



# Adaptive Implementation of a Community Nutrition and Asset Transfer Program during the COVID-19 Pandemic in Rural Bangladesh

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## ABSTRACT

**Background:** Reduced health and nutrition services as a result of coronavirus disease 2019 (COVID-19) measures endanger children's well-being. The Bangladesh Rajshahi Division of Maternal and Child Nutrition (BRDMCN; 2018–2020) involving social behavior change communication (SBCC) and an economic development (ED) of asset transfer was implemented.

**Objectives:** This study describes how the implementation modality of the BRDMCN was adapted, and changes in the program's short/intermediate-term outcomes during the COVID-19 pandemic compared with pre-pandemic.

**Methods:** The following evaluation components were assessed: 1) program fidelity, 2) program reach, 3) program acceptance, 4) perceived influence of COVID-19, and 5) short-term outcomes over the 3 y. We compared the first 2 y ("pre-COVID-19," from April 2018 through December 2019) and the final year ("during COVID-19," from January to December 2020) for all components except for (3) and (4). Data were collected through multiple sources: reviews of program annual progress reports, monitoring records of SBCC and ED programs, and cohort surveys ( $n = 1094$ ).

**Results:** The percentage dose delivery of activities decreased from 66.7–118% at pre-COVID-19 to 0–90% during COVID-19. The SBCC programs were altered to reduce the frequency of activities as well as the number of participants per session. The ED program involving large group meetings was modified to include within-member meetings, individual visits of community facilitators, or virtual discussions. Production activity using received assets continued during the pandemic, with no significant reduction compared with pre-COVID-19. The percentage of children recovering from underweight after 30 d of a Positive deviance/Hearth (PD/Hearth) session, a component of the SBCC program, remained constant at 16.5–20.3 percentage points before and during the COVID-19 pandemic.

**Conclusions:** Program activities were scaled back and changed due to the pandemic. The BRDMCN maintained asset management and the degree of short-term outcomes over the course of a 3-y project. Further study is required to determine whether adaptive program management would achieve the long-term expected impact at a population level. *Curr Dev Nutr* 2022;6:nzac041.

**Keywords:** livelihoods, social behavior change, COVID-19, adaptive management, program evaluation

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Abbreviations used: BRDMCN, Bangladesh Rajshahi Division Maternal and Child Nutrition; CF, community facilitator; CG, community group; COVID-19, coronavirus disease 2019; CS, community supervisor; CSG, community support group; ED, economic development; EPI, Expanded Program on Immunization; GMP, growth monitoring and promotion; IYCF, infant and young child feeding; MNP, micronutrient powder; PD/Hearth, Positive deviance/Hearth; pp, percentage point(s); SBCC, social behavior change communication; WAZ, weight-for-age z score; WVB, World Vision Bangladesh; WVK, World Vision Korea.

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic has posed a threat to the environment in which children grow and develop, by increasing food insecurity and poverty, as well as limiting access, delivery, and utilization of essential nutrition and health services due to movement restrictions and reductions in service provisions to comply with

public health measures (1–3). The pandemic was expected to increase the number of people living in extreme poverty (\$1.90/d) by 20% by 2020 (4). The current economic downturn in low-to-middle income countries was estimated to result in a 14.3% increase in moderate or severe wasting among children under 5 y old, with South Asia accounting for 57.6% of the increase, as well as a 25% decrease in the delivery of nutrition and health services, resulting in 128,605

additional child deaths (1). In 2020, 118 million people went hungry, in addition to the projected 768 million, and 2.37 billion people, nearly one-third of the global population, lacked adequate food access (5).

Sudden reductions in and closures of essential health and nutrition services due to infection-prevention measures or budget diversion for a quick response to COVID-19 could threaten the well-being of children who require ongoing care (2). This disruption in care will have downstream effects on maternal and child health, mortality, and malnutrition (1), resulting in permanent harm to physical and cognitive development.

Multilevel interpersonal contacts and communication, as well as frequent group activities, are critical components of comprehensive community-based nutrition programs. In the context of COVID-19, this intervention modality was vulnerable due to fear of infection, media attention, and misinformation. It was also immediately suspended during the initial lockdowns in 2020 (6). Alternative nutrition programming modalities were considered as a way to ensure and supplement program effectiveness while reducing face-to-face contact. Therefore, the term “adaptive management” or “adaptive programming” has been re-visited in international development programs (7). Practically, this refers to the adaptation of program implementation strategies to the rapid changes in the environment in which emergency assistance programs were conducted in the past (before COVID-19).

In more than 40 countries, the most common adaptation in community-based management of acute malnutrition programs was the midupper arm circumference measurement by family members rather than community health workers’ household visits (8). Instead of face-to-face counseling and group education, infant and young child feeding (IYCF) promotion messages were delivered to women in need via mobile phones, SMS (Short Message Service), and video calls, along with distribution of COVID-19 prevention guidelines (9, 10). Because these alternate modalities were introduced abruptly as a result of the situational challenge caused by COVID-19, it is unclear to what extent this change in intervention delivery approach affected children’s nutritional status.

Given predicted consequences of COVID-19 on children and changes in nutrition program implementation, an evaluation of the extent to which program interventions were reduced, alternative methods implemented, and their impact on children’s nutrition is urgently required (11). From March 2018 to December 2020, World Vision Bangladesh (WVB) and World Vision Korea (WVK) implemented the Bangladesh Rajshahi Division of Maternal and Child Nutrition (BRDMCN) community-based nutrition and livelihood program (12). The program’s goal was to improve child nutrition through social behavior change communication (SBCC) to promote optimal IYCF and economic development (ED) activities using asset transfers to socioeconomically vulnerable groups to promote income generation.

The Bangladesh government declared its first lockdown on 20 March 2020 (13), and since then, the lockdown has been extended several times. The BRDMCN project team had to propose the “Covid-19 Emergency Response Program (April to September 2020)” guided by the WVB National Office, with a re-purposing proposal that took into account the budget from suspended activities. As a result,

BRDMCN’s planned activities were canceled, the modalities of intervention were transformed, and/or frequency of activities was reduced. Variations in the activities of these programs, albeit unavoidable, have raised concerns about how they affect children’s nutrition and health. This motivated the present study, which attempts to assess changes in implementation and short-term outcomes of BRDMCN over 3 project years straddling both pre- and early pandemic periods (2018–2020).

