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Research article

Examining Levels and Social Correlates of Caregivers' Knowledge, Attitude, and Practices toward Child Health Care Services in Khulna

Ashik Mondal and Sanjoy Kumar Chanda*

Sociology Discipline, Social Science School, Khulna University, Khulna-9208, Bangladesh

A B S T R A C T

The government of Bangladesh is striving to achieve the Sustainable Development Goal 3; however, Child Health Care (CHC) services continue to be a significant issue due to caregivers' insufficient knowledge, attitudes, and practices (KAPs) toward CHC services. Despite various national health initiatives, gaps in awareness and utilization of CHC services persist, resulting in child morbidity and mortality. This study aims to examine the levels of KAPs of caregivers toward CHC services and its associated factors in Bangladesh. This study followed a quantitative approach, utilizing a survey method for data collection. A total of 280 respondents were selected by using a systematic random sampling procedure from caregivers of under-five children in Gadaipur Union, Paikgacha, Khulna who had used CHC services at least once and lived there for at least three years. Data were collected from the selected respondent's in-person through an interview schedule in September 2023. Data management was conducted using the Statistical Package for Social Sciences software, and analysis involved descriptive statistics, including percentage distribution, as well as bivariate statistics, including significant value ($p < 0.01$, $p < 0.05$) of Spearman's correlation. The study indicates that half of the caregivers exhibited low levels of knowledge, attitudes, and practices toward CHC services for their children. Significant ($p <$ **0.01, $p < 0.05$) correlations were identified between caregivers' knowledge and various social factors, including age (.160*), education (.167**), income (.267**), and occupation (.227**). Positive associations were identified between caregivers' attitudes and various factors, including education (0.219**), income (0.174**), family income (0.211**), family expenditure (0.269**), and knowledge (0.460**). Positive correlations were also identified between caregivers' practices and various factors, including age (0.124**), family income (0.215**), family expenditure (0.223**), savings (0.339**), knowledge (0.379*), and attitudes (0.357**). To enhance caregivers' KAPs toward CHC services, strategies include promoting literacy through awareness programs, establishing a monitoring system, addressing socioeconomic barriers, and collecting caregiver feedback for improvements.

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Introduction

Globally, over 5 million children under the age of five die each year (WHO, 2022). Around 3.1 million of these children die during the neonatal stage, and almost all (99%) of these deaths occur in developing countries (Memon et al., 2019).

The primary factors contributing to the annual deaths of millions of children globally due to preventable and treatable conditions include caregivers' limited understanding of child health issues and insufficient access to proficient medical care (Fore et al., 2020).

In Bangladesh, the challenge of inadequate health care services and poor health is widely recognized, particularly concerning women and children. The intricate and multifaceted phenomenon referred to as child health difficulties serves as both a cause and a symptom of health

*Corresponding author: <skchanda@soc.ku.ac.bd>

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issues in Bangladesh (Rahman, 2018). Child health is a critical concern in Bangladesh, largely due to limited access to and underutilization of healthcare facilities, particularly in rural areas (Rajia et al., 2019; Zafri et al., 2021). In Bangladesh, pneumonia, diarrhea, and malaria remain the three leading causes of under-five mortality, while 31% of children are stunted, 8% are wasting, and 22% are underweight—an issue common to many developing countries (Ezeonwu et al., 2014; Rahman et al., 2022).

Target 3.2, one of the 17 Sustainable Development Goals (SDGs) that the United Nations set forward in 2015, calls on all countries to prevent millions of avoidable deaths among infants and children under five by 2030. Reducing neonatal mortality and under-5 mortality rates to no more than 12 and 25 deaths per 1000 live births, respectively, is one of the goals that must be met (Howden-Chapman et al., 2017). In Bangladesh, infectious diseases such as measles, chickenpox, tuberculosis (TB), and several others are prevalent contributors to infant mortality, alongside pneumonia and various infections (Muhammad et al., 2017). Public health services through Upazila Health Complex (UHC) are well-established as a main Primary Health Care (PHC) centers in Bangladesh's rural areas, yet there is still a severe information gap regarding UHC's child health services (Osman & Bennett, 2018). Caregivers of children in remote regions seek health treatments for their children at the local UHC (Biswas et al., 2018). However, there has been limited research focused on child health services provided by UHC, despite UHC being the main PHC centers in rural Bangladesh. While some studies have investigated the knowledge, attitudes, and practices (KAPs) of doctors and nurses regarding CHC services in PHC centers, no particular studies have focused on parents, who are the primary caregivers of children under five. Understanding the KAPs of caregivers is essential for ensuring the effective use of CHC services provided by PHC centers in Bangladesh.

