Effectiveness of community-based comprehensive intervention in maternal health service utilizations: A cross-sectional quasi experimental study in rural Ghana

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1. Introduction & Objectives

- To contribute to increasing the coverages of maternal health services, an intervention package was implemented targeting pregnant women, in the Eastern Region of Ghana, between March 2019 and April 2022 (interrupted between March 2020 and October 2021 due to COVID-19 pandemic).
- The package was composed of (i) conducting peer health education on maternal health; (ii) training existing health workers on maternal health; and (iii) strengthening local community health committees (Figure 1).
- The objective of the study is to estimate the effectiveness of the package in the utilizations of maternal health services.

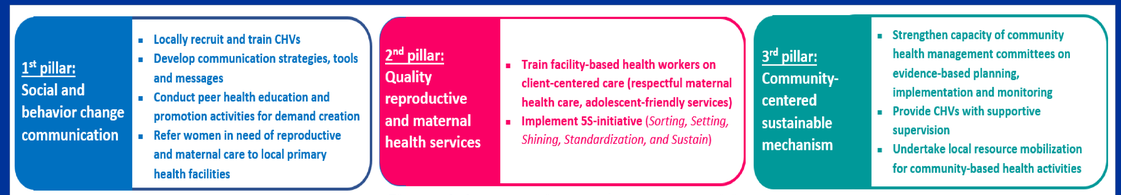
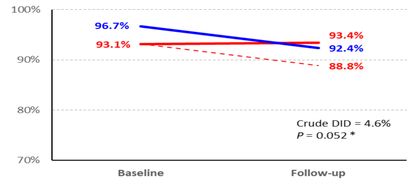


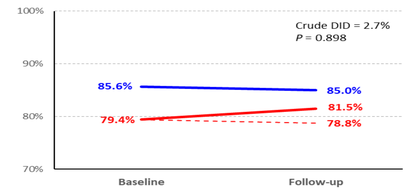
Figure 1 Intervention package composition

2. Methods

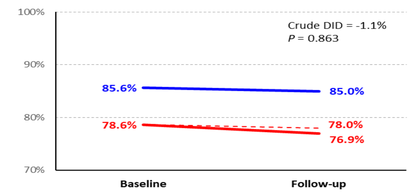
- **Study design:** Difference-in-Difference (DID) was employed to estimate the effectiveness of the package. A household survey was conducted by targeting 1,471 women who were pregnant in Suhum municipality (intervention group = 832 women) and Atiwa West district (control group = 639 women), Eastern Region, Ghana, 5th – 29th May 2022.
- **Outcome variables:** Three outcome variables were set, ie the proportions of women who: (i) made ≥4 antenatal care visits (ANC); (ii) had facility-based delivery (FBD); and (iii) made ≥1 post-partum care visit (PPC).
- **Data analysis:** Crude DID was calculated and tested by using Chi-square test. Then, adjusted DID estimates were calculated, by controlling confounders through logistic regression. Significance levels were set at the values of 0.10, 0.05, and 0.01. This is because ANC coverage (93.1%) had been already too high to have room for an increase at the significance level of 0.05.



(a) ANC (≥4 antenatal care visits)



(b) FBD (Facility-based delivery)



(c) PPC (Postpartum care visits)

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

Intervention group
Intervention group, if no intervention had been implmented
Control group

Figure 2 Crude DID for three outcome variables

Table 1 Adjusted DID estimates for ANC

Independent variable	Model 1 ANC: ≥4 Antenatal care visits		
	aOR	95% CI	P-value
Intercept	3.12	0.79 - 12.32	0.105
Group			
Control	(Ref.)		
Intervention	0.71	0.30 - 1.68	0.437
Time			
Baseline	(Ref.)		
Follow-up	0.48*	0.22 - 1.04	0.064
Adjusted DID estimates [a]	2.23*	0.86 - 5.77	0.099
Maternal age [year]			
< 20	(Ref.)		
20-29	1.48	0.70 - 3.10	0.302
30-39	2.06	0.93 - 4.55	0.073*
≥40	1.52	0.58 - 4.03	0.398
Education attainment			
None / pre-primary education and primary education	(Ref.)		
Secondary and higher education	1.22	0.76 - 1.96	0.420
Marital status			
Living together	(Ref.)		
Not living together	0.71	0.44 - 1.16	0.175
Enrolment in health insurance			
Not enrolled	(Ref.)		
Enrolled	3.77	1.75 - 8.14	<0.001***
Household size [person/household]	0.96	0.82 - 1.13	0.639
Household's wealth group			
Poor [b]	(Ref.)		
Middle [c]	2.40	1.21 - 4.77	0.012**
Rich [d]	1.90	1.08 - 3.31	0.025**

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$
[a] The interaction term of group and time pre-intervention (baseline) vs post-intervention (follow-up)
[b] Lower tertile of index (i.e. bottom 33%)
[c] Middle tertile of wealth index (i.e. middle 33%)

3. Results

- **Overall results:** Of the three outcome variables, the proportion of women having utilized at least four ANC services (ANC) produced significant DID in both crude (Figure 2a) and adjusted estimates (Table 1). The proportions of women having utilized facility-based delivery services (FBD) and post-partum care services (PPC) produced significant DID in neither crude nor adjusted estimates.
- **Sub-group analysis:** The results of sub-group analyses indicate that an increase in the proportion of women having utilized at least four antenatal care services (ANC) was significant among those from poor households (1st tertile). Moreover, 1.5 times greater DID among those from poor households (1st tertile) than among those from the middle and rich households (2nd and 3rd tertile)

4. Conclusion

- **Effectiveness of the package:** Three components of the intervention package are likely to have synchronously contributed to an increase in antenatal care coverage.
- **Resilience against COVID-19:** Despite increasing hesitancy to go out during COVID-19 pandemic, the proportion of those having made ≥4 antenatal care visits slightly but significantly increased in the intervention group.
- **Limitations of study:** First, quality of baseline data could be less accurate because they were collected at the time of follow-up data collection. Second, maternal health services were made available in an intermittent manner during COVID-19 pandemic. This extraordinary situation might have created the cases where pregnant women returned home without receiving maternal care services.