



Home Care Quality and Early Childhood Development among Children Aged 36-59 Months in Cambodia

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ABSTRACT

Introduction

In the past, many programs and projects have supported early childhood development (ECD) in Cambodia, but there is a gap in the literature regarding the links between ECD and home care quality among children. The goal of this study is to determine whether there is a link between the quality of care at home and ECD for children who are 36–59 months old in Cambodia.

Methods

The study used data from the 2014 Cambodia Demographic and Health Survey (CDHS). Chi-square tests, univariate and multivariate logistic regression were used to assess the association between home care quality and the composite Early Childhood Development Index (ECDI). Collinearity was checked between some variables before putting them in the final model.

Results

In total, there was a weighted sample size of 1733 children aged 36–59 months. More than two-thirds of children (66.67%) accessed good home care quality, and 72.51% of them were developmentally on track. We found that children with good home care quality were more likely to be developmentally on track (AOR = 1.59; 95% CI: 1.17–2.15) than those with poor home care quality. Attending an early childhood education program (ECE) was associated with ECD (AOR = 1.83; 95% CI: 1.05–3.19). Urban children were more likely to be developmentally on track than rural children (AOR = 1.61, 95% CI: 1.03–2.52). Well-nourished children were more likely to be developmentally on track than those who were not (AOR = 1.44; 95% CI: 1.10–1.87).

Conclusion

The study suggests that home care quality and joining ECE programs are the main predictors of ECD. Moreover, urban residence and a better nutritional status are associated with ECD. Therefore, access to good home care, ECE interventions and nutritional programs should be targeted at rural children aged 36–59 months.

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Introduction

Early childhood development (ECD) provides the foundation for lifelong education, work productivity, physical and mental health, and social well-being. Based on the Sustainable Development Goals (SDG), it is stated that by 2030, all children have to be developmentally on track at the beginning of their schooling [1]. Between 2010 and 2018, the prevalence of children who were developmentally on track was 75.10% [2].

Normal childhood development includes not only physical but also emotional, cognitive, language, and general learning competencies [3]. Early childhood is referred to as the preschool years and consists of the years that follow toddlerhood and precede formal schooling [4]. ECD is multidimensional, encompassing several aspects of a child's well-being: physical, social, emotional, and mental [5]. There were programs and projects to support ECD in Cambodia. Early childhood education programs (ECEP), implemented by the government and family care first (with USAID support), focus on literacy and numeracy, physical development, social-emotional development, and learning [5]. One critical factor that ensures optimal ECD is having a stimulating home environment [6].

Home care quality was measured by the amount of quality time that household members spent with children, the presence of children's books in the house, and opportunities for playing to stimulate the imagination [5]. The quality of home care was assessed in a cross-sectional study conducted in eight counties in rural China. The study found that home care quality is a factor stimulating ECD [7]. Existing studies have identified several factors associated with ECD. According to studies conducted in Bangladesh, Ghana, Costa Rica, and Uganda [8, 9]. ECD was associated with children 48-59 months old, girls, wealthy families, and a mother's secondary school education level. In addition, attending an ECE program was a main predictor of ECD [10]. Other studies conducted in Africa, North America, South America, and Asia showed that stunting was negatively associated with being developmentally on track [11, 12]. Few studies in Cambodia have been conducted to assess and explore factors associated with ECD [13, 14]. The study found that children with malnutrition were less likely to be developmentally on track [14]. Moreover, a child's school enrollment was found to be a confounding factor affecting ECD [13].

Although the 2014 Cambodia Demographic and Health Survey (CDHS) collected data on ECD and

home care quality, there has been little research looking for factors associated with ECD in Cambodia. Therefore, the purpose of this study was to determine whether quality home care is associated with better ECD.

Methods

A. Data source

Our study used an existing children's dataset from the 2014 CDHS stored in a Stata file. There were 19 study domains (14 were individual provinces and 5 were groups of provinces). The dataset included sociodemographic characteristics of the respondent (women) and children, support for learning, learning materials, adequate care, and an early childhood development index (ECDI) score among children aged 36–59 months. Of 4,516 children aged 0–59 months in the CDHS children dataset, we restricted our analysis to only children aged 36–59 months. After sampling weight was taken into account, the final sample size remaining in the analysis was 1,733 [15].

