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Presence of Books for Children in the Households of Bangladesh: A District-wise Distribution

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ABSTRACT

Health policies and public health studies in Bangladesh primarily focus on physical aspects of health, thus creating a gap in the literature regarding the assessment of the emotional-social environment for children and their developmental vulnerabilities. Interactions through literacy activities, such as shared reading times between child and parents, are possible ways to address the developmental and cognitive needs of children. This study explores the district-wise presence of books for children (aged 0–4 years) in households and identifies vulnerable households by exploring the association between sociodemographic status and household book ownership. The Bangladesh Multiple Indicator Cluster Survey 2012–13 was used to map the spatial heterogeneity of average availability of children's books, which revealed that ownership of age-appropriate books was clustered around divisional cities, with one exception. Around 65% of the households did not have any suitable books for children. The presence of children's books was significantly ($p < .005$) associated with children's age, mother's age and education, financial status of the household, education of the head of the house, mother's mobile phone ownership, and mother's access to media (newspaper and television). Parents in high-income households and with highly educated mothers were nearly three times more likely to own children's books. Similarly, parents in a household with the mother having a mobile phone were 42% more likely to own children's books. The findings suggest that a household's lack of financial capacity to purchase books, the role of public health media in promoting the mother's awareness of the need for children's books, and a lack of understanding of children's cognitive developmental needs could be more effectively addressed in Bangladesh.

Introduction

Bangladesh has had a satisfactory performance in the United Nation's Millennium Development Goals review, which went so far as to praise the "Bangladesh paradox," which produced exceptional public health improvement in a short time despite having a small economy (Bourguignon et al., 2010; Chowdhury et al., 2013; Chowdhury et al., 2007; Hogan et al., 2010). However, child health care remains a neglected topic with very few national assessments, particularly in relation to the emotional-social environment for children and their early developmental vulnerabilities

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(Gilbert, Patel, Farmer, & Lu, 2015). Most related child-health studies have been confined within the boundaries of nutrition and disease, as is common for developing countries (Gelaye, Rondon, Araya, & Williams, 2016; Reza & Henly, 2018). This study focuses on a less discussed topic, the association between the effect of sociodemographic factors and households' ownership of children's books (reading or picture) in Bangladesh, particularly regarding concerns of a severe shortage of appropriate reading materials for children (aged 0–4 years). However, reading materials such as books are one of few learning processes that contribute to literacy. We argue that a mother's lack of literacy and awareness of children's literacy developmental needs, coupled with limited household purchasing power of reading materials, could lead to developmental hindrances of children.

Bangladesh is an overpopulated country where essential health services are clustered in major divisional cities and, with a limited literacy rate associated with poverty, wider support for advancing child development is rarely an important topic of discussion in the context of day-to-day survival (Ahmed, Hossain, RajaChowdhury, & Bhuiya, 2011; Ahmed, Evans, Standing, & Mahmud, 2013; Andaleeb, Siddiqui, & Khandakar, 2007; Engle et al., 2011). The urban health care system focuses on disease diagnosis and treatment, whereas rural community health provides primary care and awareness through public and nongovernmental organizations (NGOs; Parkhurst et al., 2005; World Health Organization & others, 2015). With the primary focus on maternal care and neonatal survival, early childhood development is considered "satisfactory" if a child remains disease-free and has primary education at the appropriate time; that is, a child's physical development eclipses cognitive, social, and emotional development (Haider et al., 2001). Furthermore, despite an improvement in females' enrollment in primary schools, equality in their participation in higher education and quality of education both remain questionable (Chisamya, DeJaeghere, Kendall, & Khan, 2012; DeJaeghere & Wiger, 2013; Field & Ambrus, 2008; Hossain & Tisdell, 2005; Rao & Hossain, 2011). Hence, it is expected that the transition from females' primary literacy to efficient child care by mothers is unlikely in the current education paradigm. Using a pre–post intervention–control design, Moore, Akhter, and Aboud (2008) showed that a mother's and father's education and assets correlated with pretest cognitive scores of children and, as a result, this study hypothesizes that in Bangladesh financially limited households, combined with mothers' lack of education, could lead to the absence of developmental amenities like books for children.

