



(RESEARCH ARTICLE)



COMMUNITY ENGAGEMENT ACROSS THE MATERNAL CARE PATHWAY IN RURAL GHANA: A CONVERGENT MIXED-METHODS STUDY OF PREGNANCY SCHOOLS, EMERGENCY TRANSPORT AND SERVICE RESPONSIVENESS

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ABSTRACT

Community education, emergency transport and social accountability are usually evaluated separately, although women meet them along one pathway to maternity care. This study examined how these three forms of community engagement operate together in two rural Ghanaian municipalities. A convergent parallel mixed-methods study was conducted in Nkwanta South (Oti Region) and Gushegu (Northern Region) in 2025. A cross-sectional survey enrolled 420 women (210 per municipality) sampled from antenatal registers of selected Community-based Health Planning and Services zones. Six focus group discussions, 20 key informant interviews and facility checklists provided qualitative and contextual data. Findings were integrated using the Three Delays Framework. Overall, 246 women (58.6%) had attended at least three pregnancy-school sessions, 316 (75.2%) reported a household contribution to a community transport fund, 302 (71.9%) reported that emergency transport was available on demand and 296 (70.5%) rated staff responsiveness as good or very good. Mean recalled decision-to-arrival time was 1.8 hours (SD 0.8): 1.6 hours in Nkwanta South and 2.0 hours in Gushegu. All reported indicators were more favourable in Nkwanta South. Participants linked Model Mother mentorship to recognising risk, regular fuel contributions and trip records to transport availability, and advocacy meetings with complaint follow-up to more responsive care. The findings describe a plausible, connected pathway from informed decisions to transport and responsive services, but the cross-sectional, register-based design does not support causal or health-outcome claims. District health teams should plan these mechanisms as one package, backed by public funding, equitable transport access and documented responses to community concerns.

Keywords: Community engagement; Maternal health services; Pregnancy schools; Emergency referral transport; Social accountability; Ghana

1 INTRODUCTION

Sub-Saharan Africa accounted for about 70% of the estimated 260,000 maternal deaths that occurred worldwide in 2023 [1]. Many of these deaths follow complications that can be treated if a woman decides to seek care in time, reaches a facility that can manage her condition and receives adequate care once she arrives. Thaddeus and Maine described these steps as three delays [2]. The framework matters for community health programmes because no single intervention covers all three. Education may shorten the decision to seek care. It cannot move a woman to hospital at night, and it cannot make sure that the receiving facility is staffed and supplied.

The World Health Organization (WHO) describes community engagement as a process of building relationships through which stakeholders work together on health priorities, rather than the passive receipt of information [3]. An ecological perspective adds that individual choices are shaped by interpersonal relationships, local organisations and institutional conditions [4]. In Ghana, much of this engagement takes place through the Community-based Health Planning and Services (CHPS) strategy, which places community health officers and volunteers in defined zones and relies on community structures for planning and oversight [5]. CHPS therefore offers a setting in which education, transport and accountability arrangements operate side by side and in which the links between them can be studied.

Group education during pregnancy mainly targets the first delay. In two rural districts of the Upper West Region of Ghana, health education and participatory sessions led by community-based facilitators were associated with greater use of antenatal, delivery and postnatal care and with better knowledge of obstetric danger signs [6]. WHO also recommends facilitated participatory learning and action cycles with women's groups for maternal and newborn health [7]. Community-managed pregnancy schools share some features with these approaches. Their curricula, facilitation, decision-making role and coverage may differ, however, so evidence from one should not be transferred directly to the other. Information must also be turned into action. A qualitative evidence synthesis found that facility delivery depends on perceived need, interpersonal treatment, cost and physical access as well as on knowledge [8]. Attendance at sessions is therefore an incomplete measure of meaningful engagement.