Primary caregivers play a vital role in children's well-being, and their knowledge of Child Health Care (CHC) services is essential for effective care. Likewise, inadequate prenatal and maternal care are major causes of child illness (Kakuma et al., 2011; Kinshella et al., 2021). Unfortunately, Mothers, despite their key role in childcare, often have limited decision-making power, and combined with factors like practitioner qualifications, treatment costs, distance to facilities, and socio-economic status, this leads to suboptimal CHC practices (Di Novi & Thakare, 2022; Siddiqi et al., 2017). Child's development and growth are largely dependent on the knowledge and skill of the caregiver and how well they use health care resources. There is a significant relationship between the caregiver's education, income, employment status, comprehension of CHC services and the behavior of seeking out such services (Martha Bellete et al., 2021; Sule et al., 2013). Besides, caregivers' knowledge toward CHC vary based on their socioeconomic statuses (SESs) such as social, economic, educational, and cultural factors, determines how they treat children or seek out health care (Uchendu et al., 2019). Similarly, caregivers with positive attitudes toward CHC exhibit a high level of attentiveness to the health of their under-five children (Mphasha et al., 2022). Along with this, Common obstacles shaping mothers' attitudes toward CHC services include perceiving illnesses as minor, long distances to healthcare facilities, and financial constraints (Ferdous et al., 2014; Maloni et al., 2010). Appropriate health-seeking behaviors among caregivers can reduce child mortality; however, barriers such as transportation issues, work constraints, childcare responsibilities, and social pressures hinder proper child care practices (Wolf et al., 2020). Ahmed et al. (2022) conducted a study on eighteen low- and lower-middle-income countries (LMICs) to show that the primary cause of the rise in child mortality in LMICs is the result of lower facility health care service consumption. This harrowing situation demands immediate attention and robust measures to ensure the well-being and survival of Bangladesh's future generations.

Therefore, this study aimed to assess the KAPs levels of caregivers toward CHC services and identify the factors that influence these in Bangladesh. The findings can have practical implications, helping to ensure quality healthcare for children, informing resource allocation, guide policy development, and enhance the performance of PHC centers.

Methods

Study design

The nature of this quantitative study was explanatory. The survey method was used to identify numerical data related to levels and social correlates of caregivers' KAPs toward CHC services. In this study, caregivers of under-five children were considered the community group, as they are directly concerned about their children's health, while community experts were defined by their KAPs regarding CHC services. Quantitative research design was applied in this study. Collecting and analyzing numerical data is the process of quantitative research (Apuke, 2017).

Study setting and target population

The specific study area, Gadaipur union, was chosen and is situated within the Paikgacha upazila of Khulna district (Figure 1). This coastal region of Khulna experiences elevated saline levels of water. People of Gadaipur union mostly seek CHC services from Paikgacha Upazila Health Complex (UHC), which is a crucial health care facility that caters to residents from all 10 unions within the upazila. However, there is limited information available for the inhabitants of Gadaipur union about the medical services offered by the UHC (Tajmim, 2023). It encompasses approximately 6,374 acres, and its total population is 20,212, comprising 10,385 males and 9,827 females. The literacy rate in Gadaipur union is 41.13%, which is the lowest among the various unions in Paikgacha Upazila (Census, 2011). Study population refers to the total group of people, things, or events that a researcher is interested in researching (Fraenkel et al., 2012). The study population

for this research comprises caregivers of under-five children residing in the study area of Gadaipur union who had CHC services at least once from Paikgacha UHC and had been residents for a minimum of three consecutive years. Population lists were obtained from local health workers for this study, and the total population size was determined to be 1,043 individuals.