B. Measure of outcome

The composite ECDI was measured based on a 10-item questionnaire assessing four domains of ECD by interviewing mothers or caregivers of children aged 36–59 months. The four domains of ECD included physical, social-emotional, learning, and literacy-numeracy. A child was given a score of 1 if each item achieved a yes response and 0 otherwise (**Table 1**), and then the score was summed up in each domain. Children were considered developmentally on track in the physical, social-emotional, learning, and literacy-numeracy domains if they received scores $\geq 1/2$, $\geq 2/3$, $\geq 1/2$, and $\geq 2/3$, respectively. Children who were on track in each domain were then given a score of 1, 0 otherwise. The overall development score was the sum of all the scores from four domains. Children were considered developmentally on track (overall) if they scored ≥ 3 and not developmentally on track if they scored < 3 [5].

C. Measure of exposure

According to UNICEF, four indicators were used to assess home care quality for children: 1) the presence of children's books was defined as having at least three children's books at home; 2) learning materials were defined as the children having two or more types of toys to play with; 3) activities that promote learning were defined as having any household members aged 15 or older engaged with children aged 36–59 months in the last three days in at least four of six activities

that include reading books or looking at picture books, story-telling, song-singing, walking outside, playing, counting, or drawing things; 4) adequate care was provided; children were not left alone or in the care of another child younger than 10 years of age for more than one hour at least once in the past week. We defined good quality of care at home as any child who met at least two of these four criteria; otherwise, poor quality of care was defined [5].

Table 1: Early Childhood Development Index*

Domains	Items
Physical	- A child could pick up small object with two fingers like a stick or a rock from the ground
	- A child was not sometime too sick to play.
Social-emotional	- A child gets along with other children
	- A child did not kick, bite or hit other children or adults
	- A child did not get distracted easily.
Learning	- A child could follow simple direction on how to do something correctly
	- When given something to do, a child was able to do it independently.
Literacy-numeracy	- A child could read at least four simple, popular words
	- A child could identify or name at least ten letters of the alphabet
	- A child knew the name and recognize the symbol of all numbers from 1 to 10.

* UNICEF. The formative Years: UNICEF's work on measuring ECD. USA <https://data.unicef.org/resources/the-formative-years-unicefs-work-on-measuring-eed>. Accessed 19 January 2021

D. Data analysis

We performed weighted analyses using Stata Version 15 (Lakeway Drive, College Station, TX, USA). The sampling weights were calculated according to the DHS standard recommendation. Variable weight was created by using women's individual sample weight divided by 1,000,000, as recommended by the DHS analysis handbook [16].

A chi-square test was used to assess the crude association between home care quality and ECD status and other confounding variables. The multivariate logistic regression analysis included significant levels of some potential confounders with a p value ≤ 0.20 or some potential confounders found in the literature, regardless of their significance level [17].

Multivariate logistic regression analysis was used to assess the main association between home care quality and composite ECDI, adjusting for potential

confounders (maternal and child sociodemographic factors, attendance at the ECE program, stunting, underweight, and wasting). Adjusted odds ratios (AORs) with a 95% confidence interval (CI) and p value were reported. Multicollinearity was checked between variables using the program called "Collin" before putting them in the final model.

Results

A. Basic characteristics of children and caregivers

Of the total children, 1733 were developmentally on track (72.51%). The basic characteristics of the children and caregivers are summarized in **Table 2**. Nearly 87% of children were from rural families, and 47% were from poor families. Most children did not attend an early childhood program (86%), while nearly 56% of mothers had a primary education and 81% had jobs. A total of 52.20% of the children were well nourished.

B. Home care quality

Table 3 displays the percentages of children aged 36-59 months by indicators of home care quality. In total, 66.67% of children lived in homes with good home care quality, defined as meeting at least two of these four criteria; otherwise, they had poor quality of care, and 33.21% of children lived with poor home care quality. The lowest indicator was the presence of more than three children's books (5.70%).

C. Early childhood development

Table 4 presents the percentages of children aged 36-59 months by domain of the ECD. Overall, 72.51% of children were developmentally on track, and 27.49% of children were not developmentally on track. The lowest domain was literacy-numeracy domain (27.55%).

D. Association between home care quality and ECD

Table 5 shows that home care quality was highly associated with ECD (OR = 1.78, 95% CI: 1.36-2.33) and remained the main predictor in the multivariate logistic model with AOR = 1.59 (95% CI: 1.17-2.15); attending early childhood programs was highly associated with ECD with AOR = 1.83 (95% CI: 1.05-3.19). Children from urban areas were more likely to be developmentally on track for ECD than children from rural areas (AOR = 1.61; 95% CI: 1.03-2.52). Well-nourished children remained significantly associated with ECD (AOR = 1.44; 95% CI: 1.10-1.87).

