

Effectiveness of the Comprehensive Community-Based Intervention on Maternal and Child Health in Bangladesh

Ziaul Matin¹, Minjoon Kim¹, Farzana Bari², ASM Sayem¹, Shamima Sharmin¹, Abu Sayeed Md. Abdullah^{2*}, Md. Abdul Halim² and AKM Fazlur Rahman²

¹United Nations Children Fund (UNICEF), Bangladesh

²Centre for Injury Prevention and Research Bangladesh (CIPRB), Bangladesh

*Corresponding Author

Abu Sayeed Abdullah, Centre for Injury Prevention and Research Bangladesh (CIPRB), Dhaka, Bangladesh.

Submitted: 2023, Mar 08; Accepted: 2023, May 16; Published: 2023, Jun 15

Citation: Matin, Z., Kim, M., Bari, F., Abdullah, A. S., Halim, A. et al. (2023). Effectiveness of the Comprehensive Community-Based Intervention on Maternal and Child Health in Bangladesh. *Int J Clin Med Edu Res*, 2(6), 157-163.

Abstract

The current study looked at the influence of a community intervention on maternal and child health in five Bangladeshi districts. To determine the impact on the intervention, data was acquired through a baseline and end-of-project review. A quasi-experimental design was used in this investigation, which included a baseline and end line survey with the same variables. The research was carried out in two geo demographic groups of districts including plain land districts with easy access to services, such as Tangail and Khulna, and hard to reach locations, such as Netrakona, Cox's Bazar, and Bandarban. Program impact on uptake of maternal and child health services, as defined by the health services/behaviors for the index pregnancy, was analyzed using difference-in-difference analysis. All programs that provided information and counseling to women and their families, often in conjunction with other program measures, increased the number of women who received ANC from a medically certified person during their pregnancy significantly. The community-based programs also resulted in a significant increase in the use of neonatal and child health services. The findings of this study serve as a foundation for maternal and newborn health policies as well as intervention evaluation in both easily accessible and difficult-to-access places.

Keywords: Keyword: Effectiveness, Comprehensive, Community Based Intervention, Bangladesh.

1. Introduction

Over the past few decades, role of community participation has emerged as an increasingly effective strategy for harnessing community potential, particularly in health improvement [1,2]. Engagement of women's club, women's assembly, participation of community level stakeholders and gatekeepers has been widely used by health interventionists to engage communities in health promotion, research, and policy making to address health issues including maternal, neonatal and child health [3]. The process of community engagement refers to a process of working collaboratively with groups of people who are affiliated by geographic proximity, special interests, or similar situations, with respect to issues affecting their well-being [4,5]. Studies showed the improvement of health behaviors of individual, family and community resulting to maternal/neonatal health outcomes. World Health Organization's Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) emphasizes community engagement (CE) to ensure the eventual goal of women and children not only surviving but also thriving [6]. The inability to

involve communities to address and sustain engagement on these health issues after projects are completed may explain the lack of progress on these indicators [7,8].

Focused community-based interventions aimed at reducing newborn and infant mortality rates through either mobilization of women's groups or home visits by village women volunteers focusing on maternal, neonatal and child health practices [9]. Similar efforts also created opportunities for community leaders and communities to work together to identify innovative ways of dealing with the health service delivery and utilization challenges that they face. In developing countries like Bangladesh, antenatal, delivery, and postnatal experiences for women including care of their neonates and children usually take place equally in communities and health facilities [10]. Strategies to improve maternal and child health should therefore involve the community as a complement to any facility-based component.

According to the Millennium development goal (MDG) 2015

report, many neonatal and maternal deaths can be avoided using simple cost effective and high impact interventions [11]. Evidence also showed that the causes of poor maternal, neonatal and child health outcomes are the three de-lays i.e. delay in taking the decision to seek for health care by women, delay in reaching the health facilities and delay in receiving appropriate health care at the health facilities [12,13].

