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## Implementing components of the primary health care pre-eclampsia/eclampsia model in Bangladesh: A cost analysis

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## BANGLADESH

## Implementing Components of the Primary Health Care Pre-eclampsia/Eclampsia Model in Bangladesh: A Cost Analysis

The maternal mortality ratio in Bangladesh, as estimated by the 2016 Bangladesh Maternal Mortality and Health Care Survey, is 172 per 100,000 live births [1]. Pre-eclampsia/Eclampsia (PE/E) is the second leading cause of maternal mortality in Bangladesh, accounting for 24% of maternal deaths [2].

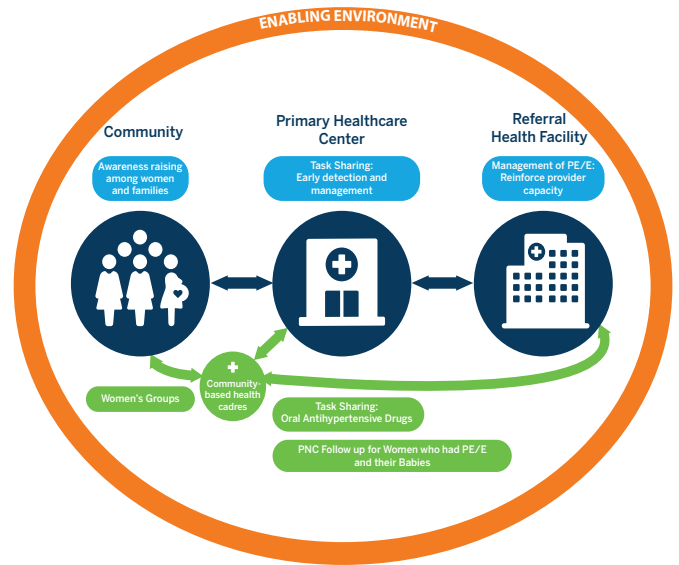
PE is identified by high blood pressure and protein in urine with-in pregnant women after 20 weeks' gestation. Women with PE are at increased risk for organ damage/failure, pre-term birth, loss of pregnancy, and stroke. PE can progress to eclampsia, which is characterized by seizures, and may be associated with kidney and liver damage, as well as maternal death. Infant risks include pre-term birth, low birth weight, stillbirth and death, among others [2]. Infants born pre-term due to PE are at higher risk of long term health issues. The risks of PE/E can be mitigated with regular screening during antenatal care (ANC) as well as the postnatal period. Once detected, regular monitoring of PE can lessen progression to severe PE/E, and severe PE/E can be managed through administration of magnesium sulfate ( $MgSO_4$ ) and antihypertensive drugs [2].

Between 2016 and 2018, the Population Council, in collaboration with the Directorate General of Family Planning and Obstetrical and Gynecological Society of Bangladesh, implemented an intervention to confront PE/E that was part of the Ending Eclampsia project, a five-year USAID investment that implemented aspects of the Primary Health Care (PHC) PE/E Model in Bangladesh, Nigeria, and Pakistan.

The intervention in Bangladesh comprised two components of the PHC for PE/E Model: 1) Task sharing to detect and manage PE/E ( $MgSO_4$  and referral) with PHC providers (Family Welfare Visitors [FWVs], Sub-Assistant Community Medical Officers [SACMOs] and Nurse-Midwives), and 2) Introducing antihypertensive drug provision at the PHC level.

*This brief describes the true cost for implementing the two Components in Bangladesh and includes a brief description of the activities within each Component. Full descriptions of the intervention can be found on the [Ending Eclampsia website](#).*