Table 2: Characteristics of children aged 36-59 months, CDHS 2014, Cambodia

Characteristics	N=1733	
	n	%
Child age in months		
36-47 months	874	50.42
48-59 months	859	49.58
Gender		
Girl	871	50.28
Boy	862	49.72
Residence location		
Rural	1499	86.52
Urban	234	13.48
Mother's education level		
No education	265	15.27
Primary	965	55.69
Secondary and higher	503	29.04
Mother's occupation (n=1732)		
Not working	331	19.11
Working	1401	80.89
Wealth index		
Poor/poorest	813	46.93
Middle	311	17.95
Rich/richest	609	35.12
Attending ECE program (n=1720)		
No	1473	85.60
Yes	248	14.40
Well-nourished ^a (n=1676)		
No	801	47.80
Yes	875	52.20

^a Well-nourished: Children who were normal in nutritional status (not stunted, not wasted and not underweight).

Table 3: Home care quality for children aged 36-59 months, Cambodia

Indicators	n	%
Present of children's book more than three	99	5.70
Learning material more than two	710	41.52
Activities promote learning	1054	61.12
Read book or looked at pictures	754	43.71
Story-telling	633	36.74
Song-singing	886	51.38
Walking outside	1298	75.32
Played with the child	1343	77.93
Name, count or drew things	698	40.47
Adequate care	1477	85.28
With care giver	1588	91.75
With other older than 10	1531	88.46
Overall assessment of home care quality ^a		
Poor ^b	570	33.21
Good ^c	1145	66.67

^a Home care quality counted: presence of children's books more than three, learning materials more than two, activities that promote learning and adequate care. ^b Poor home care quality defined by zero or only one of indicators above which children have. ^c Good home care quality defined by number two or more of indicators above which children have.

Table 4: Early childhood development of children aged 36-59 months, Cambodia

Domains	n	%
Physical (on track)	1669	96.31
Pick up small object	1525	89.36
Not too sick to play	1190	69.57
Social-emotional (on track)	1276	73.66
Get along with other	1412	82.14
Did not kick, bite or hit other	1309	76.01
Did not get distracted easily	473	27.67
Learning (on track)	1542	89.01
Follow simple direction	1399	81.31
Able to do something independently	1367	79.95
Literacy -numeracy (on track)	477	27.55
Read at least four words	589	34.19
Name at least ten letters	455	26.71
Recognize the symbol of numbers	560	32.56
Overall assessment of ECD ^a		
Not being developmentally on track ^b	476	27.49
Developmentally on track ^c	1256	72.51

^a Early childhood development included physical, socioemotional, learning and literacy domain. ^b Not being developmentally on track defined by children who are on track less than 3 domains. ^c Developmentally on track defined by children who are on track at least three domains.

Table 5: Univariate and multivariate logistic regression analysis: Association between home care quality and ECD (N=1628)

Characteristic	ECD status (on track)							
	N=1733			N=1628				
	n	%	OR	95% CI	P	AOR ^a	95% CI	P
Home care quality								
Poor	380	64.62	Reference			Reference		
Good	877	76.56	1.78	1.36-2.33	<0.001	1.59	1.17-2.15	0.002
Child age in months								
36-47 months	622	71.15	Reference			Reference		
48-59 months	635	73.89	1.14	0.89-1.47	0.280	1.01	0.78-1.33	0.889
Gender								
Girl	621	71.28	Reference			Reference		
Boy	635	73.75	1.13	0.88-1.45	0.330	1.13	0.88-1.47	0.321
Residence location								
Rural	1064	70.99	Reference			Reference		
Urban	192	82.23	1.89	1.26-2.81	0.002	1.61	1.03-2.52	0.036
Mother's education level								
No education	182	68.84	Reference			Reference		
Primary	678	70.27	1.07	0.73-1.54	0.719	1.02	0.68-1.54	0.869
Secondary	396	78.72	1.67	1.07-2.61	0.024	1.34	0.77-2.32	0.293
Mother's Occupation								
Not working	239	72.06	Reference			Reference		
Working	1017	72.59	1.02	0.69-1.50	0.893	1.01	0.66-1.56	0.934
Wealth index								
Poor/Poorest	565	69.53	Reference			Reference		
Middle	233	75.04	1.31	0.91-1.88	0.134	1.10	0.75-1.62	0.606
Rich/Richest	458	75.18	1.32	1.00-1.76	0.049	0.78	0.54-1.13	0.197
Attending ECE program								
No	1045	70.95	Reference			Reference		
Yes	210	84.66	2.26	1.37-3.70	0.001	1.83	1.05-3.19	0.032
Well nourished								
No	543	67.77	Reference			Reference		
Yes	672	72.50	1.57	1.20-2.06	0.001	1.44	1.10-1.87	0.006

^a Variables included for adjusting in multivariate model were: child's age, child's gender, residence, mother's education, mother's occupation, wealth index, attend early childhood education program and well-nourished.