The current study looked at the influence of a comprehensive community intervention package on maternal and child health in five Bangladeshi districts, three of which were hard to reach (HTR) and two of which were easy to reach (ETR). Areas that are difficult to access due to their location, physical qualities, or other considerations are classified as hard-to-reach. Communication, security, social engagement, and economic growth are all hindered by insufficient barriers. They receive a level of public service that is inequitable and falls short of the national norm [14,16]. There were no such impediments in easy-to-reach areas. The program was implemented by government health system with technically support from UNICEF Bangladesh and its NGO partners' local government bodies, social groups, and community institutions aiming to improve up-take of the maternal, neonatal and child health (MNCH) services [17]. The information was gathered via a baseline and end-of-project evaluation to determine the influence on the results.

2. Materials and Methods

2.1 Study Design, Settings, and Procedure

The current study has employed a quasi-experimental design that included a baseline and end line survey using the same variables. The study has been conducted in two geodemographic group of districts: i) plain land with easy to reach the services districts namely Tangail and Khulna and ii) hard to reach areas were Netrakona, Cox's Bazar, and Bandarban. The research was carried on in Netrakona, Bandarban, and Cox'sbazar districts from September 2017 to February 2018, and in Tangail and Khulna districts in October to December 2018.

Both baseline and endline survey used a two-stage sampling method considering household as the contact point for the respondents. In the first round of sampling, enumeration areas were randomly picked, a sampling frame of households was created. In the 2nd stage of sampling, respondents were randomly chosen from the sampling frame in both urban and rural area. The surveys offered information and estimates on several "key performance indicators" (KPIs) relating to the demographic and basic socioeconomic characteristics of the selected families, as well as important maternal, infant, and child health issues. Pre and post intervention assessment was done for the following measuring indicators.

2.2 Measuring Indicators

Antenatal Care (ANC)

- Proportion of mothers receiving antenatal care from medically trained provider.
- Proportion of women who completed 4 ANC visits or more during last pregnancy.

- Proportion of mothers consumed IFA supplementation.
- Delivery Care
- Proportion of deliveries conducted by skilled birth attendant
- Proportion of delivery conducted at facilities (by public/private facilities).
- Postnatal care (PNC)
- Proportion of mothers receiving postnatal care from a medically trained provider.
- Newborn care
- Proportion of newborns who received postnatal care by medically trained providers (within two days of delivery).
- Proportion of newborns received any care from trained providers.
- Proportion of newborns received all components of essential newborn care (ENC) services
- Percentage of women who received health care services for the newborn
- Care in Childhood sickness (aged 0-59 months)
- Proportion of children who received the Oral rehydration solution (ORS)/home-based fluids during last diarrheal episode.
- Proportion of children with diarrhea who received Oral rehydration therapy (ORT) and Zinc.
- Proportion of children with diarrhea, who received ORT, zinc and continued feeding.
- Proportion of children who received care in childhood pneumonia with medicine for 7 days and more.

2.3 Intervention

The project encouraged evidence-based MNCH interventions, quality improvement, functioning health management information systems, and evidence-based planning and implementation at the health system level. There were two arms of the intervention including the community-based intervention and facility-based intervention.

- a) "Mothers' Assembly" held in the community to raise awareness about MNCH&N: With support from local governments and influential people, women meet in the courtyard and learned about pregnancy, safe delivery, and danger signs, maternity and neonatal health services provided in a variety of health facilities
- b) Household visits by health workers to reach rural target people in the haor, hill, and coastal districts: Household visits by community health workers to provide antenatal counseling, delivery advice, and referral help for difficulties, including sick children, at home.
- c) Capacity building activities to improve skills and motivate managers and Health Care Providers (HCPs) in increasing patient flow in the facilities.
- d) Establishment and operation of the Special Cate Newborn Unit (SCANU) to reduce neonatal deaths: Changes in providing the neonatal care and Changes in the status of neonatal deaths.
- e) The use of a boat ambulance for referrals in the wetland (Haor) area etc.: Introduction of an engine boat for transporting difficult women children to distant facilities.

