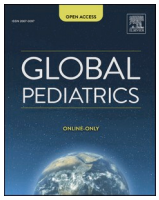
Global Pediatrics 8 (2024) 100168

Contents lists available at ScienceDirect

Global Pediatrics

journal homepage: www.elsevier.com/locate/gpeds



Early childhood development and its association with women's empowerment in the context of urban poverty in Ethiopia

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ARTICLE INFO

Keywords:
Child development
Child development deviation
Child health
Women's status
Maternal and child health

ABSTRACT

Background: Empowered women, with increased access to and control over resources, stronger social networks, greater decision-making power, and a more positive gender attitude, significantly contribute to better family well-being. While there is ample evidence regarding the association between child nutrition and women's empowerment, studies examining the association between early childhood development (ECD) and women's empowerment are scarce.

Aims: The aim of this study was to estimate the prevalence of ECD delays among 12–36 months old and investigate its association with women's empowerment among the urban poor in Ethiopia.

Methods: The study included a sample of 432 women who were unemployed or had irregular employment during the data collection period, along with their children in urban Ethiopia. The ECD was assessed using the Age and Stage Questionnaire (ASQ-3), a tool designed to accurately identify developmental delays in infants and young children and categorized as on track, needs monitoring, and possible delays. Women's empowerment was measured using a multidimensional index that captured access to and control over resources, decision-making power, and social capital, and then categorized into lowest, medium, and highest empowerment levels. The association between ECD domains and women's empowerment was analyzed using ordinal logistic regression, after adjusting for confounders.

Results: The study found a high prevalence of delays in ECD domains, with fine motor domain accounting for the largest delay (40.6 %). Children of less empowered mothers are more likely to have the highest development delays in communication (OR=2.22; 95 % CI: 1.36; 3.62), gross motor (OR=1.69; 95 % CI: 1.04; 2.76), problem solving (OR=1.85; 95 % CI: 1.15; 2.98), and personal-social (OR=2.59; 95 % CI: 1.62; 4.15) skills compared to children of more empowered mothers.

Conclusions: The study highlights the significance of women's empowerment in promoting ECD, especially in developing countries where ECD programs are fragmented and lacks coordination. Therefore, targeted interventions that improve women's empowerment could lead to improved ECD outcomes.

1. Introduction

Holistic child development, particularly in the first three years of life, is a corner stone for improved health, human capital, and wellbeing across the life course and across generations. In low- and middle-income countries (LMICs), an estimated 250 million children under 5 years of age (which constitutes 43 % of the total) were at risk of developmental delays.[1] In sub-Saharan Africa, the prevalence of developmental delays is approximately 40 %, with a wide variation ranging from 25 % in Ghana to 64 % in Chad.[2] In Ethiopia, approximately 14 million children suffer from poor development.[1] To help support every child to grow and develop to their full potential, it is essential to promote and protect early childhood development (ECD) in social, emotional, physical, cognitive and language domains.[3,4] To this end, children need to receive nurturing care, including responsive care, opportunity for early learning, and safety and security, in addition to proper nutrition and health.[5,6]

Despite the substantial progress made in improving the enabling environments for ECD, such as developing national policies and programs, ensuring ECD is still a challenge, particularly in developing countries where children under three are often neglected from government policies.[6,7] Although women's well-being and empowerment are closely linked to ECD, evaluations of ECD interventions fail to account for them.[8,9] Empowered women have better access to and control over resources, have better social networks, better decision-making power,

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https://doi.org/10.1016/j.gpeds.2024.100168
Received 16 November 2023; Received in revised form 1 March 2024; Accepted 13 March 2024
Available online 14 March 2024

and gender attitude, these all contribute to better child development and growth.[10–13] We therefore based our study on the conceptual framework which describes the pathway through which women's empowerment influence child development, growth, and nurturing care.[10]

