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Potential health facility barriers to maternal and newborn health service delivery in Nadowli-Kaleo and Daffiama-Bussie-Issa districts, Ghana

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3 **Potential health facility barriers to maternal and newborn health service delivery in**
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5 **Nadowli-Kaleo and Daffiama-Bussie-Issa districts, Ghana**
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Abstract

Objectives: When considering explanations for poor maternal and newborn health outcomes many investigations focus on decision-making patterns and actions of expectant mothers and families, as opposed to exploring the “supply side” (health service provider) barriers. As part of a larger study on birth preparedness and complication readiness (BPCR) in Upper West Region of Ghana, this paper examines the health system factors influencing the provision of adequate and quality health care during obstetric complications, labour and the postnatal period.

Design: A combination of quantitative and qualitative data were gathered from surveys of pregnant women, individual in-depth interviews of healthcare professionals and focus group sessions with community members in 8 project sites in two districts of Upper West Region, Ghana. The survey was guided by the WHO standard procedures and Ghana’s Health Ministry operational work plan for maternal and newborn care. Participants were selected using simple random, purposive and key informant sampling procedures respectively.

Setting: Nadowli-Kaleo and Daffiama-Bussie-Issa districts in Upper West Region, Ghana

Participants: Two hundred and fifty-three purposive sample comprising pregnant women (n=80), Healthcare professionals (Pharmacist, Medical doctor, two district directors of health services, Midwives, Community health and Enrolled Nurses) (n=13), and community members comprising opinion leaders, youth leaders and adult non-pregnant women (n=240).

Results: The results show that there exist significant barriers affecting the quality and appropriateness of maternal and neonatal health services in the rural communities and the Nadowli district hospital. The obstacles range from inadequate medical equipment and essential medicines, infrastructural challenges, skilled staff shortages to high informal costs,

1 particularly of medicines. There was no referral management intervention to or out of the
2
3 hospital. Seven of the eight sub-district health facilities received complicated obstetric cases
4
5 but had inadequate or no staff and the requisite equipment to manage these cases.
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10 **Conclusion:** Implementation of BPCR strategy is in its infancy at the health facility level in
11
12 the study areas. Increasing resources at the health provider level are essential to achieving
13
14 international targets on maternal and neonatal health outcomes and bridging inequities in
15
16 access to essential maternal and newborn health care.
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19 **Keywords:** Healthcare facility, birth preparedness and complications readiness, supply-side
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21 barriers, maternal and neonatal health care, Upper West Region of Ghana
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25 **Strengths and limitations of the study**

- 26
27 • The study provides the first comprehensive assessment of maternal and neonatal
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29 health delivery on from the perspectives of community residents and healthcare
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31 providers in the two districts.
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- 34 • The findings focus exclusively on participants' views from sub-district health
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36 facilities, the district hospital, health service management and community members
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38 across eight study sites.
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- 41 • The study did not assess health facilities capacities to provide quality health services,
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43 instead, a component of the more extensive multisite study into community
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45 perspectives on birth preparedness and complication readiness interventions in the
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47 rural settings.
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- 50 • The results represent the views of health facility managerial and another frontline
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52 healthcare professionals which may not reflect the views of all staff in the two
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54 districts.
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- Much of this component of the study is qualitative which has both strengths and limitations in terms of processing and interpretation.

INTRODUCTION

Although substantial progress has been made at the global level concerning the Millennium Development Goals (MDGs) four and five (improve maternal and newborn health services), in resource-poor settings such as sub-Saharan Africa, poor outcomes persist.¹ Globally, about 15 percent of obstetric complications occur during pregnancy, labour and childbirth and the early postnatal period,^{2 3} with approximately 800 girls and women dying daily as a result of pregnancy and childbirth-related complications in 2015.^{4 5} Most of these poor maternal health outcomes occur in sub-Saharan Africa.^{1 4}