Investment in education has been high in Bangladesh with a particular focus on girls' education. With the aim of the Sustainable Development Goals for 2030, these investments have resulted into an increase in adult literacy rate from 47% in 2011 to 73% in 2016 with efforts from both the government and NGOs (Richmond et al., 2008; UNESCO Institute for Statistics, 2017). Female stipend programs and food for education have increased the number of females attending both primary and secondary school (grade 6 to 10; Hossain and Zeitlyn, 2010; Hahn et al., 2018). All of these approaches are much researched in health science and education is considered an essential parameter to improve the health indicators (Razzaque et al., 2010; Jesmin et al., 2011; World Health Organization, 2015). However, a limited number of studies have investigated the pre-primary literacy development of children in Bangladesh using indicators such children's book ownership.

Contemporary literature shows that there is a connection between various aspects of developmental growth and reading to children or providing them with picture books. Engle et al. (2011) observed that reading books to children improved the parent–child relationship and, more important, giving books to young children through primary health services (in high-income countries) increased the frequency of parents' reading to their children and ultimately led to language improvements. Children's phonemic awareness, an important cognitive skill, is developed at an early age through the parental shared reading relationship (Korat, 2005; Scarborough, 1998). It is not just limited to phonological awareness or vocabulary development; several researchers have

shown that children from less affluent families without access to high-quality, age-appropriate books had worse academic performances and achievements compared to their peers (Baker, 2013; Burgess, 2002; Neuman & Celano, 2001; Neuman & Celano, 2006; Sim, 2012). A warm relationship between child and carer will help to meet the social and emotional needs of the child, and interactions through literacy activities are ways to attain such relationships, which also aid the child's literacy skills (Aram, Fine, & Ziv, 2013; Bennett, Weigel, & Martin, 2002; Ostrosky, Gaffney, & Thomas, 2006).

These relationships are influenced by several sociodemographic factors that indicate the household's purchasing capacity (family income) of suitable books or mothers' awareness (maternal educational qualifications) regarding developmental vulnerabilities of their children (Chahe & Mwaikokesya, 2018; Hoff, 2003; Hartas, 2011; Leffel & Suskind, 2013). The gap between cognitive and non-cognitive skills during early ages is increased by family environment and income status, which persist throughout childhood and adolescence (Biswas & Kabir, 2018; Heckman, 2006). Although a child starts to develop literacy skills at age 6 or 7, early childhood experiences, particularly shared enjoyment of a book with adults, is one of the factors that contribute to the attainment of necessary precursor skills (Hindman, Connor, Jewkes, & Morrison, 2008). There are three issues with mothers' education regarding shared reading time or providing books for their children. First, a mother with limited education is less likely to be aware of the role of books in boosting child development and to focus more on physical aspects such as nutrition and growth of the child (Baker, Cameron, Rimm-Kaufman, & Grissmer, 2012; Baker, 2014, 2016). Second, lack of education, which is often associated with poverty, is more likely to discourage the mother from purchasing literacy materials such as books that are considered "luxury" or not necessary in early childhood (Bornstein & Bradley, 2014; Guo & Harris, 2000; Wasik & Bond, 2001). Moreover, in developing countries such as Bangladesh, the government or NGOs have various schemes to provide books or similar materials at primary school for free, which may lead to maternal complacency in relation to purchasing books during preschool years (Rose, 2009; Sommers, 2011). Third, illiterate mothers are less likely to be acquainted with media such as newspapers, radio, or television or to own mobile phones/communication devices, which limits awareness regarding these proximal processes (e.g., shared book activities between parent and child; Haque, Rahman, Mostofa, & Zahan, 2012; Rahman & Rahman, 2007). All of these factors indicate the importance of exploring the association of sociodemographic factors with household ownership of children's books and identify those households in Bangladesh that are vulnerable.

Most of the research on early literacy development by shared book activities has been conducted in high-income countries and less in low-middle income countries with some in disadvantaged neighborhoods (Lindsay, 2010; Maulik & Darmstadt, 2009). There remains a literature gap in this sector for a developing country such as Bangladesh, where the public health context is dominated by physical wellness, which generally ignores the developmental vulnerabilities of children. To address a part of these developmental vulnerabilities of children in Bangladesh, one of the avenues of literacy acquisition are discussed in this article. This study attempts to explain this gap through an analysis of the district-wise presence of children's books in Bangladeshi households and the association between sociodemographic status and household book ownership.

