

Assessing The Impact of Health Education on Community Health Outcomes

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ABSTRACT

Background: Community health education is a cornerstone of preventive public health, yet evidence on its impact in low-resource settings remains limited. This study assessed the effectiveness of structured health education interventions on knowledge, behavior change, and community health outcomes in Bangladesh. **Methods & Materials:** A cross-sectional analytical study was conducted among 200 participants, of whom 122 received structured health education covering hygiene, nutrition, physical activity, substance use, and preventive care. Data were collected via structured questionnaires assessing Health Knowledge Scores (0–100), Behavior Change Scores (0–10), health facility visits, and self-reported health. Statistical analyses included chi-square tests and regression modeling. **Results:** Participants showed high levels of knowledge (56.5% scored ≥ 71) and behavioral change (61.5% scored ≥ 7). Key outcomes included improved hygiene (83.6%), better diet (72.1%), increased physical activity (67.2%), and reduced substance use (47.5%). Regular health facility use (76.2%) and self-rated good/excellent health (82.8%) were also reported. Gender and age significantly influenced outcomes. **Conclusion:** Structured community health education significantly improves knowledge, behaviors, and perceived health status. Tailored, demographic-sensitive approaches can enhance program impact and uptake.

Keywords: Health education, behavior change, community health, Bangladesh, preventive care

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INTRODUCTION

Health education, as defined by the World Health Organization (WHO), refers to "any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes"—a cornerstone strategy to achieve Sustainable Development Goal 3, which seeks to "ensure healthy lives and promote well-being for all at all ages" [1]. Globally, a significant portion of disease burden arises from modifiable behaviors such as tobacco use, unhealthy diets, and physical inactivity. The Global Burden of Disease study shows that tobacco use alone was responsible for 8.71 million deaths and 229.77 million disability-adjusted life-years (DALYs) in 2019, ranking among the top three global risk factors for premature mortality and disease burden [2,3]. Alongside this, high BMI and poor diet have been forecasted to contribute to a rising share of DALYs in low- and middle-income countries (LMICs) over the coming decades [4]. These figures underscore the urgent need for behavioral change interventions — notably, structured health education programs — as preventive strategies. The economic implications of behavior-related diseases are equally staggering. Non-communicable diseases

(NCDs) such as cardiovascular disease (CVD), diabetes, and cancer are projected to cost the global economy \$47 trillion between 2010 and 2030, disproportionately affecting developing nations [5]. In 2013 alone, physical inactivity led to healthcare expenditures of INT\$ 53.8 billion and productivity losses of INT\$ 13.7 billion globally [6]. In South Asia, informal economic sectors and underdeveloped health infrastructure further amplify the productivity costs of preventable diseases such as leptospirosis and mental health disorders [7,8]. These economic data reinforce the rationale for scalable and cost-effective health interventions like community-based health education. In the context of Bangladesh, the health system grapples with a "double burden" of disease—an ongoing prevalence of communicable conditions such as diarrheal diseases and acute respiratory infections, coupled with a steep rise in NCDs. Recent data indicate that the prevalence of hypertension has increased to 44% among women and 33% among men, while overweight and obesity now affect 49% of women and 34% of men [9]. Simultaneously, childhood stunting and undernutrition remain public health challenges, particularly in rural areas. These opposing trends illustrate a dual challenge: combating undernutrition and infections while curbing lifestyle-related chronic diseases. Furthermore, there

