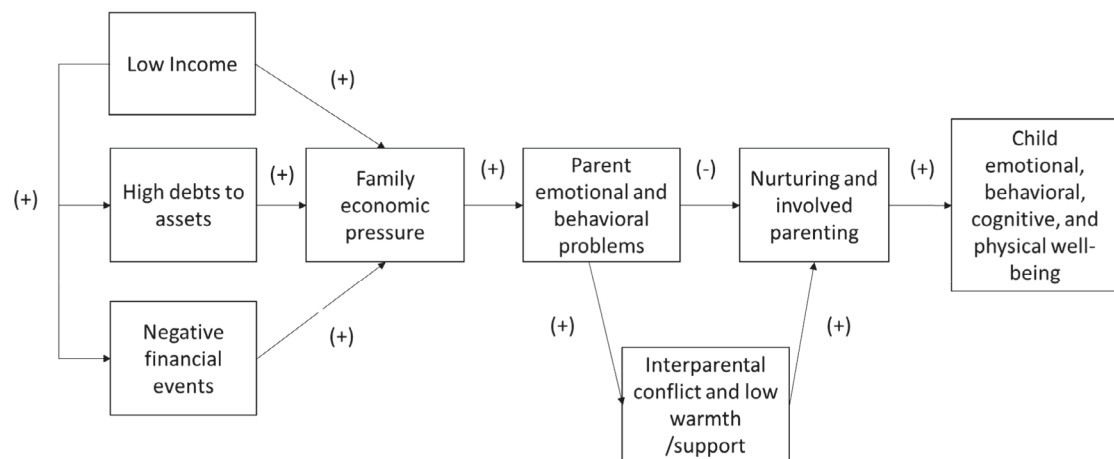
Combining the family stress theory and the family investment model, we posit that family socioeconomic situation and pressure are associated with parents' emotions, resourceful behavior, and child outcomes. As depicted in Fig. 4, this study adapted both models to explore pathways that examine whether:

1. Mothers with higher levels of education, having higher family wealth index, and living in urban areas (high socioeconomic status) will have higher levels of SWB (life satisfaction, overall happiness, and perception of a better future [optimism]).
2. Mothers with higher levels of SWB will be more involved and invest more resources toward their child's development thus having higher child development outcomes.
3. Higher levels of socioeconomic status will be associated with more resources and investment in the child and, subsequently, higher child development outcomes.

Methods

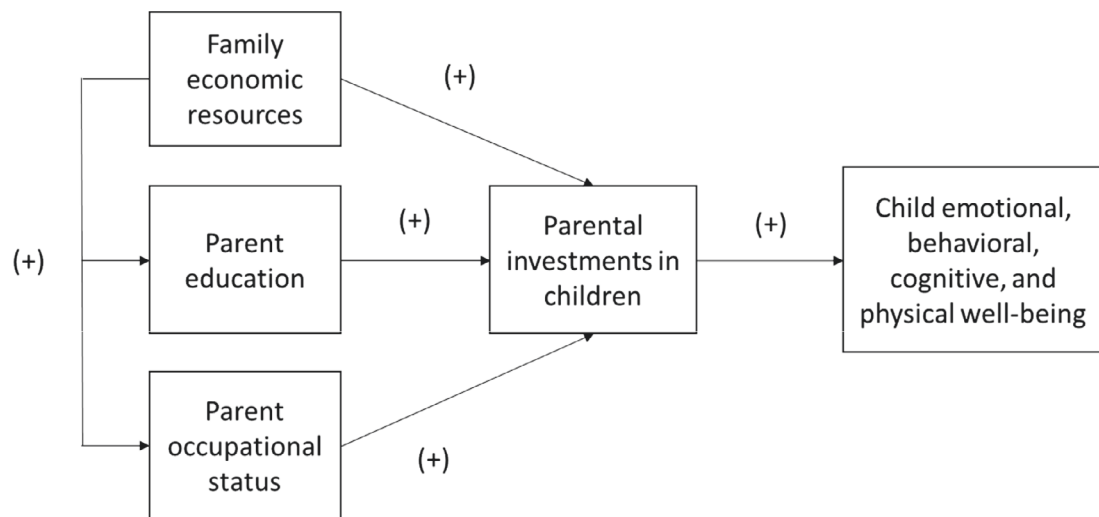
Participants and Procedures

Data for this study was obtained from the fifth round of the MICS conducted in Nigeria (National Bureau of Statistics (NBS) & United Nations Children's Fund (UNICEF), 2017).



(Source: Conger & Donnellan, 2007)

Fig. 1 The family stress model



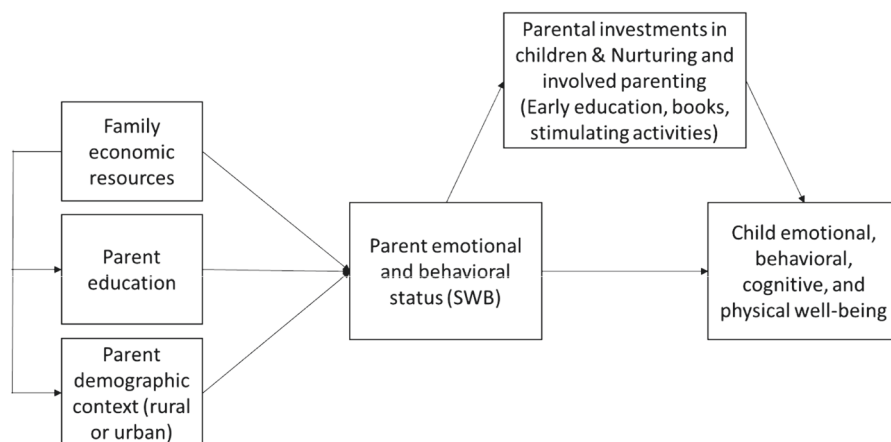
(Source: Conger & Donnellan, 2007)