Although studies in Ethiopia have well documented the association between women's empowerment and child nutritional status,[13–15] our comprehension of the relationship between women's empowerment and ECD remains limited. Previous population-based studies examining the relationship between women's empowerment and ECD measured the latter based on proxy indicators, such as stunting and extreme poverty[1,6,16] or based on the early childhood development index (ECDI) – a population-based measure developed by UNICEF to assess the development of children aged 36 to 59 months only and widely used in the Multiple Indicator Cluster Surveys (MICS).[9,10,17] However, the ECDI has limitations, such as ceiling effects, inadequate measurement of socioemotional development, and unreliability at the individual level for capturing physical and socioemotional indicators.[9,10] Although it is costly and time consuming, direct measurement of ECD using tools designed to measure early learning and development, such as the Age and Stage Questionnaire (ASQ-3), is well acknowledged for its sensitivity and responsiveness to interventions.[6] Moreover, the period from conception to age three years is of particular importance for child development and thus accurate and sensitive ECD measures capturing this age group are crucial for targeted and effective interventions.[18] Recognizing these limitations in the earlier studies, we conducted a direct assessment of ECD using the ASQ-3 designed to accurately identify developmental delays in infants and young children.[19,20]

Similarly, women's empowerment is a complex and multidimensional concept, which is often operationalized using proxy measures, such as women's education or economic standing. The variable nature of indicators and aggregations used to measure women's empowerment has contributed to inconclusive results regarding the linkages to child health and development outcomes.[12] Acknowledging the multidimensional nature of women's empowerment,[11] we developed an index to capture those dimensions – access to and control over resources, decision-making power, and social capital dimensions – using exploratory factor analysis.

The aim of this study was therefore to estimate the prevalence of ECD delays and examine the association between women's empowerment and ECD using a more refined ECD tool and a multidimensional women's empowerment index.

2. Materials and methods

2.1. Study design and settings

The baseline data was collected as part of the Growth and Economic Opportunities for Women (GrOW) – East Africa project implemented by a consortium of organizations (ChildFund Ethiopia, Children Believe, Tesfa Berhan Child and Family Development, and Addis Ababa University). The research component of the project is an impact evaluation using a quasi-experimental design aimed at assessing whether subsidized and enhanced quality community-based childcare services can improve women's wellbeing and empowerment while promoting ECD in Ethiopia (Study ID: RIDIE-STUDY-ID-63bf977db6192). The project is under implementation in three urban areas: Addis Ababa (the capital city of Ethiopia), Adama (a city located about 100 kms southeast of Addis Ababa in Oromia region), and Debre Birhan (a city located about 120 kms northeast of Addis Ababa in Amhara region). The baseline data was collected using a community-based cross-sectional survey design between July and September 2022.

2.2. Sample size estimation and sampling procedure

The study population comprised of women who were unemployed or had irregular employment during data collection period, along with their children 12–36 months old in the study area. To determine sufficient sample size to find statistically significant intervention effects, power calculation was undertaken using primary outcomes related to women's decision-making. Assuming a power of 80 %, an alpha value of 5 %, equal number of study participants in the intervention and control arms and existing data from the Ethiopian Demographic and Health Survey (EDHS) where 84 % of employed women participate in decisions about major household purchase compared to 74 % of non-employed women,[21] the total required sample size was calculated to be 526. Considering possible dropouts over the project period, we added 20 % non-response. The final sample size becomes 632 mother-child pairs.

The survey covered 14 woredas/kebeles, the smallest administrative levels in Ethiopia, from 7 sub-cities where the implementing partners are operating. Specifically, 2 woredas from Lemi-kura sub-city of Addis Ababa, 5 woredas from Bole and Abba Geda sub-cities of Adama, and 7 kebeles from Atse Zera Yacob, Etege Taytu, Atse Menelik, and Tebase sub-cities of Debre Birhan were included in the survey. All women who satisfied the inclusion criteria and consented to participate in the project were listed in the selected woredas/kebeles. Once the list was compiled, a random sample of 632 mother-child pairs were selected for the study. A subsample of 432 currently married women along with their child (97 from Addis Ababa, 128 from Adama, and 207 from Debre Birhan) were used in this analysis since some of the women's empowerment questions were asked only to married women.