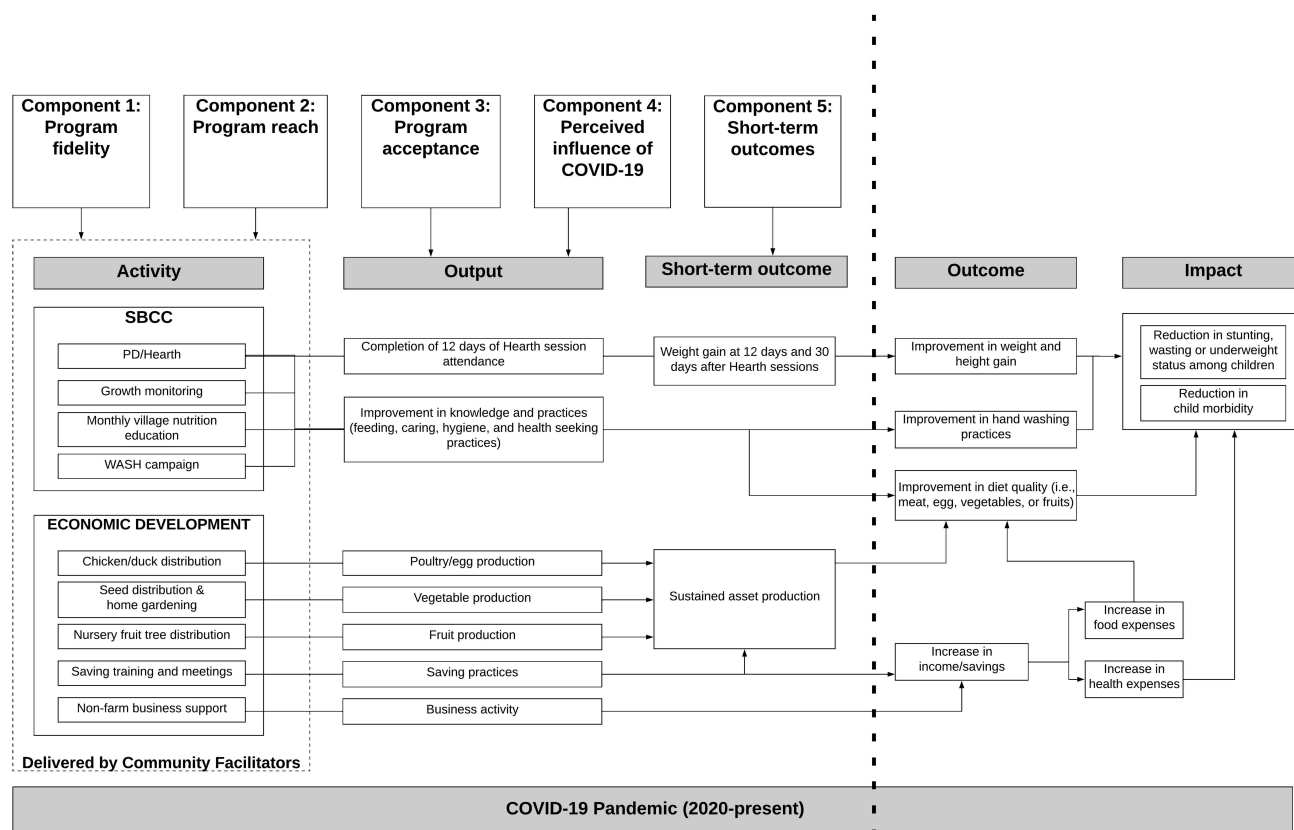
This study measures changes in the implementation of project activities and assesses the perceived impact of COVID-19 and short-term outcomes to investigate how COVID-19 restrictions impacted the program, particularly service delivery and short-term outcomes of the BRDMCN project. Specifically, this study compared the first 2 y of implementation (“pre-COVID-19,” from March 2018 to December 2019) and the final year (2020; “during COVID-19,” from January to December 2020) of implementation (Figure 1). The authors developed the following analysis to find evidence of implementation changes and their impact as a result of COVID-19 prevention measurements:

- 1) Program fidelity: How were the program services carried out in comparison to what was planned prior to the outbreak of COVID-19 and during the pandemic?
- 2) Program reach: What was the program reach before and during the pandemic?
- 3) Program acceptance: Did the program participants accept what they learned from the SBCC activity or the ED program?
- 4) Perceived influence of COVID-19: How did the program participants perceive the impact of COVID-19 on health service access and program utilization?
- 5) Short-term program outcomes: What were the short-term program outcomes prior to COVID-19 and during the pandemic?

## Methods

### BRDMCN program

The study was conducted in 3 Upazilas (the second-lowest tier of regional administration) of the Rajshahi Division in Bangladesh. The BRDMCN was mainly driven by SBCC and ED approaches to support household livelihoods, enhance caregivers’ childcaring and feeding practices, and address child undernutrition (Figure 1). Detailed program information has been published elsewhere (12). A monitoring and evaluation system was established in the project area to strengthen the program implementation and management, identify and address bottlenecks in a timely manner, and increase future data utilization opportunities (12). Delivery of the intervention activities, including monitoring activities, was implemented by 285 community facilitators (CFs), 29 community supervisors (CSs), and 9 program officers. Each CF was in charge of an average of 281 households with children under 5 y old, pregnant women, or lactating women. Poor and ultra-poor families with children under the age of 5 and/or pregnant or lactating women were selected to be the program beneficiaries. According to the area census, there were 78,156 households in 2018; 46.1% are poor or ultra-poor (Supplemental Table 1). Families with children under 5 y and/or pregnant and lactating women comprised 29% of the population in the project area. The CFs and CSs were trained to conduct a census survey,



**FIGURE 1** Conceptual framework of evaluation components. COVID-19, coronavirus disease 2019; PD/Hearth, Positive deviance/Hearth; SBCC, social behavior change communication; WASH, water, sanitation, and hygiene.

a social mapping, and a wealth ranking. Each CF conducted the census and growth monitoring and promotion (GMP) and Positive deviance (PD)/Hearth sessions, visiting 8–10 households/mo, networking with local schools and community groups (CGs); CFs reported their activities to the CS. The CSs supervised 10–12 CFs, were responsible for 4 ED groups, provided data inputs in the monitoring system, coordinated external interest groups, facilitated training and meetings, and regularly reported to program officers.

#### SBCC.

The SBCC program on health and nutrition was delivered through the PD/Hearth, GMP, and community education activities. The PD/Hearth program was designed following previously generated guidelines (14). Positive deviant inquiries were made by the project staff, CFs, and community members to identify healthy behaviors considered to benefit child nutrition and increase awareness of the importance of child nutrition. In each village, CFs screened children aged 6–59 mo to identify underweight children (weight-for-age  $z$  score  $< -2$ ). In each PD/Hearth session, 8–10 children and their caregivers learned essential knowledge and skills on breastfeeding, safe water waste management, prevention and treatment of diarrhea, and physical and mental growth of children. The sessions ran for 12 d, and caregivers learned to make complementary meals with ingredients they brought and fed children at the session on the site. Mothers were encouraged to continue practicing what they

learned from the Hearth sessions in their home environments. In addition, each child received 60 sachets of micronutrient powders (MNPs) on the first day of the session. CFs conducted 2–3 home visits over 2 wk and after each PD/Hearth session.

Monthly GMP sessions were scheduled to align with the government's Expanded Program on Immunization (EPI) schedule. Sessions were held at 295 centers with support from CFs. CG education sessions on health, nutrition, and sanitation were conducted with pregnant and lactating women and mothers of children under 5 y.

CGs and community support groups (CSGs) were the key stakeholders involved in supporting the project from the beginning. The CGs intervened in every aspect of the project, accompanied by CFs and CSs, and made a bridge that fostered rapport building. The CGs and CSGs played a pivotal role, ranging from community diagnosis, Positive Deviance Inquiry (PDI), and beneficiary selection to day-to-day doorsteps monitoring. Their role also included giving timely feedback to the participants on practices and performance through the program. They also acted as communicators and burgeoning agents with local government institutions to extract support for community clinics and community members regarding improving health and nutrition.

#### ED program.

The ED program adopted the graduation approach to improve livelihoods among the ultra-poor (15). The ED program attempted to build

the capacity of the beneficiaries by increasing homestead food production and increasing income and earning opportunities for women to meet the food and nutritional needs of children and mothers. The ED participants were selected from poor or ultra-poor households using the WVB's participatory wealth-ranking summary, which was based on information about ownership of durable goods, dwelling characteristics, and sources of drinking water and sanitation facilities (**Supplemental Tables 1 and 2**). The matching process was based on the household's preferences and aspirations and the feasibility of managing the livelihood per available household resources, such as land and labor (15).