The second delay is shaped by roads, distance and money as much as by the presence of a vehicle. In rural Ghana, poor roads, poverty and limited transport options combine to restrict access to maternal and child health care [9]. Community transport schemes can organise vehicles, drivers and funds. They cannot repair roads or guarantee what the receiving facility is able to do. Evaluations therefore need to distinguish vehicle availability, affordability, dispatch time, journey time and completed referral.

The third delay depends on what happens after arrival. Social accountability approaches try to influence it by creating regular forums in which service users and providers identify problems and agree on responses. In Malawi, a cluster-randomised evaluation of CARE's Community Score Card reported improvements in selected reproductive health outcomes and in service satisfaction [10]. In six districts of Ghana's Northern Region, including Gushegu, nearly all CHPS zones were functional, yet only about a third had uploaded community scorecard assessment results to digital platforms and fewer than half reported service improvements based on scorecard recommendations [11]. Local dialogue and routine reporting are linked but separate functions, and the presence of one says little about the quality of the other.

Measurement adds a further difficulty. WHO quality standards treat both the provision and the experience of care as dimensions of quality [12]. Current WHO guidance recommends at least eight antenatal contacts, so four visits is a historical utilisation threshold rather than a marker of adequate care [13]. Studies have usually examined one engagement mechanism at a time. Few describe how education, transport and accountability work together within the same rural health system, which is the level at which district health teams plan and manage services. This study addressed that gap in Nkwanta South and Gushegu Municipalities. Its objectives were to (i) describe pregnancy-school participation and care-seeking; (ii) document the availability and financing of community emergency transport; (iii) examine community advocacy and perceived service responsiveness; and (iv) integrate these findings into an account of how community engagement operates across the three delays. The analysis concerns service processes. It was not designed to estimate effects on mortality or to test statistical interaction between the three mechanisms.

2 MATERIALS AND METHODS

2.1 Study design

We used a convergent parallel mixed-methods design [14]. Quantitative and qualitative data were collected during the same field period, from 10 February to 26 June 2025, analysed separately and then brought together by objective. The

quantitative strand was a cross-sectional survey of women. The qualitative strand comprised focus group discussions (FGDs), key informant interviews (KIIs) and facility observation with a checklist. The survey is reported with reference to the STROBE statement for cross-sectional studies [15].

2.2 Study setting

The study took place in Nkwanta South Municipality in the Oti Region and Gushegu Municipality in the Northern Region. Both are rural settings that deliver primary health care through CHPS zones. The two municipalities were purposively selected as parallel descriptive contexts rather than as comparison arms. Both implement the three community engagement mechanisms of interest under the same national CHPS policy framework, yet they differ in geography, language, settlement pattern and health system history. Including both made it possible to examine how community engagement operates under shared primary care constraints in two distinct rural settings and to judge whether findings are consistent across them. The study was not designed to estimate a programme effect by comparing the two municipalities.

2.3 Community engagement arrangements

Three arrangements were examined. Community-managed pregnancy schools brought pregnant women together for repeated discussion of pregnancy, risk and preparation for birth, and Model Mothers, who mentor younger women, encouraged attendance. Community emergency transport was organised locally, financed partly by household contributions for fuel and overseen by Emergency Transport Committees that kept trip records. Community advocacy and scorecard processes brought community representatives together with health administrators to raise service problems, follow up on supplies and track complaints.

2.4 Participants and sampling

Eligible women were aged 15–49 years, were pregnant or had given birth in the preceding 24 months, had lived in the area for at least six months and were listed in antenatal registers serving the selected CHPS zones. Women who had never registered for antenatal care were therefore outside the sampling frame. Health sub-districts formed geographic strata. Within them, CHPS zones were selected with probability proportional to size. Population sizes from the 2021 Population and Housing Census were used for this step: 135,936 for Nkwanta South Municipality and 153,965 for Gushegu Municipality. Eligible women were cross-classified by age and parity and randomly selected within these strata, and a 10% reserve list allowed replacement within strata.