Fig. 2 The Family investment model

The MICS are household surveys that provide internationally comparable estimates of adult and child socioeconomic and health indicators. The Nigeria MICS used the 2015 updated population-housing census that included rural and urban areas as the primary sampling units and a 2-stage sampling design of the first 2360 enumeration areas (60 per state). In the second stage, 16 households were systematically drawn from each sample enumeration area. Designed to support the measurement of the Sustainable Development Goals (SDGs) indicators, the survey contained household, women, men,

and child modules. Survey questions were administered to women and men ages 15 to 49 years from 33,901 households (response rate 98.9%). The SWB module was administered only to people 14 to 24 years old. In this study, mothers or primary caregivers provided information on the focal child under 3 to 4 years old. Using the Stata 16 E statistical package, the data were cleaned, examined for outliers and analyzed. The current study was deemed exempt from ethics review by the Boston College Institutional Review Board (IRB) and no human participants were contacted.

Fig. 3 Theoretical model of the association between maternal subjective wellbeing and child outcomes



(Source: Authors, 2023)

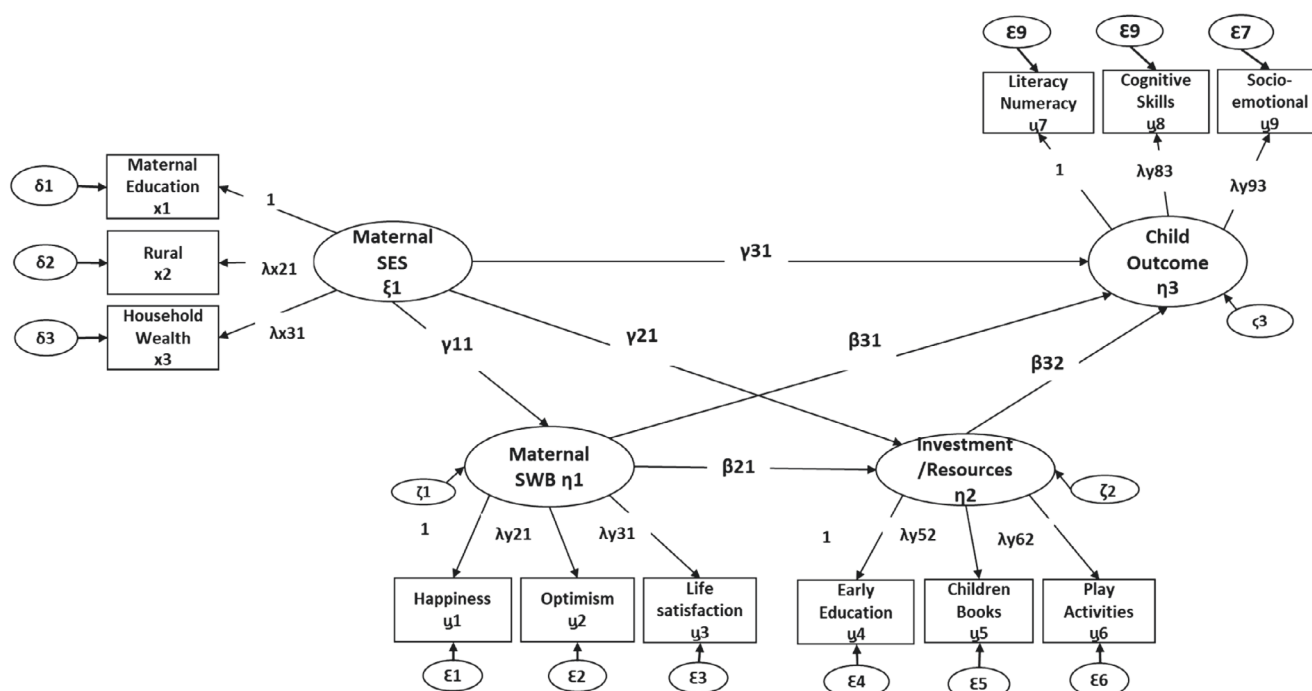


Fig. 4 Hypothesized SEM model and specifications of a fully latent framework of the association between maternal SWB and child literacy, learning approach, and socioemotional indicators

Of the women aged 15–24 ($n = 12,637$) in the sample who responded to the SWB questions, approximately 1558 had children aged three or four years eligible for the childhood outcome questions. The final sample comprised 3,116 mothers/caregivers and their focal child. The mothers/focal children lived in households inhabited by a range of 2 to 29 persons (mean 6.4, SD 3.4). Most mothers (95%) were in a union, with 88% currently married and 6% living with a man. Mothers 20–24 years old (90% of the sample) were more likely to have had secondary education and above (94%) than the mothers aged 15–19, a statistically significant

association. Seventy percent of the mothers had a primary level or no formal education, 72% were not formally employed, 72% had Islam as their head of household's religion, Christianity (27%), traditional/none (18%) which aligned with their ethnicity and were strongly correlated with child outcomes (For instance, being Igbo 0.68***, Yoruba 0.66*** and Hausa -0.43 ***, $p < 0.001$ were correlated with higher child outcomes). Most of the households in the study (82%) were situated in rural areas. The focal children in the sample were aged three years (57%) and four years (43%), including 49% females, see Table 1.