2.4 Data Collection

Household data were collected by trained data collectors through face-to-face interview using a structured questionnaire using the Redcap software in tablet and then upload-ed by data collectors after completion of each interview. A representative numbers of data collection process were observed and collected data were verified by data super-visors.

2.5 Analysis

Bivariate and multivariate analysis, chi-square with p values, DID (difference in difference) were calculated. Difference-in-differences (DID) method was done to compare the changes in end line over time between ETR and HTR groups to estimate interventions. This was done by subtracting the percentage of end line HTR data to base line HTR data then end line ETR data to base line ETR data then calculating DID percentage point by subtracting those HTR data to easy to reach data. $\{\%end\ line\ HTR - \%baseline\ HTR = a; \%end\ line\ ETR - \%baseline\ ETR = b; (a-b) = \text{percentage point of DID}\}$.

HTR=a;(%end line ETR -% baseline ETR=b;(a-b) =percentage point of DID}.

2.6 Ethics

The ethical clearance for the study was obtained from the Ethical Review committee.

3. Results

At the study's baseline and follow-up, a total of 5363 respondents were interviewed. In the HTR area, women were mostly 20-24 years old for both baseline (36.4%) and end line (40.8%), whereas in the ETR area, women were mostly 35-49 years old for both baseline (34.3%) and end line (35.2%). Mothers in HTR and ETR districts had similar secondary education characteristics at both the baseline and end line (secondary in-complete =28.7% vs 32.8 percent at baseline, p=0.03; 30.5 percent vs 34.9 percent at end line, p=0.09). (Table 1)

Characteristics	Baseline			Follow-up		
	Hard-to-reach n (%)	Easy-to-reach n (%)	p value	Hard-to-reach n (%)	Easy-to-reach n (%)	p value
Total	1290	2603		1200	862	
Age at interview						
15-19	132 (10.2)	263 (10.1)	0.900	155 (12.9)	88 (10.2)	0.076
20-24	470 (36.4)	458 (17.6)	0.000	490 (40.8)	154 (17.9)	0.000
25-29	393 (30.5)	536 (20.6)	0.000	315 (26.3)	152 (17.6)	0.000
30-34	206 (16.0)	453 (17.4)	0.306	163 (13.6)	165 (19.2)	0.001
35-49	89 (6.9)	893 (34.3)	0.000	77 (6.4)	303 (35.2)	0.000
Education						
No education	364 (28.2)	564 (21.7)	0.000	202 (16.8)	165 (19.1)	0.221
Primary incomplete	166 (12.9)	402 (15.5)	0.046	246 (20.5)	118 (13.7)	0.000
Primary complete	205 (15.9)	376 (14.5)	0.272	205 (17.1)	131 (15.2)	0.295
Secondary incomplete	370 (28.7)	854 (32.8)	0.030	366 (30.5)	300 (34.9)	0.090
Secondary complete or higher	184 (14.3)	407 (15.7)	0.301	181 (15.1)	148 (17.2)	0.243
Wealth quintile						
Lowest	258 (20.0)	471 (18.1)	0.195	240 (20.0)	169 (19.6)	0.845
Second	258 (20.0)	502 (19.3)	0.634	240 (20.0)	174 (20.2)	0.924
Middle	258 (20.0)	516 (19.8)	0.907	240 (20.0)	185 (21.5)	0.470
Fourth	257 (19.9)	566 (21.7)	0.244	248 (20.7)	160 (18.6)	0.289
Highest	259 (20.1)	548 (21.1)	0.529	232 (19.3)	174 (20.2)	0.665

Table 1: Background Characteristics of Sample, Stratified in time, and Study Areas