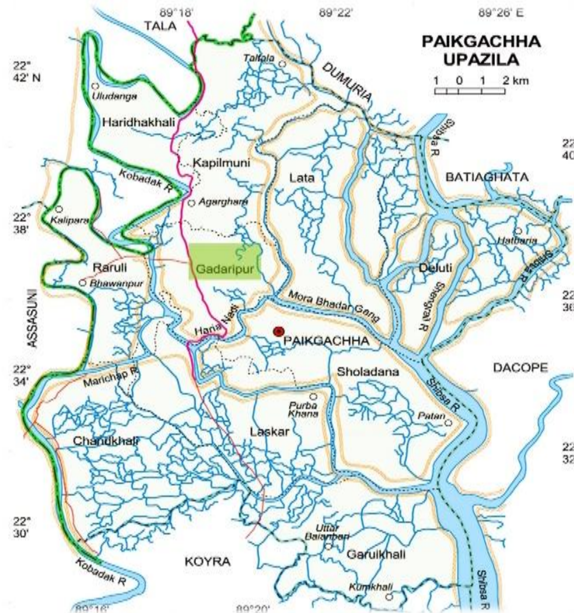

Figure 1: Map of the study area

Sample size and sampling procedure

In this study, a total of 280 samples were identified from the study population of 1043 using Cochran's formula (Singh, 2014), which represents 27% of the total study population.

Sample Size for an infinite population:

$$ss = \frac{Z^2 xp(1-p)}{c^2}$$

$$ss_1 = \frac{n}{1 + \frac{n-1}{P}}$$

Here, SS = sample size, SS1 = sample size by population, Z = Z-value for confidence level, P = estimated proportion, C = margin of error, N = population size.

$$SS = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2}$$

$$= \frac{3.8416 \times .25}{0.0025}$$

$$=0.9604 \div 0.0025$$

$$=384.16$$

The calculation for finite population

$$ss_1 = \frac{n}{1 + \frac{n-1}{P}}$$

$$= \frac{384.16}{1 + \frac{384.16 - 1}{1043}}$$

$$= \frac{384.16}{1.37}$$

$$=280$$

A systematic random sampling procedure was used to select the sample from the study population, involving several stages:

- Initially, a sampling interval of 4 was determined by dividing 1,043 by 280.
- The first respondent (serial 2) was selected by a lottery from the first four individuals on the population list. This scientifically valid lottery method ensures equal selection chances, reduces bias, and enhances representativeness, as applied in clinical research (Elfil & Negida, 2017)..
- The remaining respondents were selected systematically from the population list, with every fourth individual chosen after the first respondent (e.g., 6, 10, 14, 18).

This process continued until 280 respondents were identified, with selection conducted with replacement to ensure systematic data collection from each respondent. Here, replacement refers to including the next individual on the list if a selected respondent was unavailable, ensuring the systematic interval was preserved during data collection.

Variable Descriptions

Outcome variable

This study categorized knowledge, attitude, and practice levels; a procedure commonly used in KAP studies. Previous research has also followed this approach for KAP analysis, including Mukhopadhyay et al. (2021) and Lee et al. (2021). This study examined three outcome variables, as follows:

(i) **Knowledge:** In this study, knowledge was defined to examine caregivers' understanding of CHC services available at primary healthcare centers. For correlation, the term knowledge was assessed utilizing a 10-point scale, starting from 0 to 10, where 0 means no knowledge and 10 means the highest level of knowledge of caregivers. For identifying the level of knowledge, the 10-point scale was transformed into three levels which included: (i) low (0-4), (ii) medium (5-7), and (iii) high (8-10).

(ii) **Attitudes:** In this study, caregivers' attitudes represent their beliefs and perceptions toward the quality of CHC services provided in primary healthcare centers. To assess attitudes, a 10-point scale was used, ranging from 0 to 10, where 0 indicates no level of positive attitudes and 10 represents the highest level of positive attitudes among caregivers. For identifying the level of attitudes, the 10-point scale was transformed into three levels which included: (i) low (0-4), (ii) medium (5-7), and (iii) high (8-10).

(iii) **Practices:** In this study, caregivers' practices refer to the CHC services, which are accessed for children under five, as provided by primary healthcare centers. To assess practices, a 10-point scale was used, ranging from 0 to 10, where 0 indicates no engagement in practices and 10 represents the highest level of engagement. For identifying the level of practices, the 10-point scale was transformed into three levels which included: (i) low (0-4), (ii) medium (5-7), and (iii) high (8-10).