A total of 2960 poor ( $n = 1332$ ) or ultra-poor ( $n = 1628$ ) households with under-5 children or pregnant women were selected by CFs and the project team, with support from community leaders, using national Bangladesh's participatory wealth-ranking index (16). The 2960 households received various combinations of assets based on their living environment (i.e., some space for home gardening or pond for rearing ducks) or previous microbusiness experience in July–December 2018. A total of 2095 households received ducks in July and December 2018; 872 households received chickens in September and September 2018; 2403 households received 6 types of vegetable seeds (red amaranth, Indian spinach, *kang kong*, pumpkin, bottle gourd, and country bean) in July 2018; and 1511 households received nursery fruit trees (mango, papaya, guava, and lemon; 6 trees per household) in July 2018. Other assets included sewing machines for 150 households and small business training for 150 households in December 2018. Then, according to the assets transferred, the ED participants received income-generation training, such as farming, raising ducks, or business training.

All beneficiaries received training on savings quarterly and attended monthly savings group meetings managed by CFs and CSs. The bank and financial services for poor and ultra-poor household services were mapped and provided the relevant information to a total of 139 ED groups. The ED group leaders were trained on savings and available financial services and worked with group members to identify and motivate savings practices through quarterly meetings. The income-generation activities were discussed through monthly group meetings with other participants and their CFs. The Department of Agriculture Extension and Livestock provided technical support to the ED participants with a coordinated effort.

#### **Capacity building for partners.**

The BRDMCN project included a variety of capacity building activities for partners in the health, nutrition, and hygiene sector to train and improve the knowledge and skills of local program staff members, staff of health centers, and partner government officials involved in the implementation of the program.

#### **Data collection**

The evaluation of the present study lays out and validates the theoretical causal links between program activities comparing plans, implementation activities, outputs, and short/intermediate outcomes (17). Although evaluating the implementation process is recognized as critical in interpreting the effects of health and nutrition programs, few systematic implementation studies are available in community nutrition programs (18–22). According to the potential conceptual framework, this evaluation or adaptive management takes advantage of various data

sources collected from the monitoring system and a prospective cohort survey (Figure 1).

#### **Reviews of annual progress/evaluation reports.**

We reviewed annual progress reports, baseline reports, and endline reports prepared by the project team, WVB, and WVK from April 2018 to December 2020. The number of activities delivered, the number of program participants, the expected number of activities, and the expected number of program participants were extracted from annual progress reports.

#### **Cohort survey.**

The project established a cohort group of 1094 children who attended PD/Hearth sessions at 6–13 mo of age in October–November 2018. Of them, 532 participated in a PD/Hearth session as well as an ED program. Approximately 8–10 mo after the PD/Hearth session graduation, the first visit was made in August 2019 and the second in November 2020. With regard to PD/Hearth, caregivers were asked about their perception and satisfaction with the PD/Hearth program, and the extent to which they were practicing and sharing the behaviors learned as part of the PD/Hearth sessions. Mothers who participated in the ED program were asked about training completeness, the experience of income generation, and utilization of generated income for purchasing nutritious foods for themselves or their children.

#### **Monitoring records for PD/Hearth and ED programs**

##### **PD/Hearth.**

CFs used a paper form to monitor the children enrolled in the PD/Hearth session. CFs recorded the mother's name; child's name, age, sex, weight, and immunization status (full vs. partial); village name; Upazila; and district. Enrolled children were weighed using a weighing scale (Beurer, model PS240, Germany, or GETWELL, model GWL-GBWM-003, RFL Bangladesh) at enrollment and 12 d following the PD/Hearth session. The child's weight at 30, 90, and 180 d after the session was measured during household visits (14).

##### **ED program.**

A total of 260 CFs monitored asset management and provided guides for 2960 ED households through household visits. The monitoring visits were made in January–March 2019 (first visit), April–June 2019 (second visit), July–September 2019 (third visit), October–December 2019 (fourth visit), and April–June 2020 (fifth visit) after receiving assets spanning both before and during the COVID-19 period. The monitoring visits during January–March 2020 were canceled due to lockdowns. At each household visit, ED households were asked to share the total number or amount of assets (ducks, chickens, and vegetables) they owned, produced, purchased, consumed, and sold, and the income received from assets sold.

The forms of PD/Hearth and ED programs were submitted to the Joypurhat project office and data were entered into a monitoring program based on a Microsoft Excel Program developed by World Vision International.

#### **Variable construction and statistical analysis**

The evaluation components and indicators are listed in **Table 1**.

**TABLE 1** Indicators of evaluation components<sup>1</sup>

Characteristics		Data sources/data collection methods
(1) Program fidelity (% dose delivered or % dose received)		
PD/Hearth	<ul style="list-style-type: none"> <li>- Number of PD/Hearth sessions out of a planned number of sessions (%)</li> <li>- Number of PD/Hearth participants out of an expected number of participants (%)</li> <li>- Average participants per Hearth session (calculated by dividing the number of participants by the number of sessions)</li> </ul>	Project report review
CG/CSG	<ul style="list-style-type: none"> <li>- Number of CFs/community supervisor regular monthly meetings out of a planned number of sessions (%)</li> <li>- Number of CG and CSG orientations out of a planned number of group orientations (%)</li> </ul>	
Community nutrition education	<ul style="list-style-type: none"> <li>- Number of community nutrition education sessions out of a planned number of sessions (%)</li> <li>- Number of participants at the education sessions out of an expected number of participants (%)</li> <li>- Average number of participants per session (calculated by dividing the number of participants by the number of education sessions)</li> </ul>	
GMP	<ul style="list-style-type: none"> <li>- Number of GMP sessions out of a planned number of sessions (%)</li> <li>- Number of participant children out of an expected number of children (%)</li> </ul>	
ED	<ul style="list-style-type: none"> <li>- Households selected for asset transfer out of a planned number of participants (%)</li> <li>- Number of IGA monthly meetings out of a planned number of sessions (%)</li> <li>- Number of IG training out of a planned number of sessions (%)</li> <li>- Number of CF meetings with ED groups out of a planned number of meetings (%)</li> </ul>	
Capacity-building programs	<ul style="list-style-type: none"> <li>- Number of school campaigns out of a planned number of campaigns (%)</li> <li>- Number of participants at school campaign out of an expected number of participants (%)</li> <li>- Number of WASH training sessions out of a planned number of trainings (%)</li> <li>- Number of participants at WASH training out of an expected number of participants (%)</li> </ul>	
(2) Program reach		
PD/Hearth	<ul style="list-style-type: none"> <li>- Number of children enrolled in PD/Hearth program/number of underweight children under 5 y old (%)</li> </ul>	Project report review
GMP	<ul style="list-style-type: none"> <li>- Number of children coming to the growth monitoring promotion sessions/number of children under 5 y old (%)</li> </ul>	
ED	<ul style="list-style-type: none"> <li>- Number of ED beneficiaries out of ultra-poor households with children under 5 y old or pregnant women (%)</li> </ul>	
(3) Program acceptance		
PD/Hearth	<ul style="list-style-type: none"> <li>- Mean of PD/Hearth attendance days among mothers participating in PD/Hearth</li> <li>- % of mothers with attendance completeness (12 d) out of mothers participating in PD/Hearth</li> <li>- % of mothers contributing foods to the PD/Hearth session out of mothers participating in PD/Hearth</li> <li>- % of mothers continuing PD/Hearth practices out of mothers participating in PD/Hearth</li> <li>- % of mothers sharing lessons from PD/Hearth with neighboring mothers out of mothers participating in PD/Hearth</li> </ul>	Cohort survey (n = 1095) in 2019
ED	<ul style="list-style-type: none"> <li>- % using produced items for feeding their children and family among mothers participating in PD/Hearth and ED programs</li> <li>- % earning income using assets received among mothers participating in PD/Hearth and ED programs</li> <li>- % completing saving training among mothers participating in PD/Hearth and ED programs</li> <li>- % managing savings by women or with her husband among mothers participating in PD/Hearth and ED programs</li> <li>- % earning income from asset management among mothers participating in PD/Hearth and ED programs</li> <li>- % buying nutritious foods for a child with additional income earned from selling assets among mothers participating in PD/Hearth and ED programs</li> <li>- % buying better health care/treatment for a child with extra income earned from selling among mothers participating in PD/Hearth and ED programs</li> </ul>	