2.3. Variables and measurements

2.3.1. Outcome variable

The outcome variable in this study is ECD and assessed using the third edition of ASQ-3 (supplementary file; Annex A). The ASQ-3 is a widely used screening tool for development delays in children 3 to 61 months of age. The ASQ-3 covers five broad developmental domains: communication, fine motor, gross motor, problem solving, and personal–social skills. Each of the domains contains six questions; the questions are responded as "yes", "sometimes", and "not yet" with scores 10, 5, and 0 respectively. Each domain is scored from 0 to 60 points, with 60 being a perfect score. We calculated the average cutoff scores for each domain for the age group 12 to 36 months. If the average cutoff scores is $\leq$ 2.0 standard deviations (SD) below the mean, then the child is categorized as having a "possible developmental delay". If the score is $\leq$1.0 SD but >2.0 SD below the mean, then the child is categorized as "needs monitoring". If the score is >1.0 SD below the mean, then the child is categorized as being "on track" .[22]

2.3.2. Exposure variable

The exposure variable of this study is women's empowerment. Women's empowerment is a multidimensional construct measured using several questions.[11] We therefore used the three-dimensional conceptual model which includes resources (human and social resources that enable women to exercise their choice), agency (gives women the power to make decisions and increase their bargaining and negotiation power), and achievements (measures the realization of women's goal) as recommended by[11] and later modified by[10] to accommodate additional dimensions relevant to child development and growth. Accordingly, four dimensions of women's empowerment were suggested: access to and control over resources, social capital, decision-making, and gender attitudes.[10]

Exploratory factor analysis (EFA) was performed to develop a multidimensional women's empowerment index. First, the EFA was carried out, and then identified the domains of women's empowerment factors that can be explained by a group of indicators jointly using the *varimax* rotation. The *varimax* rotation retained three factors based on the Kaiser test (factors with an eigenvalue of 1.0 or greater is meaningful). The identified factors were grouped into three dimensions: access to and control over resources (women's participation in decisions to use their own income, their partner's income, their joint income

(partner and wife), and major household purchases), decision-making power (women's participation in decisions to visit families/friends, own health care use, and the health of the children), and social capital (working status and women's participation in community and social networks) (Table 1 provides details on the measurements). Data on gender attitudes was not collected and thus our analysis is based on the three dimensions.

Then the Cronbach's α coefficients were calculated to evaluate whether the items (questions) included in the index calculations were actually relate to those factors. Accordingly, α coefficients for decision-making, access to and control over resource, and social capital dimensions were found to be 0.9249, 0.8924, and 0.4109, respectively. Although the α coefficient for social capital dimension (0.4109) is less than the recommendation (at least 0.5), this dimension was kept in the model because of strong theoretical grounding and empirical evidence that they are essential for measuring women's empowerment.[23] Finally, the overall score and scores for the three dimensions were predicted independently to generate women's empowerment index. Then, the index was categorized into three groups based on tertiles (lowest empowerment, medium empowerment, and highest empowerment).

2.3.3. Confounding variables

The confounders are identified based on the conceptual model of the underlying and immediate causes of undernutrition and its consequences.[24] This includes child characteristics (age, sex, and morbidity), mothers characteristics (age, level of education, and overall health status), husband's characteristics (age and education), and household characteristics (family size, household food insecurity, and wealth index).

Table 1
Dimensions and measurements used to construct women's empowerment index.

Dimension	Measurements (questions)	Response coding
Access to and control over resources	The extent women participate in decisions regarding the use of money she earned.	Each of them are coded as 0 (no participation), 1 (participation at a smaller extent), 2 (participation at a medium extent), and 3 (participation at a higher extent)
	The extent women participate in decisions regarding the use of money earned by her partner.	
	The extent women participate in decisions regarding the use of money earned together with her partner.	
	The extent women participate in decisions regarding major household purchases (e.g., furniture, appliances, etc.…).	
Decision-making power	The extent women participate in decisions regarding her health care use (e.g., visiting clinic).	
	The extent women participate in decisions regarding visits to her family or relatives.	
	The extent women participate in decisions regarding health of the children (e.g. take a child to the clinic)	
Social capital	Women's main occupation.	Coded as 0 (no job), 1 (unskilled jobs), and 3 (skilled jobs or trade)
	Women's participation in community and social networks, including women's self-help group (SHGs), cooperatives mutual benefit society (idir, eqube, etc.), religious group, political party, village development committee (VDC), and leadership role they assumed in the networks.	Coded as 0 (no participation), 1 (participation in mutual benefit societies), 2 (participation in SHGs, cooperatives, VDC, and political party), and 3 (if the women assumed a leadership position in any of the groups)