Table 1 Descriptive statistics and measures of the overall sample of mother and child dyad ($n = 1558$)

	<i>N</i> (%)	Women 15–19 years <i>N</i> = 156 (10%)	Women 20–24 years <i>N</i> = 1402 (90%)	Chi-Square Value χ^2
Mother's age				
15–19 years	156 (10)			
20–24 years	1402 (90)			
Religion				
Traditional/none	18 (1)			
Christianity	415 (27)			
Islam	1115 (72)			
Household wealth quintile				
Lower quintiles (Poorest/second)	857 (55)			
Mid to upper quintiles	691 (45)			
Currently living with a man (Yes)	1472 (95)	138 (10)	1315 (91)	4.78*
Educational level				
None/Primary/nonformal	1085 (70)	125 (12)	944 (88)	12.74***
Secondary/Higher	470 (30)	27 (6)	440 (94)	
Rural Dweller	1275 (82)	139 (91)	1120 (81)	10.25***
Employed	435 (28)	31 (20)	396 (29)	4.61*
Ever lost a child (Yes)	226 (17)			
Subjective Well-being				
Very satisfied overall	963 (61)	93 (61)	853 (62)	0.01
Overall happiness	969 (62)	105 (11)	850 (89)	3.4
Optimism	1072 (69)	104 (10)	956 (90)	0.03
Child				
Child's age				
3 years	879 (57)			
4 years	674 (43)			
Child's sex				
Female	763 (49)			
Literacy-numeracy (On track)	502 (33)	37 (24)	465 (34)	5.33*
Approaches to learning (On track)	1187 (77)	111 (73)	1076 (78)	1.74
Socioemotional (On track)	1514 (99)	150 (99)	1364 (99)	0.02
Attends early education	405 (26)	24 (16)	381 (28)	9.72**
Stimulating activities (None)	703 (46)	135 (89)	1135 (82)	4.4*
Has at least 1 toy (Home or shop)	777 (50)	64 (42)	708 (51)	4.49*

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Measures

The structural and measurement models analyzed comprised four exogenous and endogenous items namely maternal SWB construct, maternal socioeconomic construct, investments in child development, and child outcomes. As defined by the MICS, the SWB latent endogenous construct consists of life satisfaction, overall happiness, and perception of a better future (NBS & UNICEF, 2017). Scholars describe optimism or perception of a

better future as an ‘inclination to hope’ (Conversano et al., 2010). Optimism as a positive orientation toward life and measure of SWB is associated with quicker recovery, planning, problem-solving and better mental health outcomes (Achat et al., 2000; Conversano et al., 2010). Scholars have linked optimism (perception of a better future) to quicker recovery, planning, problem-solving, and better mental health outcomes (Achat et al., 2000; Conversano et al., 2010). The perception of future wellbeing or a better life item asked two questions (a weak Cronbach's

alpha of 0.53): “Compared to this time last year, would you say that your life has improved, stayed more or less the same, or worsened, overall and, in one year from now, do you expect that your life will be better, will be more or less the same, or will be worse, overall?” These items were re-coded, combined to create a scale, and converted to a dichotomous item for optimism.

The happiness measure refers to hedonic pleasure (Ryan & Deci, 2001). The overall happiness item asked, “First, taking all things together, would you say you are very happy, somewhat happy, neither happy nor unhappy, somewhat unhappy, or very unhappy? This item was re-coded to a dichotomous item of women who were or were not happy overall.

The life satisfaction measure comprised nine items that asked for the woman’s level of satisfaction with family life, friendships, current job, health, where she is in life, where she lives, how people around generally treat her, the way she looks, her life, and her overall life satisfaction. Optional responses include very satisfied, somewhat satisfied, neither satisfied nor unsatisfied, somewhat unsatisfied, or very unsatisfied. Most women were not in school or employed, so items asking for satisfaction in those areas were not included. The remaining seven items (Cronbach’s alpha, 0.85) were used to create a life satisfaction scale and re-coded to a dichotomous measure of women who were either satisfied with life or not. Preliminary confirmatory factor analysis for the life satisfaction items showed an adequate fit to one factor.

To examine the household socioeconomic status as shown in Fig. 4, this latent exogenous measure comprised items measuring the household wealth quintile, maternal level of education, and family’s geographic context. The household wealth index quintile, which is a computed measure based on the different material resources such as television, car, type of roofing, flooring, source of water, or toilet facilities available (NBS & UNICEF, 2017), was re-coded into households in the lower and upper quintiles. Maternal level of education was re-coded into a binary measure for women with secondary school education/above and women with primary, non-formal education or none. At the same time, the geographic location of the household was a binary measure indicating rural or urban residence.

The third latent endogenous measure highlighted the mother/caregiver’s engagement in child development and examined investments in time or resources. We used three items, namely the number of color or picture books a child had (none or one or more books), and the number of stimulating activities (such as reading books/picture books, telling stories, singing to or with the child, taking the child outside the home, playing with the child, or naming, counting, drawing for or with the child) that the mother/caregiver engaged with the child in the past three days.