(Continued)



TABLE 1 (Continued)

Characteristics	Data sources/data collection methods
(4) Perceived influence of COVID-19	
ED	Cohort survey ( <i>n</i> = 1029) in 2020
- % of households influenced by COVID-19 on asset management out of 347 duck asset groups participating in the cohort survey	
- % of households influenced by COVID-19 on asset management out of 270 chicken asset groups participating in the cohort survey	
- % of households influenced by COVID-19 on asset management out of 126 vegetable asset groups participating in the cohort survey	
- % of households influenced by COVID-19 on asset management out of 40 microbusiness asset groups participating in the cohort survey	
Health service	-
Nutrition support	
- % type of support perceived as useful	
(5) Short-term program outcomes	
PD/Hearth	Monitoring record PD/Hearth ( <i>n</i> = 11984)
- % of children gaining $\geq 200$ g on the 12th day after enrollment out of 11,984 PD/Hearth children	
- % of children gaining $\geq 400$ g on the 30th day after enrollment out of 11,984 PD/Hearth children	
- % of underweight children on the 12th day after enrollment out of 11,984 PD/Hearth children	
- % of underweight children on the 30th day after enrollment out of 11,984 PD/Hearth children	
ED	Monitoring record ED ( <i>n</i> = 2960)
- % of households sustaining the same type of 2095 duck asset households	
- % of households sustaining the same type of 872 chicken asset households	
- % of households sustaining the same type of 2403 vegetable asset households	
- % of households newly rearing ducks out of 865 non-duck asset households	
- % of households newly rearing chickens out of 2088 non-chicken asset households	
- % of households newly producing vegetables out of 2403 non-vegetable asset households	

<sup>1</sup>CF, community facilitator; CG, community group; COVID-19, coronavirus disease 2019; CSG, community support group; ED, economic development; GMP, growth monitoring promotion; IG, income generation; IGA, income generating activities; PD/Hearth, Positive deviance/Hearth; WASH, water, sanitation, and hygiene.

#### **Program fidelity: dose delivered.**

Program fidelity is defined as “the extent to which intervention was delivered as planned” and can be measured through 3 subcomponents, including program quality, dose delivered, and dose received (23). This study measured the dose delivered and dose received, which assesses the extent to which the project team delivered each intervention component (dose delivered) or those components that were received by target children/mothers (dose received). The percentage of dose delivered was defined as the number of activities implemented compared with the intended number. The summary data were extracted from the monitoring records or annual progress reports. The monthly growth-monitoring sessions, aligning the government EPI schedule, were held at 295 centers with support from CFs. Indicators about the percentage dose delivered and percentage dose received were calculated each year (2018, 2019, and 2020). The criteria of delivery and received are as follows: 90% and above as sufficient, 70% to <90% as medium, and 70% or below as low.

#### **Program reach.**

Program reach is defined as “the proportion of intended target audience that participates in an intervention” (23). The program reach was measured to determine if the level of implementation and uptake of the intervention (SBCC and ED) was sufficient to bring the expected change among the beneficiaries. The program reach was calculated based on the

number of actual program participants and the size of the target population whose conditions meet the intervention criteria. The size of the target population was taken from census data from the project team’s population census they conducted in the project area at the beginning of the BRDMCN program in 2018. We set a percentage grid for the evaluation of program reach as follows: 70% and above as sufficient, 50% to <70% as medium, and <50% as not sufficient.

#### **Program acceptance.**

This program component assessed whether PD/Hearth participants continued the practices they learned after the program and if the ED participants managed the assets appropriately. Program acceptance indicated how well the project participants adhered to the intervention guidelines during and after training or nutrition sessions. This component was assessed only in August 2019 among cohort survey participants. All variables were presented as proportions.

#### **Perceived influence of COVID-19 on asset management.**

The perceived influence of COVID-19 was assessed in the cohort group in the third year (2020). The mothers were asked if they perceived any changes in using community health services. The answers were re-coded as “never,” “rarely,” “often,” and “all the time.” Of them, 485 mothers were ED participants [chicken (*n* = 126), duck (*n* = 347), vegetables (*n* = 271), and microbusiness (*n* = 40)] and asked if they

experienced difficulties in maintaining the asset and selling assets or byproducts by type of asset they received. All variables were indicated as proportion.

#### **Short-term outcomes.**

**SBCC outcomes.** Monitoring records of a total of 11,984 children enrolled in the PD/Hearth sessions from 2018 to 2020 were available. The weight of the children was converted to weight-for-age *z*-score (WAZ) and calculated for underweight (WAZ < -2) status. We defined the short-term outcomes of the PD/Hearth program at the participant/beneficiary level as weight gain over 200 g at 12 d or over 400 g at 1 mo after enrollment into the PD/Hearth sessions, which is routinely used in many PD/Hearth programs (14), and percentage change in underweight between enrollment and 12 d and between enrollment and 30 d (24). The changes in percentage underweight and weight gain at 12 d and 30 d after enrollment were assessed both in a total and as stratified by year (2018, 2019, and 2020).

**ED program outcomes.** Short-term outcomes were assessed using the ED monitoring data, which followed a total of 2960 households who received the ED assets every 3 mo for 1 y after the asset distribution ( $n = 2095$  for the duck group,  $n = 872$  for the chicken group, and  $n = 2403$  for the vegetable seed group). Short-term outcomes were defined as the percentage of households that kept possessing poultry assets and producing vegetables during each follow-up: third month, sixth month, ninth month, and 12th month (before COVID-19) and 18th month (during COVID-19). The difference between outcomes in 2018 and 2019 and in 2020 was tested using chi-square tests.

#### **Ethical standards**

This study protocol and materials were approved by the Institutional Review Boards (IRBs) at the Dhaka University Health Economics Department in Bangladesh and the Johns Hopkins Bloomberg School of Public Health (Maryland, USA).

## **Results**

Planned activities were implemented with high fidelity as indicated by the high levels of dose delivered. The lowest dose delivered was 66.7% (GMP sessions) before COVID-19 but the percentages of dose delivered decreased to a range of 0–70% in 2020. Exceptions were found in the number of children who received MNPs in 2020 (120%) and meetings with ED groups by CFs (150%). During 3 y of the project period, the coverage of main activities was 89.4% in PD/Hearth, 91.8% in GMP, and 79.6% in the ED program, reaching the most target children in need in the project area.

### **Component 1: program fidelity**

#### **SBCC program.**

During the 3 project years, a total of 1519 PD/Hearth sessions were held out of the 1583 sessions planned (96%) (Table 2). The rate of sessions held out of the planned number of sessions dropped to 65% in 2020 during the COVID-19 pandemic (low for the performance criteria), compared with 97.6% in 2018 and 117.7% in 2019 (sufficient). A total of 11,984 children attended the PD/Hearth sessions out of the

13,892 expected children, yielding an 86.3% dose received. The rate of actual participants to expected number of participants decreased to 54% in 2020 (low), while this number was 91.1% in 2018 and 104.3% in 2019 (sufficient). The PD/Hearth sessions had 9.3 mothers, on average, who gathered for 12 d in 2018, which was reduced to 6.6 mothers in 2020. For 3 y, 14,065 children received MNPs out of 12,736 planned (110%; sufficient). In 2020, this increased to a 180% higher dose in the number of children receiving MNPs, compared with the planned number (sufficient).

During the 3 y of the project period, a total of 197 CG/CSG orientations were conducted out of 141 planned (139.7%). Even in 2020, 127% of planned orientations were conducted (sufficient) without scale-down of the planned activities.