Exposure variables

The exposure variables are called social correlates in this study, which were selected based on the existing literature related to CHC services (Abegaz et al., 2019; Akter, 2022; Khandakar, 2014; Lungu et al., 2016; Mphasha et al., 2022; Nyande et al., 2022; Sule et al., 2013). Exposure variables were categorized by following previous scientific and KAPs research (Akter, 2022; M. Bellete et al., 2021; Khan, 2019; Lee et al., 2021; Ma et al., 2024). Social correlates in this study included gender (female/male), age (18-25/26-33/34-41), age at first marriage (15-18/19-22/23-26), educational level (illiterate/primary/secondary/higher), occupation (housewife/service/day laborer/others), caregivers' monthly income (in BDT) (0/≥10000/10001-20000/20000≥), household income (≥10000/10001-16000/16001-22000/22001-28000/29000≥), household expenditure (≥10000/10001-16000/16001-22000/22001-28000/29000≥), household savings (No savings/≥10000/10001-25000/25001-50000/50001≥).

Data collection

The data collection process first included preparing a data collection tool. In this study, the interview schedule as a data collection tool, formulated based on literature (Abegaz et al., 2019; Abullais et al., 2020; Ameen et al., 2023; Biswas et al., 2018; Lungu et al., 2016; Mphasha et al., 2023; Webair & Bin-Gouth, 2013) was prepared. Face-to-face interviews were conducted with respondents using this schedule to collect survey data. Following the development of the interview schedule, a pre-test was carried out in the study area to assess its effectiveness in extracting valid and reliable information while minimizing inconsistencies. After the pre-test, adjustments were made to revise the final interview schedule. The survey data collection with the respondents was undertaken by the lead author in September 2023. Each interview took approximately fifteen to twenty-five minutes to complete.

Data processing and analysis

The survey data collected for this study underwent processing through editing, coding, and tabulation. Once data were checked for completeness and coded, they were entered into the Statistical Packages for Social Sciences software version 27 (George & Mallery, 2019) for data management. Various statistical techniques, including descriptive and bivariate methods, were employed. Descriptive statistics such as frequencies, percentages, mean, and standard deviation (SD) were calculated and reported. In this study, the majority of variables are ranked, so Spearman's correlation analysis was used to examine the relationships between caregivers' KAPs toward CHC services and various independent variables, with a particular emphasis on SESs. It measures the strength and direction of association between two ranked variables (Schober et al., 2018). It is a numerical value that expresses the strength and direction of the relationship between two variables and ranges from -1 to 1

(Gogtay & Thatte, 2017). Assumptions of normality were confirmed before applying Spearman's correlation. Variables with a *p*-value less than 0.05and a 95% confidence interval (CI) in Spearman's correlation were considered statistically significant determinants of factors associated with caregivers' KAPs toward CHC services. To determine the Spearman's correlation coefficient, we have used this formula:

$$r = 1 - \frac{6\sum d^2}{n^3 - n}$$

Here:

- r: Spearman's rank correlation coefficient
- D: Difference between the ranks of the corresponding variables
- n: Number of pairs of data

Results

Characteristics of the Participants

Table 1 illustrates that among the 280 caregivers in the study, 91.1% were mothers and 8.9% were fathers. In terms of age distribution, 43.9% were between 18 and 25 years old, while 48.2% fell within the 26-to-33-year range. The mean age of caregivers was 26.59 ± 4.74 years. Most caregivers 56.1% were married between the ages of 19 and 22, with a mean age at marriage of 19.34 ± 1.99. In terms of education, 32.5% attained a secondary level of education, 31.1% completed only primary education, and 23.9% were illiterate. Occupationally, 63.6% were housewives, while just 3.9% were employed in service roles. Regarding income, 28.2% of the caregivers earned BDT 10,000 or less monthly, and 3.2% earned BDT 20,000 or more, with the average income being BDT 3,253.57 ± 6052.93. Additionally, 63.3% of the caregivers had no personal earnings since they were unpaid housewives. For household income, 27.5% of households

earned BDT 10,000 or less per month, and 13.6% earned BDT 29,000 or more, with the average household income being BDT 18,496.43 ± 12603.69. Monthly family expenditures showed that 32.5% of caregivers' families spent BDT 10,000 or less, while only 6.4% spent BDT 29,000 or more, with the mean expenditure at BDT 15,400 ± 6,526.26. Regarding savings, 13.6% of caregivers had savings of BDT 50,001 or more, 6.1% had BDT 10,000 or less, and 54.3% had no savings. The average savings were BDT 26,132.15 ± 44,855.02.