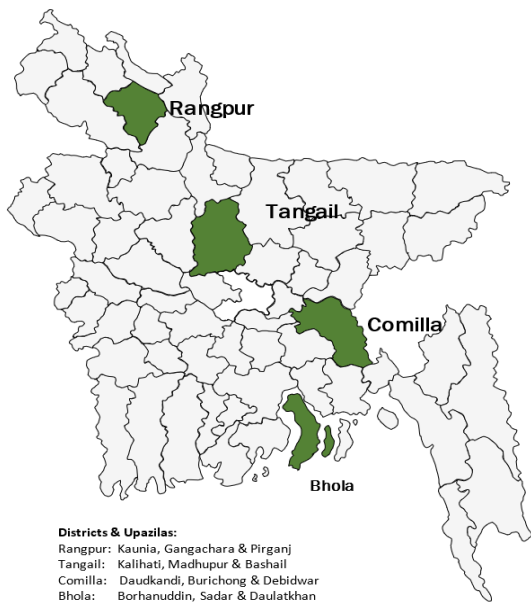
## PRIMARY HEALTHCARE PE/E MODEL



## Highlights

- **Component 1 Core task sharing with PHC providers:** 451 providers—52 physicians and 399 PHC providers from 136 facilities in 12 Upazilas were trained and received monthly monitoring support for two years, for a total of USD 241,876 (BDT 20,220,871). The cost per sub-district was USD 20,156 (BDT 1,685,073), and the average cost per provider trained was USD 536 (BDT 46,284). Actual cost per provider varied.
- **Component 2 Introducing antihypertensive drugs at PHCs:** 49 PHC providers were trained through monthly monitoring support for 15 months in 31 facilities in two sub-districts, for a total of USD 40,066 (BDT 3,349,531). Cost per sub-district was USD 20,033 (BDT 1,674,766) and cost per provider trained was USD 818 (BDT 68,358).
- **Estimates include costs of the project and opportunity costs to the Ministry of Health and Family Welfare and to participants. Approximately 10% of total costs were covered by the government and people of Bangladesh**

**FIGURE 1: Study sites in Bangladesh**



## COST ANALYSIS METHODOLOGY

The Ending Eclampsia Project in Bangladesh collected retrospective cost data between March and May of 2019. A cost ingredient approach first identified each element (input) required to implement activities for components 1 and 2 of the PHC PE/E Model and then grouped them into cost categories: a) personnel, b) supplies, c) infrastructure (here defined as office costs and any space used for trainings and monitoring visits), d) travel, and e) miscellaneous. For the purposes of the cost analysis, orientation sessions were considered a separate activity because they were conducted jointly for both Components 1 and 2. The economic cost of each activity was calculated regardless of whether the project directly paid for the goods or services. For example, to account for the opportunity cost to providers who participated in a training, their daily wage was calculated although

they were not compensated by the project. Estimates for training venues under infrastructure and opportunity costs were also calculated for rooms donated in-kind by MoHFW for some trainings and meeting spaces used for monitoring visits at health facilities. Direct activity costs and project management were also captured.

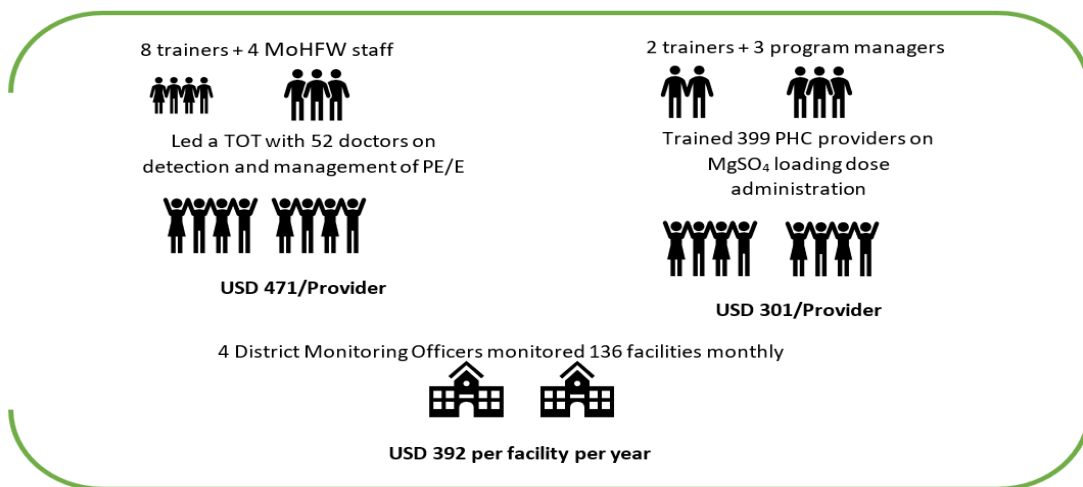
Cost data were collected from the Ending Eclampsia project’s expenditure reports. When cost information was unavailable (such as daily rates), average estimates were provided by MoHFW representatives. Cost data were generally collected in Bangladeshi Taka, in the year purchased, and then converted into 2019 USD using the December 31, 2018 closing exchange rate of 83.6 Bangladeshi Taka per 1 USD (XE Currency chart). Program management and office costs were collected in USD and converted to Bangladeshi Taka where necessary, using the same exchange rate. Costs per participant and per sub-district were calculated for each component. The following section describes the economic costs for components 1 and 2 and the orientation sessions.