Effectiveness of the comprehensive community-based intervention in Bangladesh

Services	Baseline				End line				DID; Percentage point
	HTR n (%)	95% CI	ETR n(%)	95% CI	HTR n (%)	95% CI	95% CI	95% CI	
4 ANC visit completed	314 (24.3)	22.1- 26.8	970 (37.3)	35.4-39.1	446 (37.2)	33.5-39.9	487 (56.5)	53.2-59.8	-6.3
ANC conducted by Medically trained person	786 (60.9)	58.2-63.6	2052 (78.9)	77.2-80.4	943 (78.6)	76.2-80.8	762 (88.5)	86.1-90.8	8.1
IFA intake	626 (48.5)	45.8-51.3	1708 (65.6)	63.7-67.3	563 (46.9)	44.1-49.7	673 (78.1)	75.2-80.7	-14.1
Delivery conducted at facilities	316 (24.5)	22.2-26.9	1357 (52.2)	50.2-54.1	322 (26.9)	24.4-29.4	530 (61.5)	58.2-64.7	-6.9
Skilled attendant at delivery	498 (38.6)	36.0-41.3	1395 (53.6)	51.7-55.5	442 (36.8)	34.2-39.6	555 (64.4)	61.1-67.5	-12.6
Postnatal Care	378 (29.3)	26.9-31.8	1354 (52.0)	50.1-53.9	490 (40.8)	38.1-43.6	559 (64.9)	61.6-67.9	-1.4

Table 2: Uptake of Maternal health services

Services	Baseline				End line				DID; Percentage point
	HTR n (%)	95% CI	ETR n(%)	95% CI	HTR n (%)	95% CI	95% CI	95% CI	
Proportion of newborns who received postnatal visit within two days of delivery from MTP	388 (30.1)	27.6-32.6	1162 (44.7)	42.7-46.6	703 (58.6)	55.8-61.4	490 (56.9)	53.5-60.1	16.3
Proportion of newborns received any care from trained providers	414 (32.1)	29.6-34.7	755 (29.0)	27.3-30.8	647 (53.9)	51.1-56.7	327 (37.9)	34.8-41.2	12.9
Proportion of newborns received all components of ENC services	292 (22.6)	20.4-25.0	143 (5.5)	4.7- 6.4	395 (32.9)	30.3-35.6	63 (7.3)	5.8-9.2	8.5
Percentage of women who received health care services for the newborn	55 (29.7)	23.6-36.7	637 (57.5)	54.6-60.4	381 (58.9)	29.2-34.4	235 (61.6)	56.6-66.3	25.1

Table 3: Uptake of Neonatal health services

Services	Baseline				End line				DID; Percentage point
	HTR n (%)	95% CI	ETR n(%)	95% CI	HTR n (%)	95% CI	95% CI	95% CI	
Proportion of children who received ORS/ home-based fluids during last diarrheal episode	8 5 1 (66.0)	6 3 . 3 - 68.5	485 (42.5)	39.6-45.4	302 (79.8)	75.3-83.4	114 (42.6)	36.9-48.7	13.7
Proportion of children with diarrhea who received ORT and Zinc	3 5 4 (27.4)	25.1-29.9	447 (39.2)	36.4-42.0	282 (74.5)	69.8-78.5	120 (45.0)	39.1-50.9	41.3
Proportion of children with diarrhea, who received ORT, zinc and continued feeding	2 8 7 (22.3)	20.1- 24.6	104 (9.1)	7.6- 10.9	206 (54.3)	49.3-59.3	74 (27.6)	22.7-33.4	13.5
Care in childhood pneumonia with medicine for 7 days and more	8 9 4 (69.3)	66.7-71.7	66.7-71.7	39.3-45.0	310 (81.9)	77.6-85.4	135 (50.6)	135 (50.6)	4.1