In 2015 the Sustainable Development Goals or Global goals negotiated new targets of reducing maternal deaths ratio to less than 70 per 100,000 live births as well as ending preventable deaths of newborns by 2030.⁵ There are two maternal health care (MHC) strategies proposed in the renewed commitments to stakeholders, with the high potential for preventing avoidable obstetric deaths: skilled attendance at birth and emergency obstetric health care.^{6 7} These measures are promoted through effective antenatal education and efficient management of referrals, coupled with adequate skilled healthcare professional attendance to both normal childbirths and those with obstetric complications.^{8 9} In many countries, these interventions form part of the birth preparedness and complication readiness (BPCR) strategy; a component of the antenatal care (ANC) program.^{4 10 11} Ghana has made some progress in this direction.^{5 12 13}

Although factors such as social, economic and cultural issues impact on using ANC and implementing BPCR^{12 14}, there are also “supply side” (health care provider factors) barriers to improving maternal health outcomes. These include supplies/logistics (drugs and non-

1
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3 drugs consumables, medical equipment), skilled human resources, appropriate technology
4 and the capacity to handle maternity cases.¹⁵ Availability of accessible emergency obstetric
5 services (such as parenteral oxytocics, antibiotics and anticonvulsants; assisted deliveries,
6 manual extraction of the placenta, blood transfusions, and so on) are mandatory on the
7 continuum of quality maternity healthcare.^{3 16} Preference for facility-based childbirth can be
8 high when there is the appropriate quality of care with the necessary medical facilities such as
9 equipment for surgery and blood transfusion services.^{17 18}

10
11 For childbirth to be called skilled birth, the attendant must receive training from an accredited
12 health institution and be licensed to practice.^{18 19} The inadequacy of trained health care
13 workers, including midwives, is identified as a significant barrier to improved MNH
14 outcomes. Although public and private sector efforts have recently increased skilled birth
15 attendants (SBAs) on the global front, the opposite exists in some sub-Saharan African
16 countries. There, the nurse/midwife to population ratio was estimated by the World Bank (for
17 the periods of 2008-2014) as 0.9 per 1,000 for Ghana,²⁰ compared to the global standard of
18 2.2 per 1,000 people.¹

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Ghana began an innovative decentralised health programme in 2004 aimed at addressing
problems related to utilisation of skilled birth attendants by upgrading the skills of
Community Health Nurses (CHNs) to Community Health Officers (CHOs) with basic
midwifery skills. The essence was to equip CHNs with the core competencies in managing
labours and deliveries during emergencies.^{13 21} The policy coincided with a ban on the
utilisation of traditional birth attendants (TBAs) and further challenged by an ongoing
shortage of physicians. For example, in 2012, Upper West Region (UWR) had 11 times fewer
doctors compared to Greater Accra (nation's capital) and Ashanti region; well over 50% of
all doctors live in Greater Accra with 20% in Ashanti Region. The remaining 30% resided in
the other eight health/geographic regions.²²

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3 Despite the implementation of the decentralised initiative, access to health facilities for
4 delivery is still comparatively low, with approximately 44% of women in UWR giving birth
5 in a healthcare facility.^{5 13} The rate is the second lowest in Ghana, compared to about 83% in
6 the Greater Accra Region, and 68% in the country.²² Many women in the rural communities
7 continue to prefer care from traditional birth attendants (TBAs).⁵ In many cases, women
8 chose other alternatives due to demand-side barriers such as decisions on choice of facility,
9 financial and physical accessibility which frustrate utilisation of appropriate health care.⁵
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18 There are also many supply-side barriers despite local community potentials in rural
19 communities such as those of the Upper West Region (UWR) of Ghana, including direct
20 bottlenecks of the health service delivery system impacting on potential service users such as
21 physical infrastructure, drugs, equipment, finances, human resources^{7 15} and appropriate
22 transfer arrangements.¹² UWR has 174 health facilities with five district hospitals out of the
23 ten districts and one municipality. Further, the region has the smallest number of kilometres
24 of tarred roads compared to the other nine regions of Ghana, with only Nadowli and Jirapa
25 having a direct link to the regional hospital via tarred road.²² Before the study, an ex-post
26 evaluation on the Country Programme Five (CP5) for Ghana by the United Nations
27 Population Fund (UNFPA) found thirty-six poor performing districts within the UWR
28 regarding MNH indicators. As a result, UNFPA implemented the Country Programme Six
29 (2012-2016) in those locations, which included the two study districts within which this
30 research took place (Nadowli/Kaleo and Daffiama/Bussie/Issa). Although the package
31 included key logistics and equipment as well as skill upgrade of staff, there has not been any
32 known investigation into the current state of maternal health care delivery services.^{13 17 23}
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51 Therefore, as part of a broader study, this paper focuses on the health facility factors affecting
52 preparedness for normal and emergency maternal and neonatal health service delivery in the
53 study area.
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METHODS