A total of 18,280 sessions of community group nutrition education for basic childcare, nutrition, and health were implemented out of 19,640 planned (93.9%) and involved 216,548 participants as compared with the expected 259,506 persons (83.4%; medium). In 2020, 90% of planned education sessions were conducted, while only 52% of expected participants were recruited (low) (Table 2).

A total of 4692 GMP sessions (1152 in 2018 and 3540 in 2019) were implemented out of the 9792 sessions planned before COVID-19: 66.7% (low) and 102.4% (sufficient), respectively. A total of 829 GMPs (24% of the planned) were conducted only between January and March 2020. A total of 36,105 children (17,430 in 2018 and 18,675 in 2019) participated in a GMP out of the 46,370 children planned, which equals a 117.7% implementation (sufficient). The 17,692 children who participated in GMP sessions in 2020 only included those from January to March since the GMP sessions were not held after that (Table 2).

#### **ED program.**

A total of 2960 households were selected as ED program beneficiaries, and assets transferred in 2018 (100% achievement of the planned number). While income generation activities (IGA) monthly training and IG training for best practice operated as planned in 2018 and 2019, only 60% of the planned IGA training meetings and 50% of the IG training were held in 2020 (low). It is notable that, in 2020, there were more frequent meetings between ED participants and the CFs: 150% as compared with 104% in 2018 and 100% in 2019 (sufficient) (Table 2).

#### **Capacity-building program for partners.**

Capacity building through school campaigns, with a total of 103 sessions, 48 sessions in 2018, and 55 in 2019, was conducted in 53 targeted schools. However, no sessions were provided in 2020 at schools. Of 108 water, sanitation, and hygiene (WASH) training sessions for government officials planned for 3 y, a total of 102 were conducted, but only 67% of the sessions planned (24 out of 36) were held in 2020 (low). The percentage of participants in the training in 2020 was only 59% (738 out of 1260) compared with that planned in training in 2020 (low) (Table 2).

### **Component 2: program reach**

The program reach by the PD/Hearth program for underweight children in the entire project area was as high as 89.4% in 2018 and 81.3% in 2019, but low at 31.5% in 2020 (low). The reach of the GMP for children under 5 y old was 91.8% in 2018 and 102% in 2019, but it decreased to 91.4% in 2020. The reach of the ED program was 79.6% out of 3717 ultra-poor households with children under 5 y in 2018. The ED

**TABLE 2** Program fidelity of the BRDMCN project: Bangladesh, 2018–2020<sup>1</sup>

Characteristics	Before COVID-19						During COVID-19					
	Year 1 (2018)			Year 2 (2019)			Year 3 (2020)			Total		
	Target	Delivered or received	%	Target	Delivered or received	%	Target	Delivered or received	%	Target	Delivered or received	%
I. SBCC program												
I.1 PD/Hearth implementation												
PD/Hearth sessions (12 days)												
No. of sessions	578	564	97.6%	570	671	117.7%	435	284	65.3%	1583	1519	96.0%
No. of participants	5780	5265	91.1%	4632	4830	104.3%	3480	1889	54.3%	13,892	11,984	86.3%
Average participants per Hearth session		9.3			7.2			6.6			7.9	
No. of children receiving MNPs	4624	5265	113.9%	4632	4623	99.8%	3480	4177	120.0%	12,736	14,065	110.4%
No. of CF/CS monthly meetings	84	96	114.3%	144	138	95.8%	144	136	94.4%	372	370	99.5%
No. of CG/CSG orientation meetings	3	3	100.0%	68	105	154.4%	70	89	127.1%	141	197	139.7%
I.2 Community group nutrition education												
No. of sessions	5780	5358	92.7%	6840	6750	98.7%	6840	6172	90.2%	19,460	18,280	93.9%
No. of total participants	76,636	75,770	98.9%	93,950	94,631	100.7%	88,920	46,147	51.9%	259,506	216,548	83.4%
Average no. of participants per education session		14.1			14.0			7.5			11.8	
I.3 GMP												
No. of sessions	1728	1152	66.7%	3456	3540	102.4%	3456	829	24.0%	8640	5521	63.9%
No. of participants per month	14,098	17,430	123.6%	15,790	19,457	123.2%	17,482	(17,692) <sup>2</sup>	—	47,370	54,579	115.2%
II. ED program												
ED asset transfer beneficiaries												
No. of beneficiaries	2960	2960	100.0%	—	—	—	—	—	—	2960	2960	100.0%
No. of IGA monthly meeting	289	289	100.0%	—	—	—	233	139	59.7%	522	428	82.0%
No. of IG training: best practice visit	3	3	100.0%	12	12	100.0%	6	3	50.0%	21	18	85.7%
No. of CF meeting with ED groups	417	435	104.3%	834	834	100.0%	556	834	150.0%	1807	2103	116.4%
III. Capacity-building program												
Capacity building via school campaign												
No. of sessions	48	48	100.0%	54	55	101.9%	48	0	0.0%	150	103	68.7%
No. of participants	1440	1440	100.0%	1620	1657	102.3%	1440	0	0.0%	4500	3097	68.8%
WASH training (government officials)												
No. of sessions	36	42	116.7%	36	36	100.0%	36	24	66.7%	108	102	94.4%
No. of participants	1260	1572	124.8%	1260	1224	97.1%	1260	738	58.6%	3780	3534	93.5%

<sup>1</sup>BRDMCN, Bangladesh Rajshahi Division of Maternal and Child Nutrition; CF, community facilitator; CG, community group; COVID-19, coronavirus disease 2019; CS, community supervisor; CSG, community support group; ED, economic development; GMP, growth-monitoring promotion; IG, income generation; IGA, income generating activities; PD/Hearth, Positive deviance/Hearth; SBCC, social behavior change communication; WASH, water, sanitation, and hygiene.

<sup>2</sup>Counted only the number of children who attended the GMP sessions at pre-pandemic.



**TABLE 3** Program reach of main intervention activities in the BRDMCN project

Characteristics	Before COVID-19				During COVID-19	
	Year 1 (2018)		Year 2 (2019)		Year 3 (2020)	
	<i>n</i>	% Reach	<i>n</i>	% Reach	<i>n</i>	% Reach
I. SBCC program						
PD/Hearth						
Population of children under 5 y old <sup>1</sup>	18,978	—	19,168	—	19,460	—
Estimated number of underweight children under 5 <sup>2</sup>	5883	—	5942	—	6001	—
Children participating PD/Hearth programs	5265	89.4%	4830	81.4%	1889	31.5%
GMP						
Population of children under 5 y old	18,798	—	19,168	—	19,360	—
No. of children under 5 y old <sup>3</sup>	17,430	91.8%	19,457	102%	17,692	—
II. ED program						
Poor or ultra-poor households	35,645	—	—	—	—	—
Poor or ultra-poor households with children under 5 y old	3717	—	—	—	—	—
ED participants	2960	79.6%	—	—	—	—

<sup>1</sup>The population was estimated considering the Bangladesh population growth rate 1950–2021. BRDMCN, Bangladesh Rajshahi Division of Maternal and Child Nutrition; COVID-19, coronavirus disease 2019; ED, economic development; GMP, growth-monitoring promotion; PD/Hearth, Positive deviance/Hearth; SBCC, social behavior change communication.

<sup>2</sup>The prevalence of underweight among children under 5 y old is 31%, based on the baseline report of the BRDMCN project 2018.

<sup>3</sup>In year 3 (2020), we counted only the number of children who attended the GMP sessions at pre-pandemic.

program continued with the 2960 households over the project period (Table 3). These percentages of the program's reach in the PD/Hearth and ED programs were considered sufficient for the program to have an impact.