Household food insecurity was estimated using the Household Food Insecurity Access Scale (HFIAS) – a set of questions used to distinguish food-secure from food-insecure households (supplementary file; Annex B). HFIAS has nine occurrence questions (yes or no) followed by a frequency-of-occurrence question to determine whether the condition happened rarely, sometimes, or often in the past four weeks. The HFIAS score is calculated and categorized into four levels of household food insecurity (access) prevalence: food secure, and mildly, moderately and severely food insecure.[25] The wealth index is a composite measure of household living standard. It is constructed using the Principal Components Analysis (PCA)[26] by incorporating several variables, including household's ownership of selected assets such as chair or table, television, and refrigerator; materials used for the house construction – wall, floor, and roof materials; types of drinking water sources and toilet facilities (improved or not); and fuel used for cooking and lighting (supplementary file; Annex C). The wealth index places individual households on a continuous scale of relative wealth. We then categorized the continuous wealth index into three categories – poor, middle, and rich.

2.4. Data collection and quality assurance

Standard and validated questionnaires were used to collect the baseline data. The questionnaire is developed in English and translated into Amharic language (widely used local language in the study areas) for ease of understanding by both the data collectors and the respondents. The questionnaire was pretested prior to the actual data collection; ambiguous and inconsistent questions were identified and revised accordingly. The final questionnaire was designed into digital data collection platform KoboCollect, to improve data quality, accuracy, and timeliness. The survey team was given a 3-day training to familiarize them with the objective of the study, the survey questionnaire, the use of digital data collection devices, and research ethics followed by a pilot survey in Addis Ababa before the actual deployment to the field. During data collection, each questionnaire has been checked for completeness and consistency daily. Data submitted to the server were monitored by the research team throughout the data collection period.

2.5. Data processing and analysis

Before analysis, the data was screened for missing values and outliers and the necessary actions were taken. The covariates were described using number (percent) and median (interquartile range – IQR). The ECD domains were categorized into an ordered variable – on track, needs monitoring, and possible delay. A multivariable ordered logistic regression model was then employed to examine the independent association between ECD domains and women's empowerment dimensions – combined and individual dimensions – while adjusting for the confounders.

The proportional odds assumption, a key assumption in ordinal logistic regression, which assumes that the relationship between each pair of outcomes is the same across all levels of the covariates and exposure variable – was tested using the Brant method and the result was non-significant ($p > 0.05$) as desired. The model goodness-of-fit was assessed using the ordinal version of Hosmer-Lemeshow tests using a 'ologitgof' STATA command and found to be a good-fit ($p > 0.1$) .[27] The Odds Ratios (OR) and 95 % Confidence Intervals (CI) were reported for the final multivariable-adjusted models. The statistical significance was judged based on the non-inclusion of 1.0 in the 95 % CI. STATA software package version 14 was used for the data analysis.

2.6. Ethical considerations

Ethical clearance was obtained from the Addis Ababa University (AAU) College of Health Sciences Institutional Review Board (IRB;

protocol number: 053/22/SPH). All the study participants were informed about their voluntary participation, and their liberty to withdraw from the research at any time without explanation and/or prejudice. Voluntary verbal informed consent was obtained from the mothers; parental/guardian assent was obtained for the children.

3. Results

3.1. Child, mothers, and household characteristics

Table 2 shows the child, mothers, partners, and household characteristics of the 432 mother-child pairs involved in the study. The average age of the children was 26 months, slightly over half were boys, and about 40 % had an illness 2 weeks prior to the survey date. Women were 28 years on average, about 84 % had at least primary level education, and 70 % reported a good health. The average household size was four, 94 % of households suffered from mild to severe food insecurity, and about 27 % were under poor wealth index category (Table 2).

3.2. Prevalence of ECD domains

The study attempted to estimate the prevalence of ECD delays. Accordingly, fine motor domain accounted for the largest delay (40.6 %), followed by problem solving (31.7 %), personal-social (31.0 %), gross motor (29.6 %), and communication (15.5 %) skills. Overall, about 61 % of the children experienced delays in at least one of the ECD domains (Table 3).