A sample of 381 women was calculated for a single proportion, assuming a proportion (p) of 0.55, a margin of error (d) of 0.05 and a 95% confidence level ($Z = 1.96$). A design effect of 1.10 raised this to 420 women, allocated equally between the two municipalities (210 each). All 420 women approached were interviewed, none were replaced from the reserve list, and the response rate was 100%.

Six FGDs were held, three in each municipality, with pregnant women, recently delivered mothers and Model Mothers. Each group was planned to include six to ten participants; 54 participants took part across the six groups. Twenty KIIs were conducted with Model Mothers, community health volunteers, transport actors, advocacy representatives and health leaders. Interviews were planned equally across the municipalities; 11 were completed in Nkwanta South and nine in Gushegu. Qualitative participants were selected purposively for their roles in, or experience of, the three arrangements.

2.5 Data collection

The survey questionnaire was administered by interview and covered socio-demographic characteristics, obstetric history, pregnancy-school attendance, transport arrangements, experience of care and delivery outcomes. Maternal records were checked where available. FGD and KII guides explored how the arrangements worked, the constraints they faced and participants' experiences. Instruments were translated into Dagbani and Likpakpaa, and oral language support was provided where other languages were needed. Separate consent was sought for audio recording. A facility checklist assessed selected items on staffing, commodities, equipment, infection prevention, referral and accountability.

2.6 Variables

The engagement indicators were attendance at three or more pregnancy-school sessions, a household contribution to a community transport fund and a report that emergency transport was available on demand. Care-seeking and care-experience indicators were antenatal care (ANC) initiation in the first trimester, at least four ANC visits, place of delivery, delivery with a skilled attendant, recalled decision-to-arrival interval, perceived referral coordination and perceived staff responsiveness. The four-visit indicator was kept because it was the study's operational definition; it is not used here as a measure of adequate care [13]. Arrival within two hours of the decision to seek care was treated as

timely. This cut-off was a study indicator, not a clinical safety threshold. Facility readiness was summarised as a percentage score from the checklist.

2.7 Data analysis

Survey data were analysed in SPSS version 28. Categorical variables were summarised as frequencies and percentages and continuous variables as means and standard deviations (SD), overall and by municipality. Percentages are unweighted. Unless stated otherwise, the denominator is all enrolled women in the municipality (n = 210) or overall (N = 420); outcomes that apply only to women who had given birth use that subgroup as the denominator. Municipal figures are reported descriptively without significance tests, because the sample size was calculated to estimate a single proportion rather than to compare municipalities.

Qualitative data were analysed thematically in NVivo version 14. Coding combined deductive codes drawn from the Three Delays Framework with inductive codes that arose from the data. For integration, findings from the two strands were placed side by side for each delay in a joint display and classed as confirming, expanding or diverging [14].

2.8 Reflexivity

The lead author has worked in community health programmes. This experience helped with access and with understanding the local context, but it could also have influenced participants' responses and the interpretation of data. Reflexive notes, discussion with supervisors and deliberate attention to disconfirming accounts were used to limit this influence.

3 RESULTS AND DISCUSSION

3.1 Participant characteristics

The survey sample comprised 420 women, 210 in each municipality. Most were married (344; 81.9%), and 219 (52.1%) had completed at least primary school. Household income below the minimum wage was reported by 302 women (71.9%). Farming (198; 47.1%) and petty trading (118; 28.1%) were the most common occupations. The sample therefore faced substantial economic and educational constraints. In Nkwanta South and Gushegu, respectively, 174 (82.9%) and 170 (81.0%) women were married; 122 (58.1%) and 97 (46.2%) had completed at least primary school; and 147 (70.0%) and 155 (73.8%) reported household income below the minimum wage. Farming accounted for 95 (45.2%) and 103 (49.0%) respondents, while petty trading accounted for 63 (30.0%) and 55 (26.2%). Both samples therefore experienced economic constraints, although educational attainment was higher in Nkwanta South.