The number of stimulating activities was converted to a scale and re-coded to none or one or more activities. The third item asked if the child is enrolled in an early education program, a binary item coded as yes or no.

The fourth and ultimate endogenous measure represents the child’s developmental status or outcome. Eight items from the literacy-numeracy, approach to learning, and socioemotional domains ($\alpha = 0.70$) taken from the MICS 10-item Early Childhood Development Index (ECDI) were used. Two items in the physical domain that asked about the child’s health and the pincer grasp were dropped as they are not ideal milestones for this age group and did not perform well on the scale (Enelamah et al., 2023). The items in the literacy-numeracy domain asked if the child could name or identify at least ten items of the alphabet, name and read at least four simple, popular words, and know the name and recognize the symbol of all numbers from 1–10. The cognitive approaches to the learning domain had two items that asked if the child follows simple directions correctly and could conduct an independent task. The socioemotional domain asked if the child gets along well with other children, if the child kicks, bites, or hits other children or adults, and if the child is easily distracted (Loizillon et al., 2017). Scales from each domain were re-coded to binary “yes or no” items.

Analytical Approach

A descriptive analysis of the sample and a non-parametric correlation analysis of the SWB construct with other maternal and child predictors were carried out. We also conducted a confirmatory factor analysis of each of the latent items—socioeconomic status, SWB, investment and learning resources, and child outcomes and confirmed their goodness of fit statistics. A structural equation model (SEM) was conducted using STATA 16 to assess the relationship between the mother’s SWB, socioeconomic status, investment, and resources and the child’s literacy, learning, and socio-emotional outcomes.

Model specification and identification

The hypothesized model (see Fig. 4) was used to examine the association between the primary construct, maternal SWB and child literacy, cognitive and socioemotional outcomes, and covariates maternal SES and investment and resources. There were 12 regression coefficients, 12 error variances, and six co-variances (30 parameters) to be estimated. With 12 observed items ($12(12 + 1)/2$), there were 78 data points; thus, the model was over-identified with 48 degrees of freedom (Byrne, 1998).

Results

Fewer children, 26% of the sample, were enrolled in an early childhood education program irrespective of age (4-year-olds, 29%, and 3-year-olds, 24%). Fifty percent of the children in the sample had at least one toy, whether homemade, bought, or objects found lying around the house, while only 17% of the children had at least one children's book or picture book in their homes. On average, more children (30%) had not been engaged in stimulating activities by their mothers in the past three days. However, 56% of the children had been involved in at least one activity. The number of stimulating activities was positively and statistically significantly ($p < 0.001$) correlated with a higher level of maternal education (0.24***), household wealth (0.23***), and the number of books in the house (0.24***), and negatively correlated with living in an urban area (-0.12^{***}). Attending early education was positively correlated with the number of children's picture books in the house (0.53***), mother's education (0.47***), wealth quintile (0.41***), and negatively associated with living in a rural area (-0.16^{***}). These associations were statistically significant ($p < 0.001$) for women aged 15–19 years, and 20–24 years.

The three items that constitute the SWB construct (life satisfaction, overall happiness, and optimism for a better future) had an internal consistency value, Cronbach's alpha of 0.64. On average, 61% of the mothers were happy with their lives overall, 69% were optimistic in their perception of better future wellbeing, and 61% were satisfied with their lives. There was a strong correlation among the SWB items ranging from 0.60*** between overall happiness and life satisfaction to a medium correlation, 0.29*** between overall happiness and optimism. There was no statistically significant difference in levels of the SWB between mothers in the two age groups, 15–19 or the 20–24-year-olds. The items that constitute SWB had weak correlations with other family, mother/child, and demographic items (such as household size and mother's age). Except for the household wealth quintile and the mother's educational level, none of these items were statistically significant in their association with the SWB items. Life satisfaction was associated with increased stimulating activities engaged with the child (0.24**). In addition, life satisfaction was mildly but statistically significantly correlated ($p < 0.001$) with items such as religion (0.14***), living in an urban area (0.10**), wealth (0.10**), and mother's education (-0.10^{***}).

Model Estimates and Fit Assessment of the Four Latent Constructs

Confirmatory factor analysis for the four latent measurement models was saturated, namely socioeconomic status,

Table 2 Coefficients from CFA of maternal household socioeconomic status ($n = 1558$)

Factor loadings (Observed → Latent Construct) Measurement model	Unstandardized coefficients (SE)	Standardized coefficients (SE)
Wealth	1	0.88 (0.02)***
Mother's education	0.76 (0.05)***	0.62 (0.02)***
Rural-urban	0.60 (0.04)***	0.58 (0.02)***
Measurement Error Variances		
e.Wealth	0.04 (0.01)	0.04 (0.04)
Mother's education	0.13 (0.01)	0.03 (0.12)
Rural-urban	0.10 (0.00)	0.03 (0.00)
e.Latent SES construct	0.14 (0.01)	1
Fit Statistics		
Overall parameter fit		0.82
Chi-square (df)		(0)***
SEA		0.00
CFI		1.0
TLI		1.0
SRMR		0.0
CD		0.82

*** $p < 0.001$

the SWB construct, child investment/resources, and the child outcomes with three indicators each (just identified models). Each of the 12-factor loadings for the four measurement models was statistically significant ($p < 0.001$) and strong. For the socioeconomic latent construct, standardized factor loadings include 0.88 (0.02) from the household wealth quintile, 0.62 (0.02) from the mother's educational level, and 0.58 (0.02) from rural dwellings. For the SWB latent construct, factor loadings were 0.77 (0.03), 0.68 (0.03), and -0.42 (0.02) from the life satisfaction, overall happiness, and optimism predictors, respectively. Factor loadings to the investment toward child development include 0.44 (0.03) from number of stimulating activities with child, 0.72 (0.03) from early education, and 0.75 (0.03) from picture books available in a child's home, see Tables 2–5.