### Component 3: program acceptance

This program acceptance was assessed only in August 2019 among 1029 cohort survey participants. Nearly all of the cohort group (90%) attended the 12 days of Hearth sessions (*n* = 1029). Most respondents

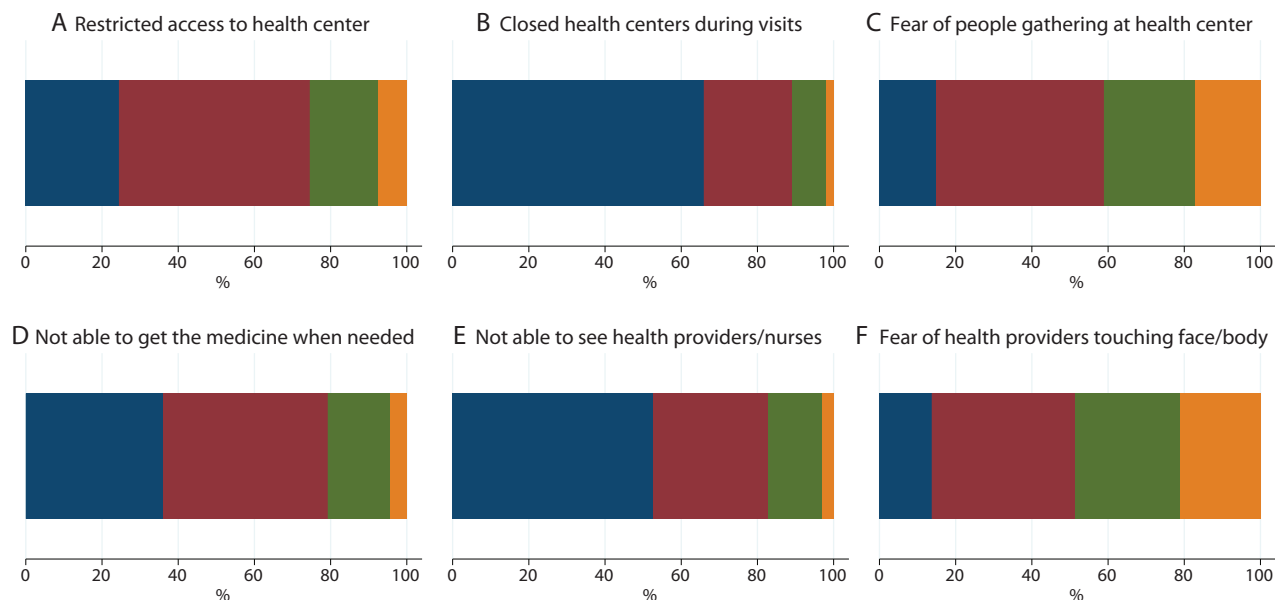
(94.7%) contributed food ingredients to prepare complementary foods in the session (Table 4). A majority of participants reported practicing the lessons learned at the PD/Hearth session for childcaring and feeding, with a frequency of always (35.0%) or usually (43.4%), which, combined, is relatively high (78.4%). A large proportion (86.6%) of respondents shared the lessons learned from the session with neighboring mothers (Table 4).

Out of the 485 ED program participants assessed from the 1029 cohort households, 95.7% completed the ED group/saving training. Management of income generated from assets was made by women

**TABLE 4** Program acceptance among cohort groups who attended the PD/Hearth sessions and received assets in 2018<sup>1</sup>

Characteristics	<i>n</i>	%
1. SBCC: PD/Hearth ( <i>n</i> = 1029)		
Hearth attendance days, mean ± SD		11.5 ± 1.7
Twelve days' attendance	926	90.0
Contributed foods to PD/Hearth session	974	94.7
Frequency of practicing the lessons learned from PD/Hearth program for childcaring and feeding		
Always	360	35.0
Usually	447	43.4
Often	143	13.9
Rarely/never	79	7.7
Shared lessons from PD/Hearth program with neighboring mothers	891	86.6
2. ED program ( <i>n</i> = 485)		
Completed the ED group/saving training	464	95.7
Savings management by women or with her household member		
Mother of child	284	58.6
Father/grandmother/grandfather/other family	49	10.1
Mother/father together	102	21.0
No income yet	50	10.3
Earned any additional income using livestock, eggs, fruits, or vegetables provided by World Vision	347	71.6
Bought nutritious foods for your child with additional income earned from selling assets (livestock, eggs, fruits, or vegetables)	302	87.0
Bought a better health care/treatment for your child with additional income earned from selling assets (livestock, eggs, fruits, or vegetables)	228	65.7

<sup>1</sup>*n* = 1029. ED, economic development; GMP, growth-monitoring promotion; PD/Hearth, Positive deviance/Hearth; SBCC, social behavior change communication.



**FIGURE 2** (A–F) Perceived changes in using community health facilities during COVID-19 ( $n = 998$ ). COVID-19, coronavirus disease 2019.

primarily (58.6%) or both parents (21.0%). A total of 71.6% of households earned income from the assets provided. Out of the 347 income-generating participants, 77.0% and 87% bought nutritious foods for themselves and their child, respectively, and 56.2% and 65.7% purchased better health care/treatment with additional income for herself and their child (Table 3).

#### Component 4: perceived impact of COVID-19

The perceived impact of COVID-19 in health facility utilization was moderate. Most respondents cited fear of people gathering (41%; often and all the time combined) or health providers touching the face or body during visits (48.4%) (Figure 2). Among the ED group who received ducklings ( $n = 347$ ) or chickens ( $n = 126$ ), 95.4% reported that they never had or rarely experienced difficulties due to COVID-19 in managing ducks or chickens, respectively (Figure 3). Difficulties in selling ducks, chickens, and vegetables were very low (1–2%). One-tenth of households in the microbusiness group reported difficulties in managing their business all of the time or often. The respondents mentioned food assistance (74.5%), public health messages (58.6%), and cash transfer (48.1%) as useful support (data not shown).

#### Component 5: short-term outcomes

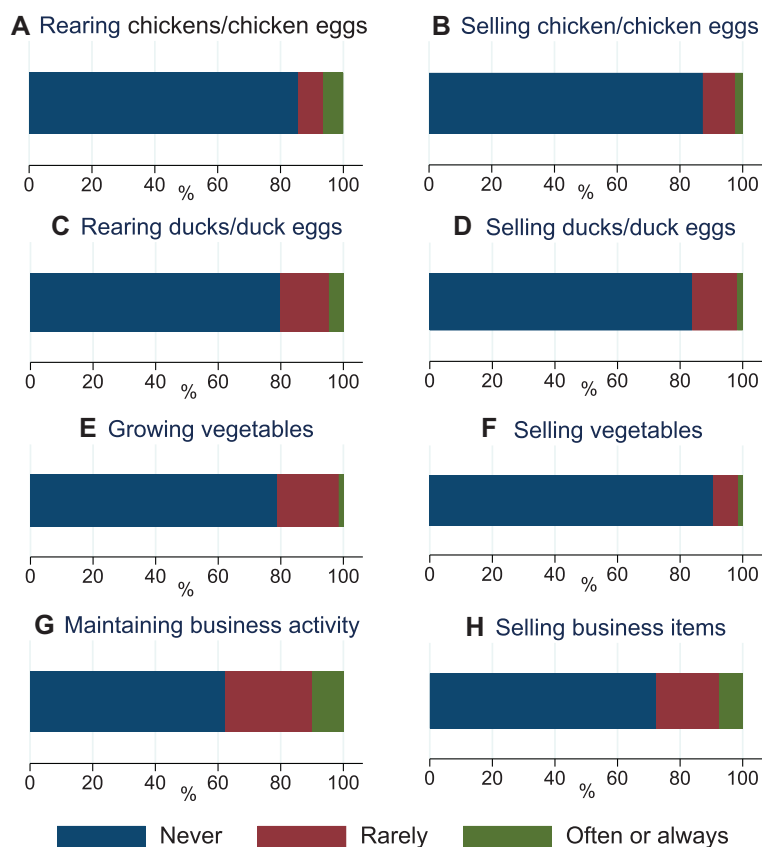
##### SBCC program (PD/Hearth).