## COMPONENT 1: CORE TASK SHARING WITH PHC PROVIDERS

Component 1 comprises task sharing for the prevention, detection and management of PE/E at the PHC level using MgSO<sub>4</sub>. There were three main activities: 1) training Doctors (Gynae consultants and Medical Officers) as trainers on the detection and management of PE/E, 2) training PHC providers (FWVs, SACMOs, and Nurse/Midwives) on administering a loading dose of MgSO<sub>4</sub> and referral, and 3) routine monitoring support to PHC providers.

**Table 1** lists the costs of replicating Component 1, task sharing with PHC providers. The total cost was USD 241,876 (BDT 20,220,871), with personnel as the largest cost category, followed by infrastructure and travel. Of the USD 146,694 in personnel costs, approximately USD

**FIGURE 2: Cost per participant for each activity under Component 1 Core task sharing to the PHC level**



19,197 (8%) were in-kind from MoHFW. Of the USD 54,049 in infrastructure costs, USD 490 (approximately 1%) were also in-kind from MoHFW. **Figure 2** shows the cost per participant. A total of 451 providers, 52 Medical Officers, and 399 PHC providers (FWVs, Nurse-midwives, and SACMOs) from 136 facilities in four districts and 12 Upazilas were trained. Participants were trained for two days. FWVs and nurse-midwives also participated in a one day refresher training. The trainings of trainers (ToTs) were led by the Obstetrical and Gynecological Society of Bangladesh and Ending Eclampsia staff. PHC provider trainings were led by the trained Medical Officers, Ob/Gyn consultants, Ending Eclampsia project staff, local program managers, and MoHFW staff.

**TABLE 1: Cost of core task sharing to PHC level**

Ingredients	Total Cost (BDT)	Total Cost (USD)
Personnel*	11,394,368	\$136,296
Supplies	827,556	\$9,899
Infrastructure*	4,546,400	\$54,383
Travel	1,794,920	\$21,470
Misc.	73,860	\$883
Total	18,637,104	\$222,932

\*Total includes overall program management estimates for the project

The average cost per Upazila for Component 1 was USD 20,156 (BDT 1,739,495) and average cost per provider was USD 536 (46,284 BDT). Cost per provider varied by activity. In activity 1, 52 doctors participated in a national-level ToT in the detection and management of PE/E for an average of USD 471 (BDT 39,365) per provider. For activity 2, doctors from activity 1 trained 399 PHC providers to detect PE/E and administer a loading dose of MgSO<sub>4</sub> for an average of USD 301 (BDT 25,163) per provider and USD 3,275 (BDT 273, 771) per Upazila. District Monitoring Officers (with the support of MoHFW representatives and Ending Eclampsia staff) conducted monthly monitoring

visits over approximately two years to 136 facilities. The cost per facility was USD 392 (BDT 32, 813) per year, for a total of USD 785 (BDT 65,623) for two years.

## COMPONENT 2: INTRODUCING ANTIHYPERTENSIVE DRUGS AT PHC

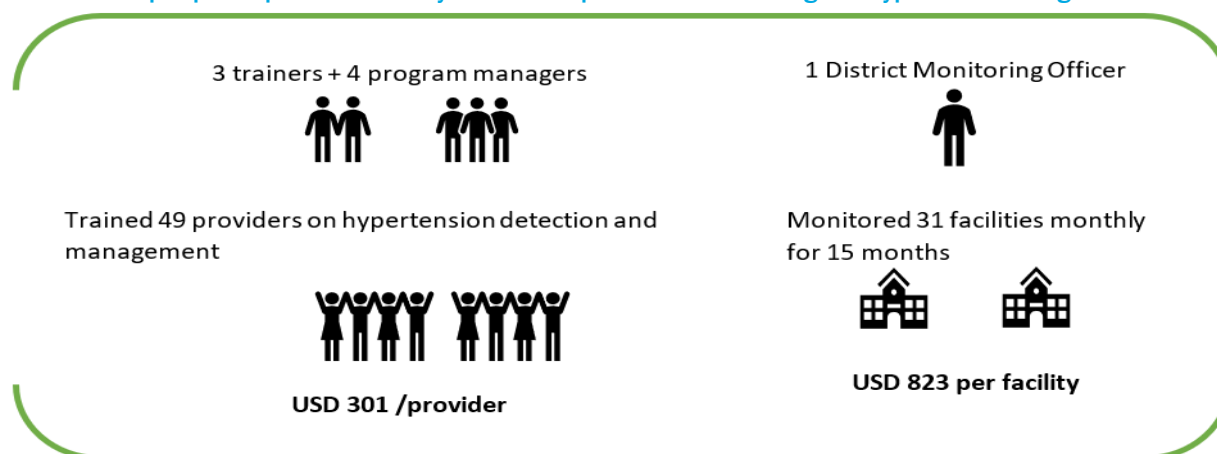
The Ending Eclampsia project introduced task sharing for provision of the antihypertensive drug oral alpha methyldopa at 31 PHC facilities in two Upazilas. Component 2 included: 1) training providers to identify and classify hypertension in pregnant women, administer antihypertensive drugs, and counsel their clients on signs of PE/E, and 2) routine monitoring and support to PHC providers. **Table 2** lists the total costs for implementing the antihypertensive component, USD 40,066 (BDT 3,349,531), with an average cost per provider of USD 817 (BDT 68,358). Of the USD 28,061 in personnel costs, USD 1,727 (6%) were donated or in-kind, and USD 123 of USD 13,529 (a little less than 1%) in infrastructure costs were in-kind from the MoHFW. **Figure 3** shows the cost per provider. A total of 49 providers from 31 facilities participated in a one-day training. Among the 49 providers, 31 were FWVs and nurse-midwives who also participated in a one-day refresher training. These trainings were conducted by three trainers and four local program managers. The cost per provider was USD 301 (BDT 25,988). The 31 facilities that participated in the antihypertensive component also received monitoring support.