For the child development outcome latent construct, factor loadings from the literacy/numeracy 0.23 (0.06), cognition and approaches to learning 0.80 (0.18), and socioemotional development 0.24 (0.06) were also statistically significant and positive ($p < 0.001$). All the latent constructs had acceptable fit statistics and required no modifications (see Tables 2 and 3). However, as latent constructs, the items had lower than preferred internal consistency as shown by their Raykov's factor reliability coefficient—socioeconomic status latent (0.64), subjective wellbeing latent (0.67), investment latent (0.67), and child

Table 3 Coefficients from CFA of the maternal subjective wellbeing construct ($n = 1558$)

Factor loadings (Observed → Latent Construct) Measurement model	Unstandardized coefficients (SE)	Standardized coefficients (SE)
Life satisfaction	1	0.77 (0.03)***
Overall happiness	0.89 (0.08)***	0.68 (0.03)***
Optimism	0.51 (0.01)***	0.42 (0.04)***
Measurement Error Variances		
e.life satisfaction	0.10 (0.02)	0.41 (0.05)
e.overall happiness	0.12 (0.01)	0.53 (0.02)
e.optimism	0.18 (0.01)	0.83 (0.06)
e.Latent construct SWB	0.14 (0.01)	1
Fit Statistics		
Overall parameter fit		0.72
Chi-square (df)		(0)***
RMSEA		0.0
CFI		1.0
TLI		1.0
SRMR		0.0
CD		0.72

*** $p < 0.001$ **Table 4** Coefficients from CFA of the Child Investment and Resources construct ($n = 1558$)

Factor loadings (Observed → Latent Construct) Measurement model	Unstandardized coefficients (SE)	Standardized coefficients (SE)
Stimulation	1	0.44 (0.03)***
Early education	1.61 (0.13)***	0.72 (0.04)***
Children's Books	1.42 (0.11)***	0.75 (0.03)***
Measurement Error Variances		
e.Has early education	0.09 (0.01)	0.48 (0.04)
e.Stimulation	0.16 (0.01)	0.80 (0.12)
e.Children's books	0.06 (0.01)	0.44 (0.00)
e.Latent construct	0.04 (0.01)	1
Fit Statistics		
Chi-square (df)		(0)***
Overall parameter fit		0.72
RMSEA		0.00
CFI		1.0
TLI		1.0
SRMR		0.0
CD		0.72

*** $p < 0.001$ **Table 5** Coefficients from CFA of Child literacy-numeracy, learning, and socioemotional ($n = 1558$)

Factor loadings (Observed → Latent Construct) Measurement model	Unstandardized coefficients (SE)	Standardized coefficients (SE)
Literacy-numeracy	1	0.23 (0.04)***
Approaches to learning	2.71 (1.26)***	0.80 (0.18)**
Socioemotional	0.88 (0.17)***	0.24 (0.06)***
Measurement Error Variances		
e.Literacy-numeracy	1.02 (0.0)	0.94 (0.03)
e.Approaches to learning	0.25 (0.20)	0.37 (0.29)
e.Socioemotional	0.75 (0.04)	0.94 (0.03)
e.Latent construct	0.06 (0.03)	1
Fit Statistics		
Chi-square (df)		(0)***
Overall parameter fit		0.65
RMSEA		0.0
CFI		1.0
TLI		1.0
SRMR		0.0
CD		0.65

*** $p < 0.001$, ** $p < 0.01$

outcome latent (0.47). Coefficients greater than or equal to 0.7 are usually preferred.

Structural regression of final model

An initial analysis of the final model revealed a good fit between the model and the data using recommended standards (Schreiber et al., 2006); refer to Table 6 and Fig. 5. The chi-square value of 258.83 with 48 degrees of freedom was statistically significant ($p < 0.001$), and other fit statistics were within the normal range. The pattern of standardized coefficients in the final model was similar to the initial pattern of the CFA of the latent constructs; refer to Table 4 and Fig. 5. There was an observed strong and statistically significant covariance between maternal SES, represented by living in a rural area, lower levels of maternal education, and household wealth and the child and outcomes (0.58, $p < 0.001$). Similarly, and as expected, maternal SES had a strong covariance with resources invested in child development (0.74, $p < 0.001$). There was also a high and statistically significant covariance between investment and resources for child development and the child outcome latent construct (0.79, $p < 0.001$). When modifications were requested, a suggested addition of the covariance between the error term of living rural and household wealth quintile