3.3. Women's empowerment scores and levels

The larger the average score, the more empowered the women are. Women are more empowered in the access to and control over resources dimension with a median and IQR score of 0.08 (−0.60; 1.12), followed by the decision-making power dimension −0.04 (−0.59; 0.95), and the social capital dimension −0.35 (−1.04; 0.46). Slightly over a third of the women fall under the lowest empowerment level (Table 4).

Table 2
Percent distribution of the child, mothers, and household characteristics among the urban poor in Ethiopia, July-September 2022.

Characteristics	N	n (%)
Child characteristics	432	
Sex (Boys)		222 (51.4)
Age (months), median [IQR]		26 (20 – 32)
Child was ill 2 weeks preceding survey		174 (40.3)
Maternal characteristics	432	
Age (years), median [IQR]		28 (25 – 32)
Education		
No education		71 (16.4)
Primary		190 (43.9)
Secondary or higher		171 (39.6)
In a good health		304 (70.4)
Partners characteristics	432	
Age (years), median [IQR]		34 (30 – 39)
Education		
No education		64 (14.8)
Primary		191 (44.2)
Secondary or higher		177 (41.0)
Household characteristics	432	
Household size, median [IQR]		4 (3 – 5)
Household food insecurity		
Food secure		26 (6.0)
Mildly food insecure		35 (8.1)
Moderately food insecure		242 (56.0)
Severely food insecure		129 (29.9)
Wealth index		
Poor		115 (26.6)
Middle		149 (34.5)
Rich		168 (38.9)

Table 3
ECD domains among the urban poor in Ethiopia, July-September 2022.

ECD domains	Survey total	
	N	n (%)
Communication	**427**	
Possible delay		66 (15.5)
Needs monitoring		121 (28.3)
On track		240 (56.2)
Gross motor	**416**	
Possible delay		123 (29.6)
Needs monitoring		69 (16.6)
On track		224 (53.8)
Fine motor	**401**	
Possible delay		163 (40.6)
Needs monitoring		107 (26.7)
On track		131 (32.7)
Problem solving	**410**	
Possible delay		130 (31.7)
Needs monitoring		95 (23.2)
On track		185 (45.1)
Personal-social	**419**	
Possible delay		130 (31.0)
Needs monitoring		91 (21.7)
On track		198 (47.3)
Delays in at least one ECD domain	**426**	**259 (60.8)**

Table 4
Women's empowerment score and levels among the urban poor in Ethiopia, July-September 2022.

Empowerment dimensions	N	Median (IQR)
Access to and control over resources	426	0.08 (−0.60; 1.12)
Decision-making power	428	−0.04 (−0.59; 0.95)
Socioeconomic resources	432	−0.35 (−1.04; 0.46)
Overall empowerment	423	−0.11 (−0.63; 1.11)
Lowest empowerment level, n (%)		147 (34.8)
Middle empowerment level, n (%)		135 (31.9)
Highest empowerment level, n (%)		141 (33.3)

3.4. Association between women's empowerment and ECD

Less empowered women are more likely to have children with poor ECD, after adjusting for child, mother, partner, and household characteristics. Children whose mother was at the lowest empowerment level were significantly more likely to have the highest developmental delays in communication (OR=2.22; 95 % CI: 1.36; 3.62), gross motor (OR=1.69; 95 % CI: 1.04; 2.76), problem solving (OR=1.85; 95 % CI: 1.15; 2.98), and personal-social (OR=2.59; 95 % CI: 1.62; 4.15) skills compared to children whose mother was at the highest empowerment level. This association was driven by the decision-making power and the access to and control over resources dimensions of women's empowerment. However, this relationship does not hold between children of mothers in the middle empowerment levels and the highest empowerment levels (Table 5).

4. Discussion

This study estimated the prevalence of ECD delays among children 12–36 months old and examined the association between women's empowerment and ECD domains among the urban poor in Ethiopia. The study showed a high prevalence of ECD delays – fine motor (40.6 %), problem solving (31.7 %), personal-social (31.0 %), gross motor (29.6 %), and communication (15.5 %) skills. Overall, about 61 % of the children experienced delays in at least one of the ECD domains. The findings also confirmed a positive association between women's empowerment and the ECD domains. The women's empowerment dimensions that played a substantial role in the association were decision-making power and access to and control over resources, while the

Table 5
Multivariable-adjusted association (ordinal logistic regression) between ECD domains and women's empowerment in urban Ethiopia.