Table 4: Uptake of Child (0-59 months) health services

Table 2 shows how maternal health care improved after a community-based intervention. For the baseline and end line, mothers' 4 ANC visits increased by 24.3% to 37.2% in the HTR area and 37.3% to 56.5% in the ETR area. ANC conducted by medically trained person was also enhanced by 60.9% to 78.6% in the HTR study region and 78.9% to 88.5% in the ETR study area with 8.1 percentage point difference. The iron and folic acid (IFA) consumption declined in the HTR but climbed by 65.6 percent to 78.1 percent in the ETR. The percentage of deliveries in health facilities grew in both study areas, from 24.5% to 26.9% in HTR and from 52.2% to 61.5% in ETR. In HTR and ETR, respectively, the percentage of deliveries by trained birth attendant increased from 38.6% to 36.8% and from 53.6% to 64.4% after community-based intervention. In both research areas, postnatal care increased dramatically from 29.3% to 40.8% in HTR and 52.0% to 64.9% in ETR after intervention.

In both hard to reach and easy to reach areas, Table 3 demonstrates the change between baseline and end line in terms of uptake of newborn health care following intervention in the HTR, the proportion of infant care by medical trained person climbed by 30.1% to 58.6%, while in the ETR, it increased by 44.7% to 56.9% with 16.3 percentage point difference. After intervention, the proportion of ENC consultations with health workers increased from 47.0% to 51.2% in the HTR area. In both areas, the proportion of newborns receiving essential newborn care by trained staff grew by 32.1% to 53.9% in HTR and 29.0% to 37.9% in ETR with 12.9 percent difference in difference. Even though most respondents did not obtain all components of ENC services, the proportion increased in both categories, from 22.6% to 32.9% in HTR and 5.5% to 7.3% in ETR, respectively with 8.5 percent difference in difference. With 25.1 percentage point difference, the percentage of women receiving health care services for the newborn also increased in both ETR and HTR area.

Table 4 shows the variations in child health service uptake before and after intervention. In the HTR, the percentage of people who received ORS/home-based fluids during their most recent diarrheal episode increased from 66.0% to 79.8%, whereas in the ETR, the percentage of people who received ORS/home-based fluids remained nearly the same along with 13.7 percentage point difference. Significant improvements in diarrhea are seen in those who receive ORT and Zinc, with rates rising from 27.4% to 74.5% and 39.2% to 45.0% for HTR and ETR areas respectively along with 41.3 percentage point difference. Even though 90.9 percent of children in ETR areas did not receive ORT, zinc and continued feeding for diarrhea before intervention, the proportion receiving these after interventions increased by 9.1% to 27.6% having 13.5 percentage point difference. In HTR and ETR, these mothers reported a significant increase in care for childhood pneumonia with medicine for 7 days or more, from 69.3% to 81.9% and 42.1% to 50.6%, respectively along with 4.1 percentage point difference.

4. Discussion

The current study is designed to offer the Bangladesh government and other stakeholders with critical evidence on the impact of

comprehensive community initiatives on improving uptake of MNCH services. Because of the project's capability, visible changes in MNCH service delivery occurred in the community and facilities, including upazila and district hospitals. The study found that the patient flow in the facilities was increased with the improvement of skills and capacity of the health managers and HCPs. The neonatal care was found improved in the SCANU facilities which resulted in a decrease in neonatal fatalities.

In the baseline survey, women in the two arms had similar socioeconomic and demo-graphic characteristics (age, educational status, wealth quintile) in the 20-24, 25-29, and 35-49-year age groups, with no educational category. Except for those age groups, the two arms of the follow-up study were not identical.

Even though this was a community-based randomized intervention research, it has significant flaws. Extraneous elements that could have a direct or indirect impact on the indicators of interest were difficult to manage [18]. All programs that provided women and their families with information and counseling, often in conjunction with other program measures, significantly increased the number of women who received ANC from a medically qualified person throughout pregnancy [19].

Other factors, such as the completion of four ANC visits, IFA intake, birth at a health facility, SBA at de-livery, and PNC for mothers, however, reduced the observed difference between the research arms including the baseline and endline findings. In the second part of neonatal survival addressing series claim that in areas where infant mortality is high, community and family initiatives can effectively reduce mortality, but that a complementary health facility-based care approach is also required [20].