3.2 Pregnancy schools and the decision to seek care

Table 1: Engagement and care-experience indicators by municipality

Indicator	Nkwanta South (n = 210)	Gushegu (n = 210)	Total (N = 420)
Respondent level, n (%)			
Attended at least three pregnancy-school sessions	135 (64.3)	111 (52.9)	246 (58.6)
Household contributed to a community transport fund	170 (81.0)	146 (69.5)	316 (75.2)
Emergency transport available on demand	165 (78.6)	137 (65.2)	302 (71.9)
Effective referral coordination reported	154 (73.3)	128 (61.0)	282 (67.1)
Staff responsiveness rated good or very good	161 (76.7)	135 (64.3)	296 (70.5)
Decision-to-arrival time, hours, mean (SD) ^a	1.6 (0.7)	2.0 (0.9)	1.8 (0.8)
Facility level			
Facility readiness score, mean % ^b	81.2	74.6	77.9

Note. Percentages are unweighted, with all enrolled women in each municipality as the denominator. SD, standard deviation. ^a Among women with a care-seeking episode. ^b Mean checklist score of the facilities assessed; the total is the mean of the two municipal scores. Facility scores are not respondent-level measures.

Overall, 246 women (58.6%) had attended at least three pregnancy-school sessions: 135 (64.3%) in Nkwanta South and 111 (52.9%) in Gushegu (Table 1). ANC began in the first trimester for 284 women (67.6%). Because the sample

included women who were still pregnant, the following indicators apply only to completed index pregnancies: 335 women reported at least four ANC visits, 260 reported facility delivery and 278 reported delivery with a skilled attendant.

In FGDs and interviews, women and Model Mothers described pregnancy schools as places where risk was explained and where advice became credible because it came from women with shared experience. One Model Mother in Nkwanta South described her role simply:

"As a Model Mother, I encourage younger women to attend early."

(Model Mother, Nkwanta South)

These accounts point to a mentorship route to earlier, better-informed care-seeking, and they fit Ghanaian evidence that community-facilitated education is associated with greater use of maternal services [6]. Two points limit this reading. First, the timing of session attendance relative to the first ANC visit was not available. Women may have joined a pregnancy school after their first clinic contact, and attendance late in pregnancy could support birth preparation but could not have caused an earlier visit. Second, sampling from antenatal registers favoured women already connected to services, and women who attend more sessions may also have more household support or more confidence in providers [8]. The study cannot separate the contribution of education from selection or earlier contact with services.

3.3 Community transport and reaching care

Household contributions to a community transport fund were reported by 316 women (75.2%), and 302 (71.9%) reported that emergency transport was available on demand. Both indicators were higher in Nkwanta South (81.0% and 78.6%) than in Gushegu (69.5% and 65.2%). Effective referral coordination was reported by 282 women (67.1%) (Table 1). Mean recalled decision-to-arrival time was 1.6 hours (SD 0.7) in Nkwanta South and 2.0 hours (SD 0.9) in Gushegu, with a combined mean of 1.8 hours (SD 0.8). In total, 289 women reported arriving within two hours of deciding to seek care.

Transport accounts stressed regular financing and oversight. A community health volunteer in Nkwanta South explained:

"We contribute fuel money, so the car is always available."

(Community health volunteer, Nkwanta South)

An Emergency Transport Committee member in Gushegu described trip records as a way of making sure that vehicles were used for emergencies. Other accounts mentioned occasional late arrival of vehicles, which qualifies the survey reports of reliable availability.

The two strands agree that household funds and record keeping held the transport arrangements together, which supports evaluating management and financing alongside the vehicle itself [9]. A contributory scheme can exclude the poorest households, however, if access depends on ability to pay, and seven in ten respondents reported household income below the minimum wage. The data do not show whether an exemption mechanism existed. Municipal authorities and health teams could consider matched public funding, maintenance reserves and dispatch protocols that guarantee transport regardless of immediate payment. Monitoring should also time each stage separately: calling for help, dispatch, travel, transfer between facilities and the start of treatment. A single recalled interval cannot show which stage causes the remaining delay.