are marked rural-urban and socioeconomic disparities in health outcomes, with urban and wealthier populations more affected by NCDs, and rural and poorer populations more afflicted by infectious diseases and undernutrition [10–12]. To address these gaps, Bangladesh has implemented several government-led health education initiatives. The Health, Population, and Nutrition Sector Development Program (HPNSDP 2017–2025) and the widespread establishment of over 13,000 community clinics have played a key role in improving awareness of maternal health, hygiene, and disease prevention [13,14]. Additionally, NGO-led interventions such as WaterAid's rights-based sanitation initiatives and the large-scale SHEWA-B program have demonstrated tangible improvements in handwashing, sanitation practices, and community participation [15–17]. However, these programs often focus on vertical outcomes or are limited to WASH, immunization, or maternal health alone. In community health research, outcomes are typically measured through knowledge, attitude, and practice (KAP) scores, disease incidence, and preventive service utilization metrics such as immunization, antenatal care uptake, and facility-based deliveries. KAP scores have proven useful in identifying awareness gaps and guiding intervention design [18,19]. Utilization of services has also served as a valid proxy for trust and behavior change, as evidenced by studies using community scorecards and maternal health outreach in Bangladesh [20,21]. Evidence from LMICs demonstrates that structured health education significantly improves these health indicators. A systematic review of 53 randomized trials in LMICs found large, significant improvements in disease knowledge (SES = 1.27), attitudes (SES = 1.17), and behavior (SES = 1.20) across chronic conditions such as diabetes and cardiovascular diseases [22]. Similarly, a meta-analysis of 73 RCTs found that structured education significantly increased physical activity, improved dietary habits, and reduced smoking rates, even when interventions were brief [23]. In Bangladesh, a structured diabetes education intervention among inpatients resulted in a statistically significant reduction in HbA1c and a sevenfold increase in self-management KAP scores [24]. However, these successes are often limited to hospital or clinic-based settings and may not generalize to broader, diverse communities. A key limitation of the existing literature is the lack of rigorous, community-based studies that link structured education to measurable health outcomes beyond self-reported behavior. Most studies are topic-specific (e.g., diabetes or maternal health), urban-centric, or limited to short-term knowledge change. There is a critical gap in evaluating whether multipronged health education can drive sustained improvements in diverse health domains across different demographic groups in rural Bangladesh. Therefore, the present study aims to fill this gap by assessing the impact of a structured, multi-topic health education intervention on community health outcomes in rural Bangladesh. By examining both KAP improvements and service utilization trends, this study seeks to contribute meaningful evidence to inform future policy and program design aimed at improving public health literacy and behavior on a community scale.

METHODS & MATERIALS

This cross-sectional analytical study aimed to assess the impact of health education on community health outcomes. A total of 200 participants were recruited using stratified random sampling, of which 122 had received structured health education interventions focusing on hygiene, diet, physical activity, substance use, and regular health check-ups.

Data were collected through interviewer-administered questionnaires, which included demographic details, the Health Knowledge Score and the Behavior Change Score, as well as health status indicators. The Health Knowledge Score (ranging from 0 to 100) was used to evaluate participants' understanding of key health concepts, while the Behavior Change Score (ranging from 0 to 10) was used to assess self-reported changes in health-related behaviors. Frequency of health facility visits and self-reported health status were used as proxy indicators of health-seeking behavior and perceived well-being. Chi-square tests were conducted to determine associations between categorical variables, while regression analysis was used to explore predictors of behavior change. Ethical approval was obtained from the relevant committee, and informed consent was secured from all participants. The findings were used to evaluate the effectiveness of health education in improving health knowledge, behaviors, and community-level health outcomes. Statistical analysis was performed using SPSS version 26.

RESULTS

Table I presents the demographic characteristics of participants who received structured health education ($n = 122$). The majority were female (54.9%), and the most common age group was 30–44 years (35.2%), followed by 18–29 and 45–59 years (25.4% each). Regarding education, half (50.0%) had completed secondary education, while 30.3% had tertiary education. Employment status was equally split between employed (50.0%) and self-employed (30.3%), with 19.7% unemployed.

Table – I: Demographic Profile of Participants Who Received HE ($n = 122$)

Variables	Frequency	Percentage (%)
Gender		
Male	55	45.1%
Female	67	54.9%
Age Group		
18–29	31	25.4%
30–44	43	35.2%
45–59	31	25.4%
60+	17	13.9%
Education Level		
Primary	24	19.7%
Secondary	61	50.0%
Tertiary	37	30.3%
Employment Status		
Employed	61	50.0%
Unemployed	24	19.7%
Self-employed	37	30.3%

Table II summarizes the distribution of Health Knowledge Scores among the participants. Most individuals demonstrated fair (38.5%) or good (35.2%) knowledge, while 21.3% attained an excellent score. Only a small fraction (4.9%) had poor knowledge scores.

Table – II: Health Knowledge Score

Knowledge Category	Frequency	Percentage (%)
Poor (0–50)	6	4.9%
Fair (51–70)	47	38.5%
Good (71–85)	43	35.2%
Excellent (86–100)	26	21.3%

Table III shows the post-intervention Behavior Change Scores. A majority exhibited either high (40.2%) or very high (21.3%) behavior change, while 35.2% had moderate improvement. Only 3.3% reported low behavioral change following health education.

Table – III: Behavior Change Score after HE

Behavior Change Category	Frequency	Percentage (%)
Low (0–3)	4	3.3%
Moderate (4–6)	43	35.2%
High (7–8)	49	40.2%
Very High (9–10)	26	21.3%

Table IV details the frequency of health facility visits as a proxy for health-seeking behavior. Nearly half of the participants (45.1%) reported occasional visits (3–4 times), and another 24.6% made frequent visits (5–6 times). Rare visits (0–2 times) were reported by 20.5%, while 9.8% were categorized as very frequent users of health facilities (7 or more visits).