Among children enrolled into the PD/Hearth program, the percentage of underweight decreased from 73.9% at enrollment to 55.7% at 30 d after the PD/Hearth session. More than two-thirds (68.7%) of the enrolled children had over 200 g of weight gain after 12 d, and 64.8% had over 400 g of weight gain after 1 mo. The improvement in nutritional status was consistently shown each year. The number of children enrolled in the PD/Hearth program was reduced by almost

one-third, from 4830 in 2019 to 1889 during COVID-19 in 2020. The percentage of children who gained adequate weight ( $\geq 200$  g) after 30 d did not show a trend between before COVID-19 (62.6% in 2018 and 64.6% in 2019) and during COVID-19 (69.7%). The percentage point (pp) difference in underweight from enrollment to 30 d after the session was comparable, at 16.8% in 2019 and 16.5% in 2020 (Table 5).

##### ED program.

There was no reduction in asset management during COVID-19 compared with before the COVID-19 pandemic. Out of 2960 households, 2095 households received ducks, and the percentage of ducklings decreased over time from 97.0% in January–March 2019 to 82.6% in April–June 2020 ( $P < 0.001$ ). However, the proportion was comparable at the fourth visit (before COVID-19) and during COVID-19 ( $P = 0.10$ ). Notably, beneficiary households that did not receive ducks as an asset began to purchase ducks gradually by using income generated from asset management. The proportion of households that initially did not receive ducks as assets but later introduced them increased from 1.6% in January–March 2019 to 31.9% in April–June 2020 ( $P < 0.001$ ). Among the 872 households given chickens, 76.7% of the households kept raising chickens by April–June 2020 ( $P < 0.001$ ). There was no difference in the percentage raising chickens among beneficiaries at the fourth and last visits during the pandemic ( $P = 0.12$ ). A rapid increase in the proportion of households purchasing chickens among the non-chicken group was seen, from 7.0% at 3 mo to 62.0% by the last visit ( $P < 0.001$ ). Among 2403 households that received vegetable seeds and gardening training, the proportion continuing asset production decreased to 65.9% during April–June 2019, but slightly increased to 73.8% during October–December 2019, and remained at 74.9% by the last visit ( $P < 0.001$ ) (Figure 4).



**FIGURE 3** (A–H) Difficulties in asset management during COVID-19 among ED participants in 2020. COVID-19, coronavirus disease 2019; ED, economic development.

## Discussion

The present study describes how the implementation of a community-based program in rural Bangladesh was implemented, adapted, and impacted due to COVID-19 lockdowns. The results revealed various adaptations to implementation in 2020 due to mobility restrictions. Nevertheless, the impact of the COVID-19 pandemic had differential effects on the implementation of specific program components, although these did not necessarily translate to marked impacts on short-term outcomes. For example, the COVID-19 pandemic caused large shifts in program fidelity, yet those changes had minor impacts on asset (poultry, vegetable production) ownership and management and on the percentage of underweight children.

### Service delivery and activity scales were reduced during the pandemic

Prior to the pandemic, most planned activities were completed on time as planned and sometimes achieved higher levels in terms of dose delivery. The lockdown caused by COVID-19 not only reduced the frequency of service delivery but also reduced expected participation. The reduced program reach during COVID-19 was anticipated to cause an impact on the overall project performance and expected impact of the BRDMCN project. However, due to mobility constraints, the modes of

delivery and frequency of activities were modified. CFs made 1-on-1 home visits and had small group meetings or discussions on mobile phones to supplement the reduced fidelity and reach.

PD/Hearth, GMP, and ED showed 80% coverage or above of the population in need. The results of this would indicate that the program's overall reach was sufficient to impact the target group. However, compared with 2019, only half of the children were enrolled in the PD/Hearth sessions in 2020. Field activities were frequently restricted due to the need for special permission and were replaced with contingency plans for rapid responses. Due to a government ban on all in-person gatherings during the early stages of the COVID-19 pandemic, the sessions were canceled. Some of these activities were resumed after the restriction was lifted on 1 September 2020 (7). In this situation, the project team had to decide whether to reduce the number of PD/Hearth session days per participant (program quality) or the number of participants (program coverage) per session, and the latter was chosen.

This adaptation was decided through detailed communication among the BRDMCN project team, headquarters, and global partnerships. The BRDMCN project team established toll-free/telephone services for day-to-day information for controlling the COVID-19 impact among the community members through CFs and equipped all front-line staff/volunteers with personal protective equipment (PPE). The

**TABLE 5** Weight gain and underweight status at enrollment and 12 d and 30 d of program enrollment among PD/Hearth children<sup>1</sup>

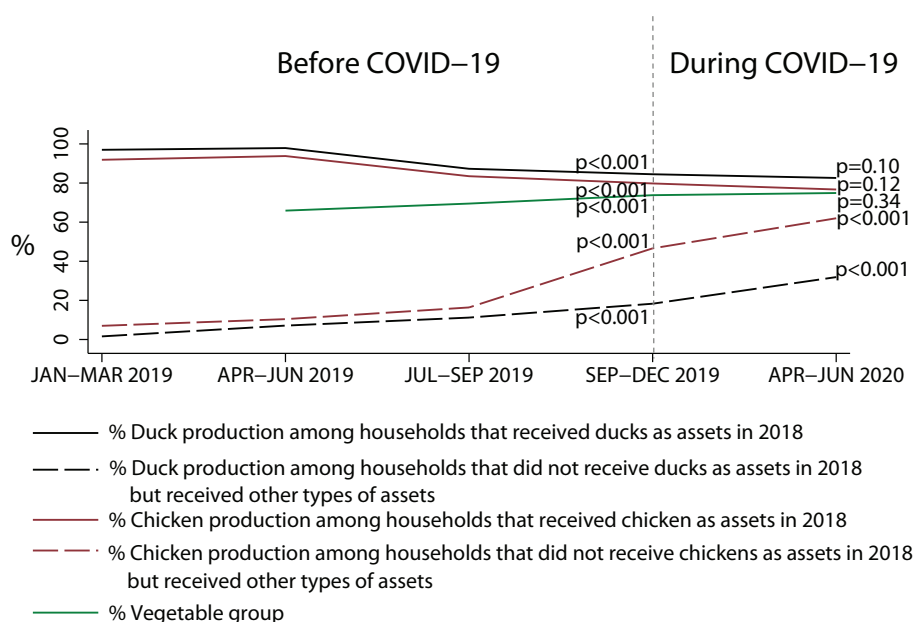
Characteristics	Before COVID-19		During COVID-19	Total
	Year 1 (2018)	Year 2 (2019)	Year 3 (2020)	
Number of children who participated	5265	4830	1889	11,984
Had adequate weight gain ( $\geq 200$ g) after 12-d session enrollment, %	72.1%	64.8%	69.0%	68.7%
Had adequate weight gain ( $\geq 400$ g) after 30-d session enrollment	62.6%	64.6%	69.7%	64.8%
Underweight status (weight-for-age z-score $< -2$ )				
At enrollment	75.7%	74.8%	69.3%	73.9%
After 12-d session enrollment	62.3%	66.4%	60.6%	63.3%
Percentage point difference from enrollment to 12 d	13.4 pp	8.4 pp	8.7 pp	10.6 pp
After 30-d session enrollment	55.4%	58.0%	52.8%	55.7%
Percentage point difference from enrollment to 30 d	20.3 pp	16.8 pp	16.5 pp	18.2 pp

<sup>1</sup>  $n = 11,984$ . COVID-19, coronavirus disease 2019; PD/Hearth, Positive deviance/Hearth; pp, percentage point(s).

project team identified which activities could be implemented during the pandemic, determined alternative methods of implementation, and guided the CFs/CSs. These examples included conducting meetings in small groups to maintain hygiene and social-distancing practices and frequent visits to beneficiary households or virtual communication to CF (25).