Theoretical framework

There are several models that link sociodemographic statuses with health and psychological well-being, such as Klerman's model (Klerman, 1991), double ABCX models (Saloviita, It, Alinna, & Leinonen, 2003), and mediation models (Linares et al., 2001). The present study was framed by ideas from the MacArthur Network on socioeconomic status and health (Adler & Ostrove, 1999; Bradley & Corwyn, 2002; Bretherton & Oppenheim, 2003), particularly the ecological theory of development (Baker, Vernon-Feagans, & Investigators, 2015; Bronfenbrenner & Morris, 1998).

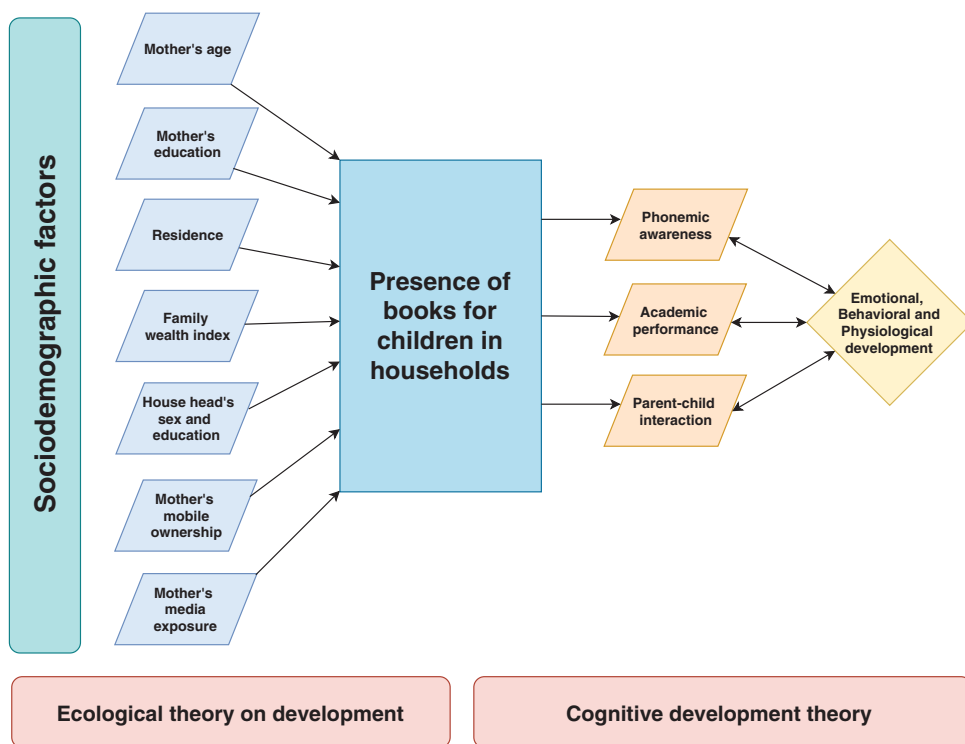


Figure 1. Theoretical hypotheses for the study.

This theory posits that environmental resources/constraints, that is, demographic factors, influence the early psychological development of young minds. The most important environmental factors discussed in the literature are the mother's educational background, language input and financial status, and parents' awareness of children's development (Reese & Newcombe, 2007; Sénéchal, 2006). Cognitive development theory links these sociodemographic factors with the thought processes of children at early stages that contribute to their emotional, behavioral, and physiological development (Beck, 2008; Wadsworth, 1996). Based on these determinants (Figure 1), this study explores the presence of children's books by mother's age and education, financial status of the household, sex and education of the house head, and awareness parameters: mother's mobile phone ownership and access to media.

Materials and methods

Data overview

The Bangladesh Multiple Indicator Cluster Survey (MICS) 2012–13 was used for this study (UNICEF, 2013). Applying a two-stage stratified cluster sampling design, this survey collected national level estimates for several health indicators from the 7 divisions and 64 districts in Bangladesh. The districts were considered as the primary sampling strata, and a number of census enumeration areas (EAs) were sampled systematically using the probability proportional to size within each stratum. A systematic sample of 20 households was drawn from each EA following the household listing within the selected EAs. Besides the collection of general sociodemographic factors, the number of books for children (aged 0 to 4 years) available in the household was also enumerated (UNICEF, 2014). Figure 2 displays the district-wise household presence of books for