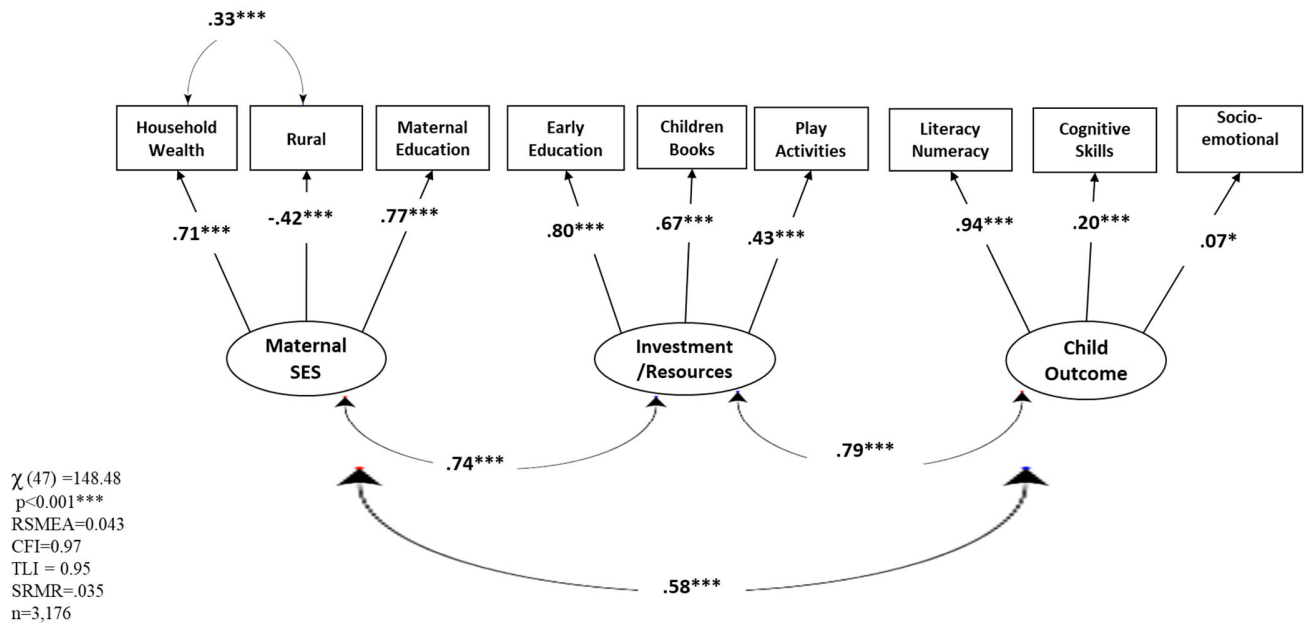


Fig. 5 Standardized coefficients from the results of an SEM (structural regression) model of child outcomes

yielded a covariance of 0.34 (0.02) statistically significant at $p < 0.001$. The modified model with error terms of being rural and wealth quintile was a better model than the first with lower chi-square and degrees of freedom that were statistically significant (148.48 (47), $P < 0.001$). Other fit indices, such as the CFI (0.97), were within the ideal > 0.90 value. The RMSEA = 0.043 was less than 0.08, TLI = 0.95 within the recommended (Byrne, 1998; Schreiber et al., 2006) greater than 0.95 value, while the SRMR = 0.035 was within the ideal recommended value of less than 0.08 (see Fig. 5). At the equation-level goodness of fit, the overall R-squared for the model was 1.0, suggesting that the variables in the data had 100% success in predicting the model, with the subjective wellbeing latent and socio-emotional items accounting for the most negligible variation in the child outcomes, having the lowest R-squared values 0.02 and 0.00 respectively (See Table 6 and Fig. 5).

Discussion

This study examined the association between maternal SWB and early childhood outcomes, specifically in the literacy-numeracy, cognitive, and socioemotional domains. We hypothesized that mothers with higher levels of education, having higher family wealth index, and living in urban areas (high socioeconomic status) will have higher levels of SWB (life satisfaction, overall happiness, and perception of a better future [optimism]). We extended this hypothesis to posit that mothers with higher levels of SWB will be more involved and invest more resources toward

their child's development, thus having higher child development outcomes. Further, we hypothesized that higher levels of socioeconomic status would be associated with more resources and investment in the child and, subsequently higher child development outcomes.

Our findings suggest an average to a high level of SWB among the mothers in the sample. There were no statistically significant differences in the level of SWB, namely, overall happiness, life satisfaction, and perception of a better future, among the two age groups of mothers (15–19 years and 20–24 years) and their means across most measures used. Further, the findings suggest that the SWB construct comprising overall happiness, life satisfaction, and perception of a better future has a weak and inverse association with the latent construct for child development outcomes represented by child literacy-numeracy, approaches to learning, and socioemotional outcome levels. This weak direct path does not change when standardized or estimated indirectly through maternal influence on investment in learning resources such as facilitating attendance to early education, the number of books, or stimulating activities with the child (total effects of SWB to child outcome = -0.04).