Despite these reductions in up taking in maternal health services, we find that com-munity-based interventions influenced the Neonatal Health Service Uptake in those five areas. With credited community-based interventions, there was a significant in-crease (% of babies who received any treatment from trained providers and obtained all components of ENC services, percentage of women who received health care services for the baby) in the usage of newborn services [21].

Bangladesh has the highest rate of ORS use for diarrhea in the world. The participation of non-governmental organizations (NGOs) and the business sector, as well as public sector stewardship, was critical in popularizing ORS [22].

Our findings show that over the course of the intervention project, proportion of children who received ORS/home-based fluids during last diarrheal episode increased in HTR states but remain almost same in ETR [23].

In the hard-to-reach location, the proportion of children with diarrhea who received ORT and zinc increased dramatically, but the proportion of children with diarrhea who received ORT, zinc, and continuous feeding increased significantly in both arms. In addition, treatment of childhood pneumonia with drugs for seven

days or longer demonstrated a significant improvement.

5. Conclusions

The MNCH intervention influenced the health-care utilization, particularly for maternal and child health services. In the areas where interventions were applied, there was a significant improvement in babies who had a postnatal visit within two days of delivery, as well as children with diarrhea who received ORT and Zinc. Despite the reduced observed disparity in uptake of maternal health services between the research arms, we propose an emphasis on community engagement for both easily accessible and difficult-to-access locations.