Caregivers' level of KAPs toward CHC services

First, out of 280 caregivers, 95.4% of the caregivers had low and medium levels of knowledge, while only 4.6% demonstrated a greater nderstanding of CHC (Figure 2). Second, for attitudes, 41.4% of the caregivers showed moderate attitudes, 52.5% low, and only 6.1% high attitudes toward CHC services. Finally, in terms of caregivers' practices, 43.7% utilized a moderate level of CHC services, 49.9% demonstrated low utilization, and 6.4% demonstrated high levels of utilization.

Association between socioeconomic correlates and KAPs of caregivers toward CHC Services

Spearman correlation analysis of Table 2 reveals several associations between caregivers' knowledge of CHC services and SESs. Age shows a significant positive correlation (r = 0.160**, $p < 0.01$), indicating a slight increase in knowledge with age. Education also has a positive correlation (r = 0.167**, $p < 0.01$), suggesting that higher education levels are linked to greater knowledge. Occupation exhibits a stronger correlation (r = 0.227**, $p < 0.01$), implying that certain occupations may provide better access to CHC information. The highest correlation is observed with caregivers' monthly income (r = 0.267**, $p < 0.01$), highlighting the critical role of personal financial resources in acquiring CHC knowledge. Age at first marriage shows a non-significant correlation (r = 0.114). Household factors—including income (r = 0.182**, $p < 0.01$), expenditure (r = 0.184**, $p < 0.01$), and savings (r = 0.189**, $p < 0.01$)—all demonstrate significant positive associations, indicating that households with better economic standing tend to have caregivers with greater CHC knowledge. These findings underscore the influence of both individual and household socioeconomic factors on caregivers' understanding of child health care services.

Table 3 presents the relationship between caregivers' attitudes toward CHC services and their SESs and knowledge. Significant positive correlations were observed with education level (r = 0.219**, $p < 0.01$), caregivers' monthly income (r = 0.174**, $p < 0.01$), household income (r = 0.211**, $p < 0.01$), and total household expenditure (r = 0.269**, $p < 0.01$), indicating that higher education, personal income, and household resources are associated with more favorable attitudes. Knowledge showed the strongest positive correlation (r = 0.460**, $p < 0.01$), highlighting that greater understanding of CHC services strongly enhances caregivers' attitudes. In contrast, age, occupation, and family savings were not significantly correlated, suggesting these factors have little influence on caregiver attitudes. These results emphasize the critical role of both economic and educational factors, along with CHC knowledge, in shaping positive caregiver attitudes.

Table 4 presents the correlations between various factors and caregiving practices. Positive correlations are observed for age (r = 0.124**, $p < 0.01$), household expenditure (r = 0.223**, $p < 0.01$), household income (r = 0.215**, $p < 0.01$), and household savings (r = 0.339**, $p < 0.01$), suggesting that these factors are associated with improved caregiving practices. This indicates that socio-economic stability plays a crucial role in shaping the quality of caregiving, as households with higher income and savings can provide a more supportive environment for child care. Caregivers' monthly income also shows a positive correlation with their practices (r = 0.196**, $p < 0.01$). Additionally, there is a positive correlation between caregivers' knowledge and their practices (r = 0.379**, $p < 0.01$), highlighting that education level and access to health information may further enhance caregivers' ability to implement proper practices. A similar positive correlation is found between caregiving practices and attitudes toward CHC (r = 0.357**, $p < 0.01$), suggesting that caregivers with more positive attitudes are more likely to adopt effective practices. Overall, these findings imply that interventions targeting both knowledge improvement and attitude adjustment could lead to significant gains in caregiving quality, emphasizing that caregiving practices are influenced by both individual characteristics and broader household and community factors