Discussion

This study showed that approximately three-quarters of children were developmentally on track, similar to neighboring countries such as Vietnam [18]. The literacy-numeracy domain was the most difficult for Cambodian children to master among the four domains, necessitating more systematic interventions such as home-based interventions for both children and caregivers. As their parents worked, children in Cambodia were frequently left at home with other adult caregivers who were mostly elderly and illiterate.

Additionally, approximately two-thirds of children were exposed to good home care quality. The two lowest indicators among the four indicators of home care quality for children were the presence of children's books and learning materials (5.70% and 41.52%), while in other countries, they were usually high. For instance, the availability of three children's books or more in Thailand, Vietnam, and Belarus was 41.20%, 26.20%, and 95.70%, respectively [18-20]. The presence of at least two learning materials in Thailand, Vietnam, and Belarus was 75.60%, 51.50%, and 90%, respectively [18-20]. Most children living in rural areas have few children's books and learning materials. Therefore, they tended to play with anything around their house (dirt, tree branches or leaves, an old tire, animals, insects, etc.), which was not listed in the questionnaire [21]. Activities promoting learning were also lower than in Thailand, Vietnam, and Belarus, especially telling stories, reading a book, looking at pictures, doing a name count, or drawing things. In the context of Cambodia, these indicators were rarely performed by their mother or other caregiver. Many Cambodian children do not use a pencil and paper until they are at least five or six years old [21]. We found that children with good home care quality were 1.59 times more likely to be developmentally on track than children receiving poor home care quality. This could suggest the crucial importance of home care quality for ECD. Additionally, this finding is consistent with previous studies in China [7, 22].

Moreover, we found that attending an ECE program had a positive association with ECD. This could highlight the significant role of ECE programs in promoting children's skills in the four domains of ECD. This finding supported a previous study that suggested that the ECE program stimulated children's brains and improved ECD [10]. Furthermore, children living in urban areas were more likely to develop on track at an early age than children living in rural areas, a finding that was consistent with studies in Bangladesh, Costa Rica, and Ghana, where it was observed that children living in rural areas frequently faced a shortage of resources (books, learning

materials) [9]. Because of their parent's socioeconomic status in rural areas, children may be left at home with adults other than their parents, who have low education levels and are unaware of any ECD-promoting activities. Although in a few communities, children aged 3–4 in preschool could attend some forms of organized learning activities or community preschool, few of the children in our study had the opportunity to do so [15]. We also found that well-nourished children had a positive association with ECD. This result suggested that nutritional status is also the main predictor for ECD.

The current study has faced a number of limitations. First, there was temporal ambiguity in the cross-sectional study, making causal inference impossible. Second, recall bias might occur since activities that promoted learning in the past three days may lead to underreporting. However, this information bias was minimized by using a standard questionnaire. Third, although the tool for measuring ECD may not be applicable for children in Cambodia's rural setting, especially in terms of the literacy-numeracy domain, adjustment for confounding factors such as the residence of children was assessed in the final model. However, the UNICEF and many countries continue to use it because it is one of the key indicators for global monitoring and reporting [5, 23]. The strength of the study is that it uses nationally representative data from the CDHS, and the ECDI measurement and tool have been validated and standardized for use across global DHS and many population-based surveys [24].

Conclusions

The overall ECDI was relatively low compared to neighboring countries. The study reported that good home care quality and ECE programs are important factors in stimulating Cambodian children to be developmentally on track. The results provided evidence that children who were from urban areas and well-nourished were more likely to be developmentally on track than those who were not. Improving home care quality by increasing parents' knowledge is the most beneficial way to help children achieve their proper development. In addition, investment in childcare and integration with the ECE program and nutrition program in preschools, especially in rural areas, will have an impact on the next generation.

Ethical considerations

Our study used a subset of the survey data from the 2014 CDHS. All data collection instruments were anonymous; they contained no identifying information

such as name, address, telephone number, or medical record number. The study protocol was approved by the National Ethics Committee for Health Research in Cambodia (NECHR) on June 8, 2021 (Ref. #106).

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Declaration of conflicting interests

The author declares that there are no conflicts of interest.

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