Only a few studies have systematically evaluated such “adaptive management” in community-based health and nutrition programs to date. One study in Ethiopia reported that post-pandemic nutrition and health services, such as deworming, nutrition counseling, GMP, and severe acute malnutrition treatment, had lower coverage and were scaled back relative to 2019 (6). Another study leveraged a context of

an intervention to strengthen nutrition services through a government antenatal care platform in Uttar Pradesh, India. The study demonstrated a steep reduction in service provision (40–80 pp) and utilization (40–80 pp) during lockdowns and a gradual recovery in the implementation scale in later 2020 (26). Maternal, infant, and young child nutrition counseling services in urban health facilities in Bangladesh experienced a reduction in the service provision in anthropometric monitoring and child immunizations for pregnant women (20–29 pp) and children (37–57 pp) (10). A substantial decline in service utilization of facility visitations, health, and nutrition counseling from the demand side was observed for pregnant women (35 pp) and children (50–61 pp) during lockdowns and even after that. All of these examples indicate that, in the



**FIGURE 4** Percentage of households having or producing assets over 18 mo of follow-up. COVID-19, coronavirus disease 2019; ED, economic development. The p-values before September-December 2019 were produced by chi-square test indicating the difference in % having or producing assets across 3-mo, 6-mo, 9-mo, and 12-mo follow-up. The p-values after September-December 2019 were produced by chi-square test indicating the difference in % having or producing assets between 12-mo follow-up and 18-mo follow-up.

context of COVID-19, new adaptive modalities necessitated resource mobilization and close collaboration with various stakeholders.

### **Pre-pandemic program acceptance was high**

The high program acceptability during the pre-pandemic period suggests that the reduced service delivery and a low number of participants in 2020 did not result in low service acceptance. A qualitative study found that improvements in women's self-efficacy, as well as visible improvements in the children's health and nutrition status, increased program participation (27). Women in the ED program contributed to generating income for the family in addition to their male partners, promoting their social dignity and empowerment (27).

### **Asset management might mitigate the effects of COVID-19**

Food-insecure households were reported to have used food compromising or financial coping strategies during the early lockdown (28). The assets received by the ED participants may help to mitigate potentially worsening economic disruptions. To supplement their diet, they could buy vegetables, meat, or eggs, or earn money by selling assets. Providing assets to produce foods or support agriculture-promoting projects aids in the food security of the poor (29). Although the primary goal of the ED program was not to mitigate the effects of the pandemic, income-generation projects and agriculture-based and duckling activities could provide some resilience against external shocks such as those created by COVID-19. This possibility should be validated through an impact evaluation.

### **Short-term outcomes during COVID-19 are comparable to previous years**

In terms of child nutrition status, short-term outcomes among direct program participants did not differ from before the pandemic to during the prevention measures. In addition, the PD/Hearth program had a longer-term (i.e., 6 mo) impact on reducing underweight among program participants (24). As previously stated, the project team chose to raise people's awareness of the COVID-19 situation with the help of CGs/CSGs and thus reduced the number of participants per session while maintaining the quality of the program as much as possible.

Over the course of the follow-up visits, the proportion of households keeping ducklings or raising chickens decreased gradually. However, the rate of decline in 2019 was comparable to that during COVID-19. A reason for the sustained outcomes can be found among more frequent contact with CFs. Despite the fact that project management groups had to limit their supervision, CFs were able to continue household visits within the community where they lived. In an environment where there is still an infection risk, providing care to a small group may help the program's impact to be sustained. Furthermore, the dropout rate of CFs was high in 2018 and 2019 but it was very low in 2020 (25). In 2020, 80.9% of respondents met with CFs at least once a month, whereas 17.1% met on a weekly basis (data not shown).

This study contributes to the following areas. First, it demonstrated how the program implementation and utilization could be influenced by external shocks such as COVID-19, thus serving as an example of an implementation study that assessed the dynamic changes in program activities and short-term outcomes in a COVID-19 affected program

setting. Second, this study also presented process elements and how they changed at the onset of the COVID-19 pandemic, such as changes in the implementation plan, delivery, modifications, and participants' utilization of the program, which cannot be demonstrated in an impact evaluation. Third, this study also suggests that the project which was originally intended to improve child nutrition could potentially improve families' resilience to external shocks. To protect children's lives, it is essential to maintain program quality in the face of COVID-19 infection. Stressing community-level COVID-19 prevention strategies and raising awareness of COVID-19 prevention could be a cost-benefit trade-off of the disease's impact.

### **Strengths and limitations**

This study revealed how the planned nutrition and economic development services were adapted and how the short-term outcomes changed due to COVID-19 compared with pre-pandemic. Utilizing various data sources, such as project reports, monitoring records, and a cohort survey, enables triangulation and interpretation of information. Also, this study can be an example of process evaluation regarding what can be measured and how to utilize the existing monitoring data to describe the program monitoring.

A few limitations are as follows. First, the descriptive approach used in this study does not demonstrate the association between evaluation components, such as the relation between the amount of intervention delivery and short-term outcomes. Second, the scope of short-term performance research was limited by using simple indicators such as asset maintenance every 3 mo. Detailed changes in the amount of assets produced or the amount of revenue generated over a 12-mo period have been reported in other studies (16). Third, we only assessed short-term outcomes 30 d after graduation from the PD/Hearth program, which can be a high-fidelity period of the PD/Hearth program, even under COVID-19. However, the "underweight" status in the short term might differ from long-term impacts on child nutrition. Also, underweight is an insufficient measure to inform the source of poor weight gain and to explain why a child is not gaining weight or not gaining height. Fourth, although many activities other than the PD/Hearth, ED, and GMP sessions were delivered, the number of participants for other activities was limited. The population census was not enough for the various program coverages other than the PD/Hearth, ED, and GMP. For example, the frequency of community education by CFs could be counted, but it was not feasible to count the number of community members who gathered to hear the information at each education session. Fifth, we did not assess if the facilitators or program participants were infected with COVID-19. If they were infected, their poorer health status might affect the performance on study outcomes, and their performance would be poorer than uninfected persons. Last, data from the PD/Hearth and ED programs used for short-term outcomes were collected for monitoring purposes and measured by as many as 250 CFs. However, the project team provided regular refresher training to CFs to ensure the quality of data. The time of data collection in November 2020 was somewhat "just the beginning" of the COVID-19 pandemic and it is likely that the situation of poor and vulnerable households deteriorated significantly as the crisis became protracted. This limitation justifies the need for a re-assessment of the program implementation and longer-term impacts of the pandemic.



## Conclusions

Our study examined the changes during 3 y of implementation as well as the short-term outcomes of a community-based nutrition program involving SBCC and asset transfer for income generation in rural Bangladesh before and during the COVID-19 pandemic. The intervention activities were downscaled to nearly half of what had been planned. Asset-creating activities were maintained, with the spillover effect promoting the retention of poultry among those who did not receive initial poultry assets. Over the 3 y, there was a comparable reduction in the prevalence of underweight children 30 d after enrollment. Despite the reduced number of intervention activities, the quality of intervention and short-term outcomes could be maintained. Further investigation is required to determine whether the modified activities compensated for the overall reduction in the service scale.

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## Data Availability

Data described in the manuscript, code book, and analytic code will be made available upon request pending application and approval.

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