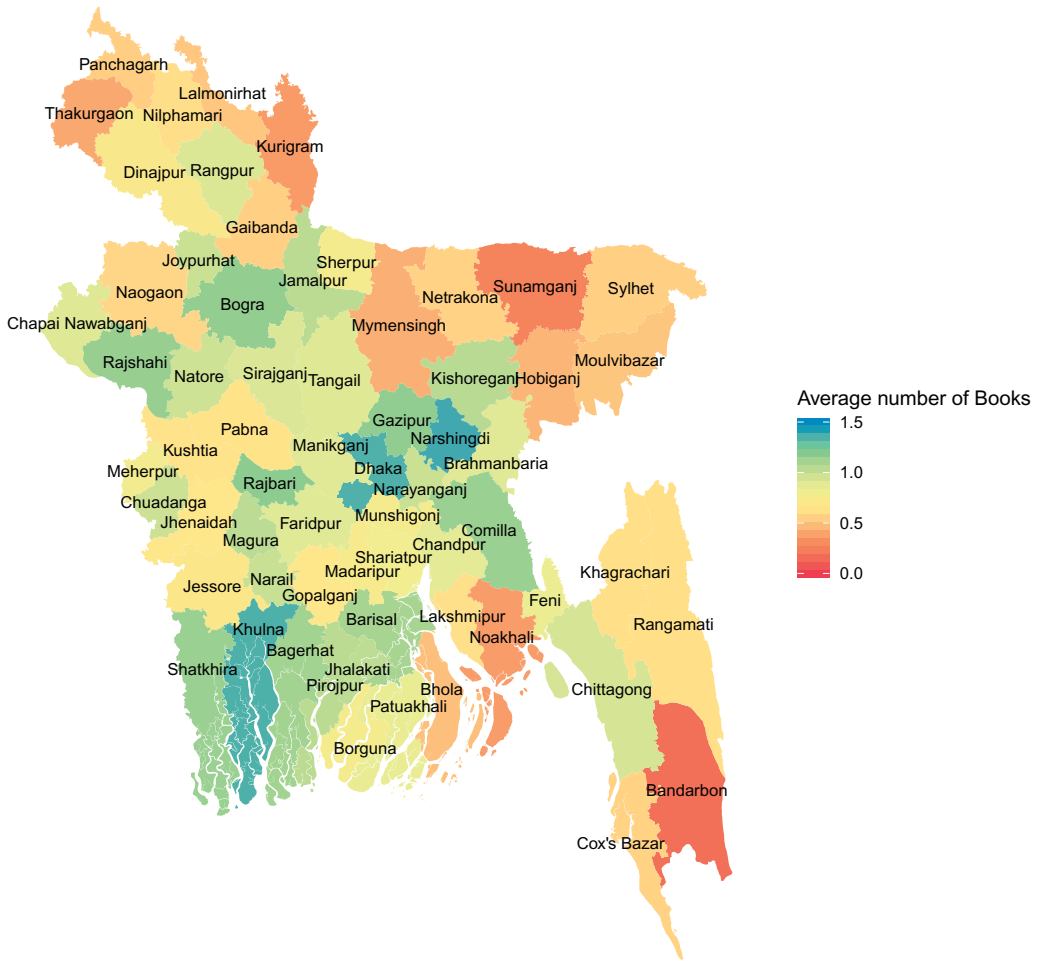


Figure 2. A district-wise mapping on the presence of age-appropriate books (reading or picture books) at home for a child (0–4 years) in Bangladesh.

children. In this study, the households with this information as well as the essential sociodemographic factors were selected. The final sample size for this study was 22,454 households.

Independent variables

The household sociodemographic factors that were explored for association with the presence of books in households were children's age (continuous), place of residence (rural, urban), mother's age (continuous), mother's education (none or below primary, primary completed, secondary or higher), wealth index (poorest, poorer, middle, richer, richest), mother's mobile ownership (yes, no), sex of house head (female, male), education of house head (none or below primary, primary completed, secondary or higher), age of mother at first marriage (continuous), and mother's access to media—newspaper, radio, and television (never, sometimes, or regularly). Data for each district were also extracted to account for spatial heterogeneity. The household wealth index was precalculated in MICS based on asset variables using principal component analysis (UNICEF, 2014).

Table 1. Presence of children's book (reading or picture books) in the households of Bangladesh. The 11-scale variable was converted into binary for fitting models.