ECD domains	Women's empowerment categories	Combined empowerment – OR (95 % CI)	Empowerment dimensions – OR (95 % CI)		
			Access to and control over resources	Decision-making power	Social capital
Communication	Lowest	2.22 (1.36; 3.62)	2.12 (1.28; 3.51)	2.54 (1.40; 4.63)	1.16 (0.70; 1.92)
	Middle	1.19 (0.71; 1.98)	1.18 (0.73; 1.93)	1.54 (0.99; 2.38)	1.06 (0.65; 1.73)
	Highest (Ref.)	1.0	1.0	1.0	1.0
Gross motor	Lowest	1.69 (1.04; 2.76)	1.46 (0.88; 2.40)	1.41 (0.77; 2.55)	1.26 (0.76; 2.10)
	Middle	1.06 (0.64; 1.75)	1.20 (0.74; 1.95)	1.49 (0.96; 2.31)	0.99 (0.61; 1.62)
	Highest (Ref.)	1.0	1.0	1.0	1.0
Fine motor	Lowest	1.56 (0.96; 2.53)	1.41 (0.85; 2.33)	1.24 (0.66; 2.34)	1.44 (0.86; 2.40)
	Middle	1.00 (0.61; 1.62)	0.91 (0.56; 1.46)	1.02 (0.66; 1.57)	1.19 (0.73; 1.93)
	Highest (Ref.)	1.0	.1.0	1.0	1.0
Problem solving	Lowest	1.85 (1.15; 2.98)	1.57 (0.96; 2.59)	2.32 (1.22; 4.42)	0.94 (0.57; 1.54)
	Middle	1.05 (0.64; 1.71)	0.99 (0.62; 1.57)	1.25 (0.82; 1.91)	0.90 (0.56; 1.46)
	Highest (Ref.)	1.0	1.0	1.0	1.0
Personal-social	Lowest	2.59 (1.62; 4.15)	1.60 (1.01; 2.53)	2.36 (1.55; 3.59)	0.98 (0.62; 1.56)
	Middle	1.48 (0.92; 2.39)	0.84 (0.57; 1.11)	0.90 (0.62; 1.32)	0.83 (0.58; 1.21)
	Highest (Ref.)	1.0	1.0	1.0	1.0

All estimates are adjusted for child sex, age, and illness status; mothers age, education, and overall health; partners age and education; and household size, food security status, and wealth index.

contribution of social capital dimension was unfounded.

Development delays in early childhood (particularly birth to three years) can lead to sub-optimal physical, cognitive, emotional, and social development, which can result in learning difficulties, reduced productivity, lifelong health, and parenting of the next generation.[6,28] Although our study population are disadvantaged poor in the urban settings, the observed prevalence of ECD delays is higher than a similar study conducted in Ethiopia. In the Southern Ethiopia, for example, a study documented ECD delays ranging from 4.0 % for fine motor to 8.8 % for problem solving skills.[29] Similarly, in Southwest Ethiopia, the range extended from 10.1 % for fine motor to 17.2 % for gross motor skills,[30] all assessed using the same screening tool – ASQ3. On the other hands, our findings corroborate studies conducted in other low-income countries, such as Guatemala, where the ECD delays ranged from 8 to 40 %.[31] Nine sub-Saharan African countries reported elevated prevalence of ECD delays (ranging from 9 % for physical development to 90 % for literacy–numeracy development)[10] as well as twenty-six African countries (ranging from 8 % for physical development to 85 % for literacy–numeracy development)[9] using a different tool – the ECDI tool used in the MICS.

The high prevalence of ECD delays in our study calls for strengthening holistic and collaborated efforts to improve ECD in Ethiopia through targeted interventions, such as ensuring nurturing care.[6,16,18] Ethiopia has introduced its first ECD policy and strategic plan in 2010 and revised it in 2020 to support attain the 2030 target for child health and well-being.[32] However, most of the interventions are survival-focused and address the health and nutrition aspect of young children, overlooking the oth.er nurturing care components, such as responsive caregiving, opportunity for early learning (e.g., communication and play), and protection.[32,33] Moreover, health care providers knowledge and awareness on ECD and nurturing care are limited.[32] Despite its benefits for children, ECD interventions improve women's financial and mental well-being and overall empowerment.[8] Therefore, coordinated implementation of the ECD strategy across key sectors, such as health, education, women's affairs, and social protection, and enhancing the knowledge and awareness of health care providers and concerned professionals on ECD would ensure better ECD and women's empowerment.