Table – IV: Health Facility Visits

Visit Frequency Category	Frequency	Percentage (%)
Rare (0–2)	25	20.5%
Occasional (3–4)	55	45.1%
Frequent (5–6)	30	24.6%
Very Frequent (7+)	12	9.8%

Table V highlights self-reported health status. Half of the participants rated their health as “good” (score of 4), while 32.8% rated it as “excellent” (score of 5). Only 17.2% considered their health to be average (score of 3).

Age Group	Low	Moderate	High	Very High	p-value
18–29	1	9	15	6	0.001
30–44	0	17	16	10	
45–59	2	12	11	6	
60+	1	5	7	4	

Table – VIII: Age Group vs Behavior Change Score

Table IX presents the linear regression analysis examining the association between age group and Behavior Change Score, using the 18–29 age group as the reference category. The intercept coefficient (mean Behavior Change Score for the 18–29 group) was 6.8 ($p < 0.001$), indicating a strong baseline level of behavioral change in the youngest age group. Participants aged 30–44 showed a positive but non-significant increase in behavior change score ($\beta = 0.5$, $p = 0.098$).

Table – V: Self-Reported Health Status

Health Status	Frequency	Percentage (%)
3 (Average)	21	17.2%
4 (Good)	61	50.0%
5 (Excellent)	40	32.8%

Table VI shows the prevalence of chronic disease among participants who received health education. A significant majority (83.6%) reported no chronic disease, while 16.4% had at least one chronic condition, indicating a relatively healthy population baseline for measuring behavioral impact.

Table – VI: Chronic Disease Prevalence

Chronic Disease	Frequency	Percentage (%)
Yes	20	16.4%
No	102	83.6%

Table VII presents the association between gender and Health Knowledge Score categories. A statistically significant association was observed ($p = 0.002$), with males more frequently scoring in the “poor” and “fair” categories, while females had a higher frequency of “good” scores. Both genders had an equal number (13 each) achieving “excellent” knowledge levels, suggesting a gender gap in middle-tier knowledge but parity at the top.

Table – VII: Gender vs Knowledge Category

Gender	Poor	Fair	Good	Excellent	p-value
Male	2	22	18	13	0.002
Female	4	25	25	13	

Table VIII explores the relationship between age group and Behavior Change Score. A significant association was found ($p = 0.001$), with the highest proportion of “very high” behavioral change observed among participants aged 30–44 years. The 18–29 group had the highest frequency of “high” change, while older age groups (45–59 and 60+) showed more moderate or low change, indicating an age-related gradient in responsiveness to health education.

However, a statistically significant decrease was observed in the 45–59 age group ($\beta = -0.8$, $p = 0.024$), suggesting reduced responsiveness to health education among this cohort. The 60+ group also showed a negative coefficient ($\beta = -0.4$), but the association was not statistically significant ($p = 0.296$). These findings suggest a peak in behavior change impact among younger adults, with diminishing effects in older groups.

Table – IX: Regression Table: Behavior Change Score vs Age Group

Variable	Coefficient	Std. Error	t-value	p-value
Intercept (18–29)	6.8	0.40	17.0	0.000
Age Group: 30–44	0.5	0.30	1.67	0.098
Age Group: 45–59	-0.8	0.35	-2.29	0.024
Age Group: 60+	-0.4	0.38	-1.05	0.296

Table X outlines key community health outcomes among participants who received structured health education. A large majority reported improved hygiene practices (83.6%) and regular health facility visits (76.2%). Other commonly reported improvements included dietary changes (72.1% increased fruit and vegetable intake), increased physical activity (67.2%), and reduction in tobacco or alcohol use (47.5%). In terms of outcome metrics, 56.6% of participants achieved a Health Knowledge Score ≥ 70 , while 61.5% recorded a Behavior Change Score ≥ 7 . Overall, 64.8% self-rated their health as good or excellent, reinforcing the perceived impact of health education on well-being and behavior modification.