No. of books	Households' frequency (%)	Binary outcome	Frequency (%)
0	14,536 (65.18)	None	14,536 (65%)
1	3,381 (15.15)	At least one	7,768 (35%)
2	1,972 (8.84)		
3	1,083 (4.86)		
4	486 (2.18)		
5	348 (1.56)		
6	254 (1.14)		
7	62 (0.28)		
8	45 (0.20)		
9	39 (0.17)		
10 \geq	98 (0.44)		

Outcome variable

The outcome variable for the models was the number of available children's books per household. Most houses (65%) did not have any such books. Few households ($n=846$ out of 22,454) had more than five books (Table 1). Thus, for fitting models to this outcome variable with skewed distribution, the presence of books was collapsed into two categories: households with no books ($n=14,536$) and households with at least one book ($n=7,768$).

Statistical analysis

Bivariate analysis (Agresti & Kateri, 2011) with chi-square (χ^2) test was applied initially to explore the frequency distribution of the sociodemographic factors by the presence of children's books in the household. The chi-square (χ^2) test showed the primary association between the factors and the outcome variable. Then the binary outcome was fitted to these factors using the generalized linear mixed model (GLMM; Upton, 2016). It provided the effect size as well as the direction of each covariate fitted against the outcome. These then were adjusted for the district-wise difference, which was considered a random effect. The *R* package *lme4* was applied to adjust the districts and fit the GLMM with a binary outcome. All statistical analyses were performed in *R* (version 3.5.0).

While generally a *p* value of .05 is considered the threshold of significant association, we followed the recommendation of Benjamin et al. (2017) to use a more conservative threshold of .005 for new discoveries. Therefore, we interpreted the covariates as significant only when the *p* values were less or equal to .005 and also were consistent with the relevant confidence interval.

Results

As the map in Figure 2 implies, most districts in Bangladesh, on average, did not have any books or an average of less than 1 book for children per household. The green or blue regions indicating one or more books in each household were mostly divisional cities such as the capital Dhaka and Khulna, Rajshahi, Barisal, Chittagong, and the nearby areas. Districts close to the capital (Narsingdi, Gazipur, and Rajbari) also had books in households whereas, even though Sylhet is a divisional city, it did not have the expected book availability. This map paints a discouraging picture, showing the lack of children's books in Bangladeshi households with more than half of the households not having any such books (Table 1).

All the sociodemographic factors had a significant ($p < .005$) association with the presence of books per household, as observed from the χ^2 test (Table 2). With most of the study sample from rural areas, the higher number of households with at least one book was from urban areas

Table 2. Bivariate analysis between presence of children's books in households and sociodemographic factors.

Sociodemographic factors	Scales	Number of children's books		<i>p</i> value (χ^2 test)
		None (%)	One or more (%)	
Children's age	Mean (<i>SD</i>)	1.27 (1.21)	3.10(0.93)	
Residence	Rural	11,977 (67.2)	5,850 (32.8)	<.001
	Urban	2,559 (57.2)	1,918 (42.8)	
Mother's age	Mean (<i>SD</i>)	27.20 (7.56)	27.97 (7.19)	
Mother's education	None or below primary	2,428 (73.2)	891 (26.8)	<.001
	Primary completed	9,710 (67)	4,779 (33)	
	Secondary or higher	2,398 (53.3)	2,098 (46.7)	
Wealth index	Poorest	2,402 (76.4)	740 (23.6)	<.001
	Poorer	2,755 (73.8)	980 (26.2)	
	Middle	2,868 (68.2)	1,340 (31.8)	
	Richer	3,275 (61.1)	2,088 (38.9)	
	Richest	3,236 (55.3)	2,620 (44.7)	
Mother's mobile ownership	No	1,012 (76.3)	315 (23.7)	<.001
	Yes	1,3524 (64.5)	7,453 (35.5)	
Sex of the house head	Female	840 (61.5)	525 (38.5)	.004
	Male	13,696 (65.4)	7,243 (34.6)	
Education of house head	None or below primary	7,262 (70.8)	2,991 (29.2)	<.001
	Primary completed	5,109 (64.9)	2,764 (35.1)	
	Secondary or higher	2,165 (51.8)	2,013 (48.2)	
Age of mother at first marriage	Mean (<i>SD</i>)	17.04 (3.31)	17.18 (3.54)	
Mother reads newspaper	Never	12,469 (67.3)	6,071 (32.7)	<.001
	Sometimes or regularly	2,067 (54.9)	1,697 (45.1)	
Mother listens to radio	Never	13,300 (64.8)	6,907 (34.2)	<.001
	Sometimes or regularly	1,236 (58.9)	861 (41.1)	
Mother watches television	Never	6,462 (72.4)	2,465 (27.6)	<.001
	Sometimes or regularly	8,074 (60.4)	5,303 (29.4)	