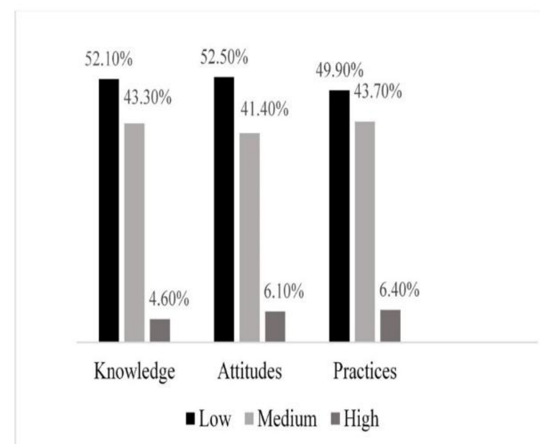

Figure 2: Caregivers' level of knowledge, attitudes and practices toward CHC service

Table 1: Socioeconomic and demographic characteristics of the caregivers

Variable	Number (%)	Mean	Standard deviation
Gender			
Female	255 (91.1%)		
Male	25 (8.9%)		
Age			
18-25	123 (43.9%)		
26-33	135 (48.2%)	26.59	4.743
34-41	22 (7.9%)		
Age at first marriage			
15-18	113 (40.4%)		
19-22	157 (56.1%)	19.34	1.991
23-26	10 (3.5%)		
Education level			
Illiterate	67 (23.9%)		
Primary	87 (31.1%)		
Secondary	91 (32.5%)		
Tertiary	35 (12.5%)		
Occupation			
Housewife	178 (63.6%)		
Service	11 (3.9%)		
Day labor	52 (18.6%)		
Others	39 (13.9%)		
Caregivers' monthly income (in BDT)			
No income (0)	178 (63.6%)		
≥10000	79 (28.2%)	3253.57	6052.932
10001-20000	14 (5.0%)		
20001≥	9 (3.2%)		
Household monthly income (in BDT)			
≥10000	77 (27.5%)		
10001-16000	72 (25.7%)	18496.43	12603.691
16001-22000	71 (25.4%)		
22001-28000	22 (7.8%)		
29000 ≥	38 (13.6%)		
Household monthly expenditure (in BDT)			
≥10000	91 (32.5%)		
10001-16000	95 (33.9%)		
16001-22000	68 (24.3%)	15400.0	6526.263
22001-28000	8 (2.9%)		
29000 ≥	18 (6.4%)		
Household monthly savings (in BDT)			
No savings	152 (54.3%)		44855.02
≥10000	17 (6.1%)		
10001-25000	27 (9.6%)		
25001-50000	46 (16.4%)		
50001≥	38 (13.6%)		

Table 2: Knowledge of caregivers toward CHC Services by their social correlates

Variable								
Knowledge	1							
Age	.160**	1						
Education	.167**	-.397**	1					
Occupation	.227**	.190**	.122*	1				
Caregivers' monthly income	.267**	.200**	.239**	.889**	1			
Age at first marriage	.114	.409**	.105*	.270**	.411**	1		
Household income	.182**	-.005	.378**	.077	.154**	.213**	1	
Household expenditure	.184**	.004	.267**	.045	.113	.178**	.858**	1
Household savings	.189**	-.044	.453**	.178**	.273**	.190**	.659**	.485**

Note: ** 0.01 and *0.05 levels of significance

Table 3: Attitudes of caregivers toward CHC services by their social correlates and knowledge

Variable									
Attitude	1								
Age	.000	1							
Education	.219**	-.397**	1						
Occupation	.119*	.190**	.122*	1					
Caregivers' monthly income	.174**	.200**	.239**	.889**	1				
Age at first marriage	.130	.409**	.105*	.270**	.411**	1			
Household income	.211**	-.005	.378**	.077	.154**	.213**	1		
Household expenditure	.269**	.004	.267**	.045	.113	.178**	.858**	1	
Household savings	.133*	-.044	.453**	.178**	.273**	.190**	.659**	.485**	1
Knowledge	.460**	.160**	.167**	.227**	.267**	.114	.182**	.184**	.189**

Note: ** 0.01 and *0.05 levels of significance

Table 4: Practices of caregivers toward CHC services by their social correlates with knowledge and attitudes