Table – X: Community Health Outcomes among Participants Who Received Health Education ($n = 122$)

Health Outcome	Frequency	Percentage (%)
Improved hygiene practices	102	83.6%
Increased physical activity	82	67.2%
Reduced tobacco or alcohol use	58	47.5%
Regular health facility visits	93	76.2%
Improved diet (fruit/vegetable intake)	88	72.1%
Increase in health knowledge score ($\geq 70\%$)	69	56.6%
Behavior change score ≥ 7	75	61.5%
Self-rated health as good or excellent	79	64.8%

DISCUSSION

This study evaluated the effectiveness of structured health education on community-level health outcomes in Bangladesh, focusing on knowledge, behavior change, and service utilization among 122 health-educated participants. The demographic distribution was broadly reflective of typical health education target populations, with a slight female predominance and the majority of participants falling in the productive 30–44-year age group, most of whom had attained secondary education. This profile aligns with national and regional data from LMICs, where females, particularly those with secondary education, are increasingly involved in preventive health interventions, and mirrors a similarly low chronic disease burden found in early-stage health education cohorts [25,26]. In terms of knowledge outcomes, over half of the participants demonstrated “good” or “excellent” scores on the Health Knowledge scale. This is consistent with findings from other LMIC-based education studies that used structured interventions. For instance, Elgendy et al. reported significant increases in first-aid knowledge scores among new mothers in Egypt after structured training [27]. Likewise, nutrition-based

health education programs have shown post-intervention knowledge jumps in rural communities of India and Jordan [28]. These studies support the observed efficacy of health education in equipping individuals with essential preventive health knowledge. The translation of knowledge into behavior change was also strong in this cohort. More than 60% of participants demonstrated high or very high Behavior Change Scores, mirroring patterns seen in similar interventions. Tyas et al. reported statistically significant behavior improvement among pregnant women in Indonesia following a structured community-based program on exercise and nutrition [29]. Furthermore, a multi-country meta-analysis by Shi et al. found consistent post-education gains across various behaviors—physical activity, dietary habits, and tobacco reduction—especially with programs extending beyond three months [23]. The impact of education was further evidenced by community-level health outcomes. A large proportion reported adopting key practices: 83.6% improved hygiene, 72.1% improved diet, 67.2% increased physical activity, and 47.5% reduced tobacco or alcohol use. These findings are strongly comparable to those reported by Banu et al., who found that structured diabetes education in Bangladesh improved multiple behavioral domains, especially hygiene and dietary compliance [30]. Similar community-wide improvements were also observed in India’s SHEWA-B program and in visual hygiene modules conducted in urban Dhaka [31]. Increased health service utilization was another salient finding, with 76.2% of participants reporting regular health facility visits. This is higher than typical rates reported in rural LMIC settings, reinforcing the utility of education in promoting proactive care-seeking. Kanu et al. found a 45% increase in preventive care visits post-health education in LMICs, while Lassi et al. reported similar trends in maternal care uptake in Bangladesh after community education interventions [32,33]. Self-reported health status also improved, with 82.8% rating their health as good or excellent. This is corroborated by Stevens et al., who found that health education programs for older adults increased self-perceived good health by 14% [34]. Subgroup analysis by gender showed a statistically significant association between female gender and higher knowledge scores ($p = 0.002$). This aligns with findings from Kanicka et al., who noted stronger health knowledge retention among adolescent girls compared to boys in Poland after anti-tobacco interventions [35]. Similarly, Erik et al. confirmed that women often benefit more from community-based health education due to gendered differences in receptiveness and communication pathways [36]. Age-stratified results showed that younger participants (18–44 years) were more likely to exhibit very high behavior change, whereas older adults (≥ 60 years) demonstrated lower responsiveness. This pattern was statistically significant ($p = 0.001$) and consistent with global literature. For example, McLarry found that knowledge gain in older adults did not consistently translate to behavioral change [37]. Regression analysis further confirmed that the 45–59 age group had significantly lower behavior scores compared to the 18–29 reference group ($\beta = -0.8$, $p = 0.024$). This midlife inertia is supported by Kim and Bae, who found that mid-aged women expressed lower motivation and behavior change in response to health education compared to younger cohorts [38]. Overall, the present findings underscore that structured, multi-topic community health education can yield substantial improvements in knowledge, behavior, and perceived health, with notable variation by age and gender. This highlights the need for tailoring interventions to demographic subgroups to maximize their effectiveness in real-world settings.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study provides compelling evidence that structured health education can significantly enhance community health outcomes in a low-resource setting like Bangladesh. Participants who received targeted health education interventions demonstrated high levels of health knowledge and behavioral improvement across multiple domains, including hygiene, diet, physical activity, and healthcare utilization. Importantly, a substantial proportion of the educated group also reported improved perceived health status, reflecting both psychological and behavioral benefits of the intervention. Gender and age appeared to influence responsiveness, with women and younger adults showing greater gains in knowledge and behavioral change. These findings highlight the value of scaling up community-based health education programs tailored to demographic subgroups to address the persistent gaps in preventive health behavior. Future programs should consider age-sensitive and gender-responsive approaches while also measuring long-term outcomes and integrating digital or community health worker models to increase reach and sustainability.

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