(42.8%). There was little difference in mother's age (around 27 years) between the two groups (households with or without books); however, children's age was lower in the households without any books (1.27 years vs. 3.10 years). Education of both mothers and house heads suggested that percentage of book ownership increased with education. Similarly, 76.4% of the poorest households did not own books, compared to 55.3% of the richest households, which indicates an association between family wealth and book ownership. Around 35% of mothers owning mobile phones had books at home compared to around only 24% of mothers without mobile phones. Mothers never reading newspapers and never hearing the radio were associated with around 10% fewer households with books at home compared to those who were sometimes or regularly exposed to these media (Table 2). However, television viewership (65% of the mothers) seemed to be the more common media that mothers were regularly exposed to compared to radio or newspapers.

Table 3 displays the GLMM results for one-to-one relationships between the sociodemographic factors and presence of books (unadjusted model) as well as the combined effect of each factor on the outcome (adjusted model). Both models were adjusted for the district-wise spatial variance by taking it as a random effect; however, only the adjusted model's variance was reported, which was 1.49 (not close to 0) showing the need for district-wise discrepancy adjustment. All the associations in the unadjusted model were significant ($p < .005$), which meant they were all eligible for inclusion in the final adjusted model. Children's age and mother's age were significantly associated with the presence of children books in the household (adjusted model). However, the direction of the odds was the opposite with children's age positively associated with book availability and negatively associated with the mother's age. The mother's education was positively associated with book ownership, as households with mothers who completed primary education and higher education had 1.9 and 3.2 times greater chance of owning children's books at home, respectively (adjusted model, Table 3). Greater household income or wealth afforded a higher likelihood for

Table 3. Binary linear mixed model fitted to ownership of children's books in the household (binary) with sociodemographic factors.

Sociodemographic factors	Unadjusted odds ratio		Adjusted odds ratio	
	Odds (95% CI)	<i>p</i> value	Odds (95% CI)	<i>p</i> value
Random effect (district) variance			1.497	
Children's age (numeric)	3.49 (3.39, 3.61)	<.001	4.55 (4.37, 4.74)	<.001
Residence (ref: rural)				
Urban	1.53 (1.44, 1.64)	<.001	1.06 (0.95, 1.18)	.289
Mother's age (numeric)	1.01 (1.01, 1.02)	<.001	0.99 (0.98, 0.99)	<.001
Mother's education (ref: none or below primary)				
Primary completed	1.34 (1.23, 1.46)	<.001	1.88 (1.67, 2.12)	<.001
Secondary or higher	2.38 (2.16, 2.63)	<.001	3.22 (2.74, 3.77)	<.001
Wealth index (ref: poorest)				
Poorer	1.15 (1.03, 1.29)	.010	1.16 (1, 1.35)	.053
Middle	1.52 (1.37, 1.64)	<.001	1.58 (1.35, 1.84)	<.001
Richer	2.07 (1.87, 2.28)	<.001	2.37 (2.03, 2.77)	<.001
Richest	2.69 (2.38, 2.89)	<.001	2.94 (2.46, 3.5)	<.001
Mother's mobile ownership (ref: no)				
Yes	1.77 (1.56, 2.02)	<.001	1.42 (1.17, 1.71)	.002
Sex of the house head (ref: female)				
Male	0.85 (0.76, 0.95)	.004	0.81 (0.69, 0.95)	.012
Education of house head (ref: none or below primary)				
Primary completed	1.31 (1.23, 1.39)	<.001	1.03 (0.94, 1.13)	.489
Secondary or higher	2.26 (2.09, 2.43)	<.001	1.46 (1.29, 1.66)	<.001
Age of mother at first marriage (numeric)	1.01 (1.00, 1.02)	<.001	1.01 (1, 1.02)	.063
Mother reads newspaper (ref: never)				
Sometimes or regularly	1.69 (1.57, 1.81)	<.001	1.26 (1.12, 1.42)	<.001
Mother listens to radio (ref: never)				
Sometimes or regularly	1.34 (1.22, 1.47)	<.001	1.05 (0.91, 1.21)	.469
Mother watches television (ref: never)				
Sometimes or regularly	1.72 (1.62, 1.82)	<.001	1.27 (1.16, 1.40)	<.001

the presence of books in the household, as the richest cluster was 2.9 times more likely to own children's books than the poorest cohort.