**TABLE 2: Cost of introducing antihypertensive drugs at PHC**

Ingredients	Total Cost (BDT)	Total Cost (USD)
Personnel*	2,662,401	\$31,847
Supplies	31,968	\$382
Infrastructure*	1,131,041	\$13,529
Travel	399,380	\$4,777
Misc.	3,680	\$44

\*Total includes overall program management estimates for the project

**FIGURE 3: Cost per participant and facility under Component 2 introducing antihypertensive drugs at PHC**



Monitoring support for antihypertensive administration started nine months after Component 1 began and therefore lasted for 15 months only. Once Component 2 began, monitoring visits for both Components 1 and 2 were done jointly and the costs were shared between the two components. The total cost per facility to monitoring under this component was USD 823 (BDT 21,328) for the 15 months. Average cost per Upazila was USD 12,756 (BDT 1,066,423).

## CONCLUSION

The economic cost to implement the Ending Eclampsia project activities in 136 facilities in 12 Upazilas in Bangladesh was USD 312,814 (BDT 26,151,219), or USD 26,068 (BDT 2,179,268) per Upazila. In all components, personnel was the largest cost category, totaling USD 190,379 (BDT 15,915,716), accounting for approximately 61% of the total costs. Personnel was the largest cost component because this was a human resource-based intervention.

Lessons from implementation of the PE/E PHC Model in Bangladesh could lead to cost savings in future interventions. For example, two providers at each PHC facility were trained in PE/E management, but since typically only one provider is responsible for managing maternal health cases at the PHC level, it may only be necessary to train one provider per facility.

The project directly paid for approximately USD 161,185 (BDT 134,571) or 85% of the personnel costs captured, but it was important to capture the true costs of participants' contributions to the project. Health care providers were taken away from their health facilities and MoHFW staff were unable to partake in other health interventions. This analysis, therefore, captured their opportunity costs, which accounted for approximately 15% of personnel costs. The real opportunity costs to providers, however, vary greatly depending upon responsibility and years of experience. An estimated average was used for this analysis, but in reality this cost calculation varies for each provider. We also considered estimates for space contributed by MoHFW, because those rooms were unavailable for use by others during Ending Eclampsia activities.

Implementation of the PHC-PE/E Model was generally phased, starting with Component 1 and followed by Component 2. Only the orientation sessions for stakeholders and beneficiaries were jointly implemented. Additional costs could be saved by implementing these two component models concurrently and combining certain activities. For example, if trainings on use of antihypertensive drugs were incorporated into the core component initially, implementation costs would be shared and likely reduced.

To replicate this intervention, infrastructure and travel costs will vary, depending if an implementing organization or agency had already purchased large equipment and could share costs (e.g. vehicles and projectors) among other activities or would need to rent goods and services. Average rental costs were used for this analysis for a broader cost synopsis, although the cost to the project may have been lower.

Exploring ways to integrate the two components of the Ending Eclampsia Model within existing training systems should be explored to further reduce costs. This implementation cost analysis serves as a starting point for those considering implementation of different PHC PE/E Model components.

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