3.4 Advocacy, responsiveness and the receiving facility

Staff responsiveness was rated good or very good by 296 women (70.5%): 161 (76.7%) in Nkwanta South and 135 (64.3%) in Gushegu (Table 1). At facility level, mean readiness scores were 81.2% in Nkwanta South and 74.6% in Gushegu, with a combined mean of 77.9%. These scores are facility-level summaries. They describe the context in which women received care and are not respondent-level outcomes or evidence of complete emergency obstetric capability.

Advocacy participants described meetings with health administrators, follow-up on supplies and tracking of complaints. Women linked community monitoring with more responsive treatment at facilities.

These accounts suggest that participation reached beyond health messaging into negotiation over how services were delivered, the user-provider relationship that social accountability approaches aim to build [10]. Independent stock histories and response-time audits were not available, so the changes that participants described could not be verified.

The data also do not show that advocacy produced the higher readiness score in Nkwanta South, since procurement, staffing, geography and management capacity can shape both advocacy activity and service quality. In Northern Region CHPS zones, including Gushegu, scorecard results were often not uploaded to digital platforms and recommendations were not always acted on [11]. That study provides context rather than an estimate for the present samples. It does suggest that scorecard discussions should end in named actions, deadlines and feedback to communities, with a route into routine reporting. Public authorities remain responsible for staffing, commodities and clinical capability, and community effort cannot substitute for them.

3.5 Community engagement as a connected care pathway

Table 2 brings the two strands together for each delay. Pregnancy schools and Model Mothers acted mainly on the decision to seek care, transport funds and committees on reaching care, and advocacy on the care women received after arrival. Participants described the arrangements as dependent on one another: an informed decision is of little use without a vehicle, and a vehicle is of little use if the facility is unprepared. This interdependence comes from participants' explanations. It should not be read as a demonstrated statistical interaction, which would require an engagement index with reported coding, distribution and model output.

Table 2: Joint display of quantitative and qualitative findings by delay

Delay	Survey finding	Qualitative finding	Integrated interpretation
Deciding to seek care	246 (58.6%) attended at least three pregnancy-school sessions; ANC began in the first trimester for 284 (67.6%)	Model Mother mentorship and repeated discussion of risk made advice credible	Expansion. Suggests a mentorship route to informed decisions; the order of session attendance and first ANC visit is unknown
Reaching care	316 (75.2%) contributed to transport funds; 302 (71.9%) reported transport on demand; mean decision-to-arrival time 1.8 hours	Regular fuel contributions, committee oversight and trip records; occasional late vehicles	Confirmation, with partial divergence on reliability. Equity of a contributory scheme is unknown
Receiving care	296 (70.5%) rated staff responsiveness good or very good; facility readiness 81.2% (Nkwanta South) and 74.6% (Gushegu)	Advocacy meetings, follow-up on supplies and complaint tracking	Expansion. Describes a perceived accountability route; reported changes were not independently audited

Note. ANC, antenatal care. Integration categories follow Fetters et al. [14].

Some participants also suggested that experiences at facilities shape later willingness to seek care. This feedback loop is a hypothesis drawn from the narratives rather than a measured longitudinal pathway. It does help to explain why raising attendance alone may not be enough when care is seen as unresponsive. All reported indicators were more favourable in Nkwanta South. That pattern cannot be attributed to programme maturity or intensity, which were not measured, and it cannot be separated from differences in geography, staffing and population.