However, there were statistically significant differences between the two age groups of mothers regarding their area of dwelling (rural or urban), educational level, and employment. In addition, mothers (overall 62%) who identified their religion as Islam (65%) were more likely to note that they were very satisfied with their lives compared with Christians (54%) and traditional beliefs (50%). There were differences in the level of life satisfaction based on the

Table 6 Path coefficients and fit indices for modified model of child literacy-numeracy, learning and socioemotional outcomes mother-child dyad ($N = 3176$, $n = 1588$)

Factor loadings	Unstandardized coefficients (SE)	Standardized coefficients (SE)
Structural Model		
Covariance		
Maternal SES * SWB	0.00 (0.00)**	0.08 (0.04)*
Maternal SES * Child investment	0.05 (0.02)***	0.74 (0.03)***
Maternal SES * Child outcomes	−0.09 (0.01)***	−0.58 (0.05)***
SWB * Child outcomes	−0.00 (0.01)	−0.00 (0.03)
SWB * Child investment	0.00 (0.00)	0.02 (0.04)
Child investment * Child outcomes	−0.27 (0.01)***	0.79 (0.05)***
Errors rural * wealth	0.04 (0.00)***	0.33(0.03)***
Measurement Model		
Maternal SES		
-Rural/Urban	1	−0.42 (0.03)***
-Wealth	1.87 (0.13)***	0.71 (0.02)***
-Mother's educational level	2.23 (0.17)***	0.77 (0.02)***
SWB		
-Life satisfaction	1	0.76 (0.03)***
-Overall happiness	0.90 (0.08)***	0.69 (0.03)***
-Optimism	0.52 (0.05)***	0.41 (0.03)***
Child investment/resources		
-Early education	1	0.80 (0.02)***
-Stimulating activities	0.55 (0.04)***	0.43 (0.03)***
-Children's books	0.72 (0.03)***	0.67 (0.02)***
Child development outcome		
-Literacy-numeracy	1	0.94 (0.06)***
-Approaches to learning	0.17 (0.03)***	0.20 (0.03)***
-Socioemotional	0.06 (0.03)*	0.07 (0.04)*
Measurement error variances		
-Rural/Urban	0.12 (0.01)	0.83 (0.02)
-Wealth	0.09 (0.01)	0.50 (0.03)
-Mother's educational level	0.09 (0.01)	0.40 (0.03)
-Life satisfaction	0.10 (0.01)	0.42 (0.05)
-Overall happiness	0.12 (0.01)	0.53 (0.04)
-Optimism	0.18 (0.01)	0.83 (0.02)
-Early education	0.07 (0.00)	0.36 (0.02)
-Stimulation	0.16 (0.01)	0.81 (0.02)
-Children's books	0.08 (0.00)	0.55 (0.02)

Table 6 (continued)

Factor loadings	Unstandardized coefficients (SE)	Standardized coefficients (SE)
-Literacy-numeracy	0.13 (0.12)	0.12 (0.12)
-Approaches to learning	0.66 (0.02)	1.0 (0.00)
-Socioemotional	0.79 (0.03)	0.96 (0.01)
Latent error variances		
Maternal SES latent	0.04 (0.00)	1
SWB latent	0.14 (0.01)	1
Investment/resources latent	0.12 (0.00)	1
Child outcomes latent	0.96 (0.13)	1
Fit Statistics		
Chi-square (df)		148.48 (47)***
RMSEA		0.043
CFI		0.97
TLI		0.95
SRMR		0.035
CD		0.99

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

ethnicity of the mothers, with those who identified as Hausa (67%), Igbo (53%), and Yoruba (33%) saying that they were very satisfied with their lives. These differences were statistically significant. There was no statistically significant difference between mothers who had secondary education and higher (59%) and those who had primary and lower (63%) in their level of life satisfaction. Similarly, there was no difference in the level of life satisfaction between mothers who engaged in more than three stimulating activities with their children (63%) and those who did not (59%).

Many of the household and maternal measures that have been found to affect maternal mental health in other studies in Nigeria, such as household size, loss of a child, and income (Adewuya et al., 2005), were weak, not statistically significant in their association with the maternal SWB construct and not used in the final model. Other than the SWB construct items' strong correlation with each other, only the household wealth index, employment, and religion items were significantly associated with maternal SWB and had small effect sizes. Thus, while the SWB constructs highlight the eudemonic and hedonic aspects of mental health, how the items on the MICS SWB module were phrased may be too broad to capture the specific mental wellbeing *affect* of the mothers.

The results also highlight the positive strength of association between the family investment in learning resources comprising the facilitation of attendance to early education, the number of children or picture books available in the

home, and the number of different stimulating activities with child development outcomes. The family investment latent construct had the most robust path to child outcomes (total effects, 0.79, $p < 0.001$). On the other hand, maternal SWB had a low and non-statistically significant path coefficient to family investment in resources for child development. This result suggests that SWB did not affect the processes or resources mobilized toward the child nor the child development outcomes or that the measures examined in the SWB construct are insufficient in capturing this association (See Table 6 and Fig. 5).

Directly to the child outcomes, the household socioeconomic factors that include living in an urban area, being in the upper wealth quintile, and having a secondary or higher level of education had a weak effect on child outcomes with a coefficient of 0.09, that increased to a moderate and statistically significant coefficient (0.58, $p > 0.001$) when standardized. Individually, the maternal level of education (0.77), household wealth quintile (0.71), and rural/urban divide (−0.42) significantly loaded to the household socioeconomic latent construct ($p < 0.001$). Overall, maternal socioeconomic status had a strong total effect and covariance with child outcomes (total effects 0.58), which may be attributed to its intermediate effect on investment in child development (total effects = 0.74, $p < 0.001$), underscoring the direct and indirect importance of socioeconomic factors to child development. An error coefficient of 0.96 was associated with child outcomes, suggesting that more factors are involved in its variation that are not included in the data. Although the covariance estimates only say a little about the direction of influence of these constructs, there is little concern that the relationships are spurious given the theoretical basis of the analysis. In line with the family stress and investment models, findings represent the influence of socioeconomic status that translates into resources invested toward a child's development.