Variable										
Practices	1									
Age	.124**	1								
Education	.040	.397**	1							
Occupation	.005	.190**	.122*	1						
Caregivers' monthly income	.196**	.200*	.239**	.889**	1					
Age at first marriage	.032	.409**	.105*	.270**	.411**	1				
Family income	.215**	-.005	.378**	.077	.154**	.213**	1			
Family expenditure	.223**	.004	.267**	.045	.113	.178**	.858**	1		
Family savings	.339**	-.044	.453**	.178**	.273**	.190**	.659**	.485**	1	
knowledge	.379**	.182**	.229**	.223**	.374**	.178**	-.023	-.016	.257**	1
Attitude	.357**	-.046	.161**	.081	.177**	.080	-.008	.004	.036	.149*

Note: ** 0.01 and *0.05 levels of significance

Discussion

This study aimed to assess the levels of KAPs of caregivers toward CHC services and its correlated factors in Bangladesh. Caregivers with high levels of KAPs toward CHC services play a pivotal role in enhancing the quality of CHC services. Their contributions are instrumental in mitigating diseases, reducing morbidity and mortality rates among children, and strengthening the overall health care system in LMICs.

Need to increase caregivers' knowledge toward CHC services

This study underscores the noteworthy associations between caregivers' knowledge and various socioeconomic factors, encompassing age, education level, occupation, monthly income, total monthly income, total monthly family expenditure and family savings. The low level of knowledge among caregivers in this study was attributed to structural challenges, including limited access to educational resources, high poverty rates, frequent natural disasters, unemployment, and insufficient community-based health promotion programs. Additionally, this study shows that more than half of the caregivers had a low level of knowledge toward CHS services, which has consistency with previous studies (Ameen et al., 2023; Namulema et al., 2024). This study highlights the pivotal role of caregivers' education in improving their knowledge of child health and related services, confirms with the findings from previous research. Caregivers with higher education levels demonstrate greater ability to assess the severity of illnesses and seek appropriate medical care for children, as observed by Agbozo et al. (2016).

The importance of caregivers' education is particularly evident in LMICs, where access to healthcare services is often limited, as emphasized by Shumba et al. (2020). The role of maternal education is especially significant, given the typical responsibility of mothers as primary caregivers (Chanda, 2013). Studies by Kajungu et al. (2023), Sule et al. (2013), Debuo et al. (2017) and also underscore the critical influence of caregivers' education has critical influence on their knowledge of child health. Older caregivers tend to have a more comprehensive understanding of childhood illnesses (Setorglo et al., 2019). Caregivers' occupations and level of income are closely linked to caregivers' knowledge of child health (Debuo et al., 2017; Sule et al., 2013). Sociodemographic factors also play a crucial role in influencing caregivers' awareness of CHC services (Agbozo et al., 2016). Furthermore, Uchendu et al. (2019), emphasize the multifaceted effects of social, economic, educational, and cultural factors on caregivers' knowledge, shaping their childcare practices and healthcare-seeking behaviors.This discussion provides a comprehensive understanding of the intricate connections between caregivers' knowledge, education, and various socioeconomic determinants in the context of CHC services. For improving CHC knowledge among caregivers requires urgent implementation of health literacy programs, training community health workers, and providing financial support programs for caregivers.

Need to increase caregivers' positive attitudes towards CHC services

This study showed significant positive correlates between caregiver attitudes and several key socioeconomic factors, namely education level, occupation, monthly income, and total monthly family expenditure. Moreover, our study emphasizes a robust correlation between caregivers' attitudes and their knowledge of CHC services. This contributes to the growing body of evidence supporting the intricate link between caregivers' attitudes, their understanding of CHC services, and active engagement with these services.