3.6 Implications for policy and practice

For district health systems in rural Ghana, the findings point to three practical changes. First, pregnancy-school registers should record the date of each session against gestational age and the date of the first ANC visit, so that programmes can see whether education reaches women early enough to affect first contact. Second, community transport should be managed and monitored as a service, with protected access for households that cannot pay at the moment of an emergency and with each stage of the journey timed. Third, scorecard and advocacy meetings should produce named actions with deadlines, documented feedback to communities and entry into routine reporting, so that municipal and regional managers can respond [11]. District health teams can plan the three arrangements as a coordinated package, but the package still depends on public investment in staffing, commodities and referral readiness. Future evaluations should recruit from community pregnancy listings rather than clinic registers, include women who never registered for ANC, measure eight-contact care and the content of care [13] and use designs with a baseline or comparison group.

3.7 Strengths and limitations

The study examined three engagement arrangements in the same two settings and drew on the accounts of women and of several groups of local actors. Concurrent data collection and a joint display kept both strands tied to the same questions.

The limitations are important. The cross-sectional design, without a baseline or comparison group, does not support causal inference. Recruitment from antenatal registers excluded women who never registered, and qualitative participants were reached through programme-linked actors, so women who disengaged from care or experienced failures of the system may be under-represented. Attendance, transport times and ratings of care were self-reported and open to recall and favourable reporting. Percentages are unweighted and do not account for clustering within CHPS zones, so they describe the sample rather than the municipal populations. Facility readiness was measured at facility level and should not be read as if it were measured on the same women as the survey indicators. Newborn survival was not analysed because live-birth eligibility, the neonatal observation period and pregnancy-level linkage could not be confirmed. Finally, two purposively selected municipalities limit transferability to other rural settings.

4 CONCLUSION

In two rural Ghanaian municipalities, pregnancy-school mentorship, community-managed transport and community advocacy addressed different delays on the same pathway to maternity care. Most women reported household contributions to transport, transport available on demand and responsive staff, and participants described how each arrangement relied on the others. The study's contribution is a description of these linked processes. It does not show causal effects or reductions in mortality. District health teams should plan and monitor the three arrangements together, with public funding, equitable transport access and documented responses to community concerns. Prospective studies with verified denominators and comparison groups are needed before claims about health outcomes can be made.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

Haliq Adam is employed by Catholic Relief Services, which did not fund the study and had no role in its design, conduct, analysis or reporting. The other authors declare no conflicts of interest.

Statement of ethical approval

Ethical approval was obtained from the University of Port Harcourt Research Ethics Committee (UPH/R&D/REC/EXEC/250) and the Ghana Health Service Ethics Review Committee (GHS-ERC: 017/12/19-23). Written permission was obtained from the regional and municipal health directors. The study was conducted in accordance with the Declaration of Helsinki.

Statement of informed consent

Participants aged 18 years and older gave written informed consent, or a thumbprint in the presence of a witness if they could not write. Participants aged 15–17 years gave assent, with written consent from a parent or guardian, as specified in the approved protocol. Separate consent was obtained for audio recording. No identifying information is reported.

Authors' contributions

Haliq Adam designed the study, led the fieldwork and analysis and wrote the first draft. Daprim Ogaji and Mohammed Ali supervised the study and interpreted the results. Abdul-Fatahi Adam reran the analyses and checked the tables. Tiimob Gideon Likida reviewed the measures and the reporting checklist. Mohammed Ali Ibrahim checked the references and figures. All authors read and approved the final manuscript.

Data availability

The de-identified survey data and qualitative codebook are available from the corresponding author on reasonable request, subject to approval by the ethics committees.

Disclosure of thesis origin and related manuscripts

This article reports data from the doctoral research of Haliq Adam in Health Systems Management at the University of Port Harcourt, titled "Community Engagement in Maternal–Child Health: Evaluating Care-Seeking, Emergency Transport, and Service Quality in Rural Ghana". A companion manuscript from the same parent study, on community financing and accountability in emergency maternal referral transport and responsive care in the same municipalities, addresses a different research question and has not yet been submitted for publication.

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