We found a positive association between women's empowerment and ECD domains. Accordingly, children of less empowered women are 2.22 times, 1.69 times, 1.85 times, and 2.59 times more likely to have highest developmental delays in communication, gross motor, problem solving, and personal-social skills, respectively, compared to children of high-empowered women. Consistent with other studies, women's decision-making power dimension predicted most of the ECD domains better (communication, problem solving and personal-social skills),[9,10] while access to and control over resources dimension predicted two of the domains (communication and personal-social skills).

Studies have documented conflicting results regarding women's empowerment and ECD association. Although women's empowerment was positively associated with early child cognitive development in nine sub-Saharan African countries, no evidence confirmed the association with child literacy–numeracy, socioemotional and physical development.[10] In contrast, according to a study conducted in twenty-six African countries, women's empowerment only impacted the literacy-numeracy domain of child development and not the physical, learning and socio-emotional developmental domains.[9] The difference between these studies[9,10] and ours could be the use of different screening tools for ECD indicators (we used ASQ-3 while they used ECDI), variables used to construct women's empowerment index and its operationalization, and the multicounty nature of their study using the Demographic and Health Surveys may have masked some of the contextual factors.

Our finding is supported with the hypothesis that women with better empowerment have more access to and control over resources, and participate in decision-making to improve the well-being of their children and family.[11,13,34] Additionally, empowered women are more likely to receive support for childcare from their partners when needed. This improves ECD indicators by ensuring that the children are always taken care of. Subsidized early childcare can help ensure women's empowerment through employment and economic opportunities while improving child development outcomes.[8,35,36] Overall, empowering women contributes to ECD, and ECD interventions, on the other hand,

enhance women's empowerment.

Our study has some limitation. First, we only considered married women, although we acknowledge that single women face challenges regarding empowerment vis-à-vis ECD. This is because some of the empowerment questions are collected only from married women. Second, the sample size was estimated for impact evaluation using power calculation and thus the prevalence estimates may not be accurate. However, we assume that it provides an acceptable prevalence estimate for the ECD using a more refined tool – ASQ3. Third, the ECD tool is not validated in Ethiopia. However, we customized the questions to the context and conducted pretesting to ensure that the questions are understandable by caretakers. We suggest conducting a validation study of the ECD tool in the Ethiopia context. Finally, the cross-sectional design of the study could not allow us to establish causality between women's empowerment and ECD. Thus, a longitudinal study is recommended.

5. Conclusions

We found a positive association between women's empowerment and ECD domains – communication, gross motor, problem solving, and personal-social skills. This underscores the importance of women's empowerment in promoting ECD, particularly in developing countries where ECD programs are fragmented and lacks coordination. Our findings suggest that targeted interventions that improve women's empowerment may lead to improved ECD outcomes.

Authors signature

I declare that I participated in the design, execution, and analysis of the paper, that I have seen and approved the final version and that it has neither been published nor submitted elsewhere. I also declare that I have no conflict of interest, other than any noted in the covering letter to the editor.

Funding

This work was supported by IDRC (PROJECT ID: 109800). The funder had no role in the research undertaking. The author had the final responsibility for the decision to submit for publication.

CRediT authorship contribution statement

Tefera Darge Delbiso: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Software, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

No conflict of interest.

Acknowledgements

The author thanks Amber Peterman for her constructive feedback during tool development, data analysis, and reviewing the draft manuscript; the implementing partners – ChildFund Ethiopia, Children Believe, and Tesfa Berhan Child and Family Development – for facilitation and support during data collection; and IDRC for funding the evaluation portfolio of childcare through the GrOW East Africa initiative. The author also thanks Annet Abenakyo Mulema and Martha Melesse from IDRC; and Lilly Omondi and Natan Tilahun from ChildFund Ethiopia for their inputs at the inception phases of the research. The author is grateful to all the study participants for their time and patient during data collection, and the survey team for their hard work.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.gpeds.2024.100168.

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