This study aligns with findings by Danso et al. (2023) and Sule et al. (2013), which indicate that caregivers with better knowledge of health services exhibit more positive attitudes toward CHC services. The interplay between knowledge and specific healthcare perspectives also plays a pivotal role in shaping caregivers' perceptions of children's health, consistent with Mabetha et al. (2021). However, knowledge alone is not sufficient. Factors such as limited community interaction and inadequate child nutrition counselling also influence caregivers' perceptions, as highlighted by Tekle et al. (2019) . Higher educational attainment among caregivers correlates with more positive attitudes toward seeking healthcare for children (Abullais et al., 2020; Lovelyn et al., 2016; Mphasha et al., 2023). Mphasha et al. (2022) and Abullais et al. (2020) also emphasize the influence of income, cultural beliefs, and access to information on caregivers' attitudes and their motivation to maintain positive approaches to child health care. Yoo et al. (2015) similarly reported a positive correlation between caregivers' financial resources and their attitudes. Caregivers' attitudes toward child health are influenced by multiple factors, including vaccination perceptions, poor-quality healthcare services, long distances to facilities, financial constraints, limited trust in health systems, and insufficient child health information as noted by Ames et al. (2017). In summary, these findings highlight the complex interplay between caregivers' attitudes, their knowledge, and key socioeconomic factors such as education, occupation, income, and family expenditure, offering important insights for child health research. Improving caregivers' attitudes toward CHC services requires health literacy programs, targeted training for health workers to foster trust and engagement, and systematic collection of caregiver feedback. Addressing socioeconomic barriers of caregivers such as education, occupation, income, and family expenditure through enhanced healthcare accessibility, affordability, and quality is also essential.

Need to increase caregivers' practices toward CHC services

This study showed that positive correlates were observed between caregivers' practices and various factors, including caregiver's age, monthly income, total monthly

family income, monthly family expenditure and savings. Additionally, associations were identified between caregivers' practices and their knowledge and attitudes. The significance of caregivers' health care-seeking behaviors in managing childhood illnesses is underscored, with potential implications for reducing child mortality rates. This study aligns with existing research highlighting the influence of a mother's age on her ability to recognize common childhood ailments and seek improved medical care (Aga et al., 2024; Weldesamuel et al., 2019). Higher monthly income is associated with better caregiver practices, as financial stability facilitates access to health resources (Yu et al., 2024). Akter (2022) also emphasizes the impact of caregivers' employment status and income on the use of health services for children under five. Families with higher healthcare expenditures tend to be more proactive in seeking child health services (Setijanto et al., 2023). Caregivers with adequate knowledge of childhood illnesses are more likely to seek professional care, as confirmed by (Abullais et al., 2020). Caregivers' actions are also influenced by factors such as education, income, awareness, perception of illness severity, belief in early treatment effectiveness, and attitudes toward healthcare services for children as identified by Mahejabin et al. (2014) and Simieneh et al. (2019).

This discussion highlights that to enhance CHC practices of caregivers in this study area, a monitoring system should track the success of initiatives and gather caregiver feedback. Modern diagnostics and treatments should be implemented to improve child health, ultimately enhancing caregivers' KAPs toward CHC services.

Strengths and limitations

A key strength of this study was the generalizability of the findings. Since the study followed a quantitative approach, the findings can be generalized to the entire context of caregivers living in Khulna. Also, since systematic random sampling, a type of probability sampling, was used to select the sample, the sampling method is free from bias which increases the validity of this study. However, although it is possible to generalize the findings to the local context, the results may not be applicable to the national context as this requires a large amount of data which this study lacks. Additionally, this study was conducted following a quantitative approach, so the in-depth experiences of caregivers are missing. Finally, data validity is lacking because this study focused only on caregivers' perspectives.

Conclusion

The study reveals that most caregivers had a low level of knowledge, attitudes, and practices toward CHC services in UHC. The findings highlight that several social correlates, such as age, education, occupation, income, and savings, are associated with KAPs of caregivers toward CHC services. Additionally, knowledge of caregivers was found to be significantly associated with their attitudes and practices. These results hold crucial policy implications, suggesting that targeted interventions are needed to bridge the knowledge gap among caregivers and improve the delivery of quality child health services. Policymakers should implement structured awareness and education programs at the community level, NGOs can conduct caregiver training sessions and workshops, and health workers should be equipped to engage caregivers effectively, promote positive attitudes, and encourage best practices in child care. Further research is needed to explore this matter in greater depth, with qualitative or mixed-method approaches being particularly suitable. Such studies could examine the perspectives of caregivers, community leaders, and health officials, providing a more comprehensive understanding of CHC services and informing interventions that are context-specific and sustainable.

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Ethical issues

The researchers adhered to the principles of the Declaration of Helsinki for research involving human participants, including obtaining informed consent from caregivers before the survey. This research also received approval from an ethical clearance committee affiliated with Khulna University Research and Innovation Centre (**Reference number: KUECC-2025-04-26**).

Competing interests

No competing interests are declared by the authors

Consent for publication

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