References

1. Cyril, S., Smith, B. J., Possamai-Inesedy, A., & Renzaho, A. M. (2015). Exploring the role of community engagement in improving the health of disadvantaged populations: a systematic review. *Global health action*, 8(1), 29842.
2. Yanti, B. (2022). OPTIMALISASI PERAN KADER TUBERKULOSIS MELALUI “PROGRAM KETUK PINTU” DI PESISIR UJONG BATEE ACEH. *Martabe: Jurnal Pengabdian Kepada Masyarakat*, 5(4), 1463-1470.
3. Charania, N. A., & Tsuji, L. J. (2012). A community-based participatory approach and engagement process creates culturally appropriate and community informed pandemic plans after the 2009 H1N1 influenza pandemic: remote and isolated First Nations communities of sub-arctic Ontario, Canada. *BMC public health*, 12, 1-9.
4. Committee C.; TSA (CTSA) CCEKF. Principles of Community Engagement.
5. Mortuza-Ahmed, M. (2014). Impact of a participatory intervention with women’s groups on birth outcomes in Bangladesh. *InterSedes*, 15(30), 55-68.
6. Marston, C., Hinton, R., Kean, S., Baral, S., Ahuja, A., Costello, A., & Portela, A. (2016). Community participation for transformative action on women’s, children’s and adolescents’ health. *Bulletin of the World Health Organization*, 94(5), 376.
7. Rosato, M., Laverack, G., Grabman, L. H., Tripathy, P., Nair, N., Mwansambo, C., ... & Costello, A. (2008). Community participation: lessons for maternal, newborn, and child health. *The Lancet*, 372(9642), 962-971.
8. Rifkin, S. B. (2009). Lessons from community participation in health programmes: a review of the post Alma-Ata experience. *International Health*, 1(1), 31-36.
9. Manandhar, D. S., Osrin, D., Shrestha, B. P., Mesko, N., Morrison, J., Tumbahangphe, K. M., ... & Anthony, M. D. L. (2004). Effect of a participatory intervention with women’s groups on birth outcomes in Nepal: cluster-randomised controlled trial. *The Lancet*, 364(9438), 970-979.
10. Kucho, B., & Mekonnen, N. (2017). Delivery at home and associated factors among women in child bearing age, who gave birth in the preceding two years in Zala Woreda, southern Ethiopia. *Journal of Public Health and Epidemiology*, 9(6), 177-188.
11. U Nations. The millennium development goals 2015. Available online: https://scholar.google.com.tw/scholar?q=related:Sybfg5yVZKcJ:scholar.google.com/&scioq=&hl=en&as_sdt=0,5 (accessed on 22 September 2021)
12. Union, A. Draft Policy Brief for the International Conference on Maternal, Newborn and Child Health (MNCH) in Africa. Johannesburg, South Africa. Available online: [https://scholar.google.com.tw/scholar?q=related:SzWImi-WoZhoJ:scholar.google.com/&scioq=Draft+Policy+Brief+for+the+International+Conference+on+Maternal,+Newborn+and+Child+Health+\(MNCH\)+in+Africa.+Johannesburg,+South+Africa,+1+--+3+August,+2013+community+en](https://scholar.google.com.tw/scholar?q=related:SzWImi-WoZhoJ:scholar.google.com/&scioq=Draft+Policy+Brief+for+the+International+Conference+on+Maternal,+Newborn+and+Child+Health+(MNCH)+in+Africa.+Johannesburg,+South+Africa,+1+--+3+August,+2013+community+en) (accessed on 20 September 2021)
13. Calvillo, E.J.; Skog, A.P.; Tenner, A.G.; Wallis, L.A. Applying the lessons of maternal mortality reduction to global emergency health. *Bull World Health Organ* 2015,93,6, 417–23.
14. Ahmed, R.; Hassan, S. Hard-to-Reach Areas: Providing Water Supply and Sanitation Services to All 2012. Available online: <https://openknowledge.worldbank.org/handle/10986/17374> (accessed on 1 October 2021)
15. Karim, F., Ali, N. B., Khan, A. N. S., Hassan, A., Hasan, M. M., Hoque, D. M. E., ... & Chowdhury, M. A. K. (2020). Prevalence and factors associated with caesarean section in four Hard-to-Reach areas of Bangladesh: Findings from a cross-sectional survey. *Plos one*, 15(6), e0234249.
16. Lewnard, J. A., Mbah, M. L. N., Alfaro-Murillo, J. A., Altice, F. L., Bawo, L., Nyenswah, T. G., & Galvani, A. P. (2014). Dynamics and control of Ebola virus transmission in Montserrado, Liberia: a mathematical modelling analysis. *The Lancet Infectious Diseases*, 14(12), 1189-1195.
17. Brinkerhoff, D. W., & Brinkerhoff, J. M. (2004). Partnerships between international donors and non-governmental development organizations: Opportunities and constraints. *International Review of Administrative Sciences*, 70(2), 253-270.
18. Midhet, F., & Becker, S. (2010). Impact of community-based interventions on maternal and neonatal health indicators: Results from a community randomized trial in rural Balochistan, Pakistan. *Reproductive health*, 7(1), 1-10.
19. Goudet, S., Murira, Z., Torlesse, H., Hatchard, J., & Busch-Hallen, J. (2018). Effectiveness of programme approaches to improve the coverage of maternal nutrition interventions in South Asia. *Maternal & child nutrition*, 14, e12699.
20. Darmstadt, G. L., Bhutta, Z. A., Cousens, S., Adam, T., Walker, N., & De Bernis, L. (2005). Evidence-based, cost-effective interventions: how many newborn babies can we save?. *The Lancet*, 365(9463), 977-988.
21. Bhutta, Z. A., Darmstadt, G. L., Hasan, B. S., & Haws, R. A. (2005). Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. *Pediatrics*, 115(Supplement_2), 519-617.
22. Billah, S. M., Raihana, S., Ali, N. B., Iqbal, A., Rahman, M. M., Khan, A. N. S., ... & El Arifeen, S. (2019). Bangladesh: a success case in combating childhood diarrhoea. *Journal of*

global health, 9(2).
23. Lamberti, L. M., Taneja, S., Mazumder, S., LeFevre, A., Black, R. E., & Walker, C. L. F. (2015). An external evaluation

of the Diarrhea Alleviation through Zinc and ORS Treatment (DAZT) program in Gujarat and Uttar Pradesh, India. *Journal of global health*, 5(2).

Copyright: © 2023 Abu Sayeed Abdullah, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.