Other variables played a greater or lesser part in the likelihood of book ownership. Place of residence, sex of the house head, age of mothers at first marriage, and mother listening to the radio were not significant. Secondary or higher education of the house head showed significant positive association (odds ratio = 1.46), unlike primary completion, which was not significant. Possible awareness indicators of mother's ownership of mobile phone and media exposures (apart from radio) were significant ($p < .005$). A household with the mother having a mobile phone was 42% more likely to own children's books. Similarly, a mother reading newspapers or watching television was associated with over 25% likelihood of living in households with child-appropriate books. Finally, varying inflation factors were calculated for the adjusted model and all the scores were below 4, indicating that there was no issue of pronounced multicollinearity in the model (Kutner, Nachtsheim, & Neter, 2004; Polhemus, 2005).

Discussion

A household with children's reading or picture books was significantly associated with children's age, mother's age and education, financial status of the household, education of house head, mother's mobile phone ownership, and mother's access to media (newspaper and television). These factors indicated that children living in well-off families with educated mothers are more likely to own books. Media and mobile phone ownership, which are most likely associated with awareness of mothers of children's cognitive development, seemed to be a potential cause for the presence of suitable books for children. The district-wise distribution revealed that the divisional

cities (except Sylhet) and its adjacent areas have higher scope of accommodating households with children's books; however, there was no urban–rural significant gap. This district-wise variation could be associated with access and supply of book shops and social demand to buy books or literacy materials for children.

Literacy of mothers has previously been associated with important early childhood developmental activities like shared reading time (Ball, Paris, & Govinda, 2014; Banerji, Berry, & Shotland, 2013). From the MICS data, this study found that in Bangladesh a household's book ownership was significantly associated with mother's level of education. Uneducated mothers or those with below primary level education prioritize concerns about the survival of their child and their physical development, which can extend to regular vaccination and postnatal checkups as part of country-wide campaigns on educating mothers on primary child health care in Bangladesh (El Arifeen et al., 2013; Hayford, Uddin, Koehlmoos, & Bishai, 2014; Uddin et al., 2016). However, mothers with essential education beyond the primary level have greater awareness of the emotional and behavioral needs of children beyond the physical and physiological needs (Mejia, Calam, & Sanders, 2012; Yoshikawa, Aber, & Beardslee, 2012). The difference in age of mothers between both types of households (with or without books) were small; however, older children (mean age 3.10 years) were more likely to have books compared to younger counterparts (mean age 1.27 years), which is obvious as higher age leads to greater chance to acquire more books. Nonetheless, the lack of adequate knowledge or awareness of a mother on the need to provide books to children most likely explains the country-wide scarcity of children's books in households (Opel, Ameer, & Aboud, 2009).

The impact of poverty on health care in general is well established, as is its effect on developmental vulnerabilities of children (Mistry, Benner, Biesanz, Clark, & Howes, 2010; Rogosch, Dackis, & Cicchetti, 2011). Absence of children's books in Bangladeshi households was found to be associated with wealth index, the financial capacity indicator of a household. Even with its recent success of becoming a low-middle income country, the purchasing capacity of most households in Bangladesh is limited to “necessary” goods (E-Jahan, Ahmed, & Belton, 2010; Raihan et al., 2013; World Bank, 2016). Therefore, most households place emphasis on survival and physical wellness, and consequently other important developmental aspects like language and phonetics are neglected (Jain & Kibria, 2009; Kibria & Jain, 2009). Furthermore, parents, particularly those with limited education, possibly consider free primary public education as the most suitable step for children to be introduced to books (Chowdhury et al., 2003; Aboud, 2006). This suggests a twofold problem: first, children are devoid of the early linguistic development of reading or listening to age-appropriate books and, second, there is no shared reading time, leading to a gap in parent–child interaction (Aboud, Hossain, & O'Gara, 2008; Haider et al., 2001). Moreover, greater family income allows the household to live in divisional cities, where supply of such books is higher. Hence, financial incapacity fosters neglect about the value of children's books.