Limitations

The limitations of this study need to be acknowledged. First, the study is cross-sectional and does not provide an opportunity to assess measures at more than one time-point, thus precluding causal inferences. Further, only mothers 15–24 years who are older adolescents and youth self-reported their SWB measures. Their life priorities based on age may affect their response to the SWB questions. There is also the possibility that examining life satisfaction, optimism, and happiness in the Nigerian population overlooks the impact of the country's collectivist culture, often-rural natural settlements, and social connections that may mediate self-reported life satisfaction and overshadow the impact of neurological stress processes. However, recent studies also note a decrease in the role of family networks and

reciprocity of support that had previously buffered poverty and lack in African settings (Tsai & Dzorgbo, 2012). Moreso, there were limited maternal mental wellbeing-specific measures in the dataset, precluding further associations. Indeed, most surveys in sub-Saharan Africa do not have variables or measures that grasp the impact of the prevailing toxic stress from adversity and poverty in daily living encountered by the populace, especially women who produce over 80% of food consumed (Ivers & Cullen, 2011). Ignoring the impact of toxic stress, whose etiology is primarily unseen, may yield misleading results about the subjective wellbeing of mothers in Nigerian ecology. Another limitation of this study is that the conceptual basis of using measures of life satisfaction may be problematic in the Nigerian setting, given the internalized or gendered position the women may have been normed to, thus precipitating biased responses from them. More so, the assessment of child development, where questions about a child's developmental progress and milestones are maternal self-reports rather than direct assessments of the child, may be subject to recall bias and social desirability.

Conclusion

This study examined the association between maternal SWB and child outcomes in the literacy-numeracy, cognitive, and socioemotional development domains. We also highlighted the association of maternal household socioeconomic status and investment in a child's learning with SWB and child outcomes. In examining maternal SWB and its subsequent association with child outcomes, this study hoped to extend the eudemonic aspects of SWB as a proxy and precursor to mental health, raise awareness, and enhance the development of more responsive interventions. However, from our analysis, SWB was weakly associated with child outcomes.

Definitions and Application to the Context. Previous fundamental studies have argued for and established the association of SWB with mental health outcomes (Howell et al., 2013; Keyes, 2006). While SWB is widely accepted in the social policy sector, GDP studies, and human development index studies of countries, it may not be the ideal proxy for mental health in sub-Saharan Africa, even at the population level.

Are Nigerian women satisfied with life? Our analysis implies so. We ascertained that the mothers residing in Nigeria's rural and urban communities were faring well based on their responses as shown in the SWB measures. Most of the mothers adjudged themselves to be very satisfied with their lives in areas of family life, friendships, current job, health, where they are in life, where they live, how people around them generally treat them, the way they look, and their overall life satisfaction. Most women were also very happy overall and optimistic about the future. Given the

country's conflict and political and economic situation, is this response reflective? These are questions for future research.

Subjective wellbeing and socioeconomic status. It is essential to highlight the alignment of this study with the family stress theory and investment model. There was a weak but positive association between the SWB constructs and maternal socioeconomic status, which aligns with previous studies that note the non-linear relationship between wealth and life satisfaction (Addai et al., 2014). Further, the impact of maternal socioeconomic status on child outcomes is in line with numerous studies cited and within the context. The SWB construct was weakly associated with most sociodemographic and economic measures of the mother, including the child indicators. The SWB measure may not be sufficiently sensitive to capture the wellbeing of mothers in the Nigerian sample. The family stress theory also hints at maternal emotional status and its association with maternal behavior and child outcomes. Our study showed that maternal activities with her child strongly predicted child outcomes. However, we could not link maternal engagement with the child to stressors as indicated by the theory, an area to incorporate in future research designs.

Investing in child development

On the role of investments into child development, we showcased that of 1539 children ages 3–4 years whose mothers responded to the child development items, only 37 children had 4–10 children's books; 229 children had 1–3 books while 1273 (83%) of the sample had no children's books or picture books in their home. These findings indicate an overall low family investment in time and resources for child development and an essential intervention area for research and practice.

Implications and future directions

We highlighted the need for continued efforts to increase opportunities to improve household socioeconomic status and subsequently invest of resources in child development. An important direction for researchers in Nigeria and LMICs would be to advance intervention research on early childhood challenges and subsequently, evidence-based family-strengthening programs. Social protection interventions that increase resources for families to invest in early education, build parenting skills, and improve communication at the parental and child level have assisted families in other settings (Betancourt et al., 2020). Significantly, programs that support families to come out of poverty raise the bar and bring improvement overall. We also observed the associations of maternal age with outcomes during early childhood, where women in the 19–25-year range had better child outcomes, and suggest that this should be an area for future

research. Past studies in Nigeria note that higher levels of education among the women folk are a most significant factor for the use of health services and better outcomes, including the ability to earn income and direct more resources towards the development of their children (Ade-dokun et al., 2017; Burroway & Hargrove, 2018; Ramdahl et al., 2018). Efforts to increase maternal education and empowerment, educate whole communities on family strengthening and early childhood development practices, and income generation that will foster a conducive environment for both mother and child to thrive and succeed.

Compliance with Ethical Standards

Conflict of interest The authors declare no competing interests.

Informed consent This study was deemed exempt from ethics review by the Boston College IRB, as no human participants were contacted. The data is de-identified and in the public domain.

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