Besides education and family income, awareness is considered to have an association with access to media (Lecouturier et al., 2010; Seymour, 2018; Wakefield, Loken, & Hornik, 2010). Public health campaigns, arguably, are among the most effective vehicles to provide information to illiterate and poor communities in developing countries (Cecchini et al., 2010; Wakefield et al., 2010). Such campaigns have also been successful in Bangladesh (Do & Kincaid, 2006; Kabir & Islam, 2000; Sanghvi et al., 2016); primarily because a focused message could reach a larger audience, the same messages could be repeated numerous times, awareness could be induced through entertainment, and a community intervention could be possible (Boles, Adams, Gredler, & Manhas, 2014; Sharma, Sawangdee, & Sirirassamee, 2007; Wakefield et al., 2010). One such success story would be the “Meena cartoon” in Southeast Asia, an entertainment-based digital screenplay that originated in Bangladesh, which has been delivering messages on gender equity and social development issues (Ashraf & Hoque, 2016; McKee, Aghi, Carnegie, & Shahzadi, 2004). However, the effectiveness of these media campaigns is limited to mothers or parents

having access to these media or, in recent years, those who have access to mobile phone devices (Moorhead et al., 2013; Uddin & Choudhury, 2008). Governments or other health bodies are using mobile phones to send health messages in Bangladesh (Islam et al., 2014; Prue et al., 2013). Consistent with this, the current study found an association between the presence of children's books in households and mobile phone ownership and mothers' media access.

This study had a number of limitations that could pave the way for future research: First, a deeper understanding of children's lack of cognitive development and mothers' unawareness required a qualitative assessment from the participants, which was not available in MICS 2012–13. Future research could consider conducting focus group discussions or in-depth interviews with mothers or caregivers to understand their views on the relationship between books and cognitive development. Second, this study was limited to the available data of mothers; however, shared reading time with fathers is also discussed as important in literature (Baker et al., 2015) and is also worthy of exploration. Third, there are other possible avenues to quantify literacy acquisition beyond shared reading time. For example, the survey did not ask about exposure to books outside the home and therefore this was unable to be accounted for and quantify its impact. Due to the survey data limitation, it was not possible to evaluate these avenues and, thus, the study considered only one aspect of literacy acquisition. This should be considered while interpreting the findings. Fourth, to assess a causal relationship and a comprehensive understanding of the impact of mothers' level of schooling on child's reading behavior require data from experimental settings, which could be a future of area of research. Finally, as this study used cross-sectional data, the associations observed between sociodemographic factors and book ownership were not strictly causal. A cluster randomized control trial with multiple communities could be considered in which books are provided to the intervention communities.

Conclusion

With the aim of exploring the association between child-appropriate books in Bangladeshi households and sociodemographic factors, this study analyzed data from the MICS 2012–13. This nationwide survey revealed that a major proportion of Bangladeshi households did not own any books for children and the households with age-appropriate books were clustered around the divisional cities, with one exception (Sylhet). Among the sociodemographic factors analyzed, a number—mother's education, financial status of the household, mother's mobile phone ownership and access to media (newspaper and television)—showed significant association with the presence of books. All these referred to the lack of awareness regarding the necessity of parental shared reading time or providing books to children. The current public health model in Bangladesh focuses on physical health, particularly postnatal survival, overlooking mental health care. The findings suggested that awareness and/or access issues to children's books need to be addressed in Bangladesh as an important developmental activity for the child, as well as the parent–child relationships. More intervention studies are required to determine key causal factors and to address specific developmental vulnerabilities such as phonetic and language awareness of children in Bangladesh and possible effective intervention strategies. Finally, health policies could also consider the cognitive aspect of children's development besides their physical wellness.

Ethical clearance

This study was based on analysis of a secondary survey data from UNICEF, where all the personal identifiable information of participants had been removed. Informed consent was taken

from participants before participating in the survey by the national statistical office, Bangladesh Bureau of Statistics and UNICEF. The data are available online: <http://mics.unicef.org/surveys>.

Author's contribution

R. K. Biswas conceptualized the study, compiled the data, performed the statistical analysis, and drafted the manuscript. E. Sarker helped to synthesize the analysis plan and edited the draft. The manuscript was critically reviewed and edited by E. Kabir and T. Senserrick. All authors read and approved the final manuscript.

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