Study setting

The study described here is part of an extensive mixed methods research project exploring barriers to preparedness for birth and complication readiness interventions in eight purposively selected study sites in the Upper West Region of Ghana, four in Nadowli/Kaleo and four in Daffiama/Bussie/Issa. The study area had two-tier health system; the district level (the hospital) and 29 sub-district level health facilities (13 health Centre and 16 CHPS compounds are the lowest order in the Ghana Health Service structure)^{24 25} (Figure 1). The CHPS compounds provide preventive services and obstetric first aid including immunisations, vaccinations, health promotion and health education activities, whilst the health centres provide both preventive and curative services to the communities. Six of these communities did not have access roads to the nearest hospital (Nadowli Hospital).

The population of Nadowli/Kaleo district was 61,561 (46.7% males and 53.3% females), constituting 8.8 percent of the region's population.²⁵ Daffiama/Bussie/Issa Districts also had a population of 32,827 (48.7% males and 51.3% females) representing 4.7% of the people of UWR.²⁴

Figure 1. Study communities and health facilities

Study design

Given the complexity of health service related factors influencing birth preparedness and complication readiness^{13 17 18 22}, and the need to explore these from the perspectives of community members, expectant mothers and service providers a mixed methods approach was considered to be most appropriate, using focus groups discussions (FGDs), structured

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3 surveys (SS) and in-depth interviews (IDIs), respectively. The district health management
4 provided time series data to a structured survey question on their resource capacities and
5 logistics and referral management prospects and challenges.
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10 **Participant selection**

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12 Following appropriate ethical approvals (Charles Sturt Human Research Ethics Committee
13 2016/013 and H16178; Regional Health Directorate of Upper West Region) participants were
14 selected in the following ways.
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19 *Expectant Mothers*

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21 In order to explore their previous and current experiences during pregnancy and labour, a
22 uniform sample size of ten pregnant women in their second or third trimester (excluding the
23 ninth month) per community was selected. A list of mothers that met the selection criteria
24 was obtained at the ANC unit (with clearance from the Regional Health Directorate and the
25 Director of Health Services), whilst other pregnant women that had not commenced ANC
26 were identified with the help of the healthcare staff and community-based health surveillance
27 volunteers. A combination of simple random and purposive and key informant procedures
28 was adopted to determine potential participants from this pool of expectant mothers. Out of
29 the pregnant women that consented to participate in the study, 67 had begun using antenatal
30 care (ANC) services, and 13 were not at the time of the survey.
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45 *Focus group participants*

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47 A combination of key informant and purposive sampling procedures were adopted to identify
48 and select convenient sample of; opinion leaders (n=80), youth leaders aged 18-35 (n=80)
49 and nonpregnant women (who had childbirth experiences) (n=80) to provide data in 24
50 different group discussions, three in each community. The community representative, who is
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a nonpartisan but statutorily elected official representing each community at the District level, assisted in identifying potential participants for the FGDs. The sample sizes were pre-determined to facilitate data saturation and potential transferability of the findings to other contexts and settings.

Health care staff

Skilled healthcare staff were included in the study to provide their opinions on health services delivery and the outcomes. Upon receiving written support from the Health Directorates, the staff in charge of each of the healthcare facilities in the study area were asked to participate in the study. Three “other nurses” that were providing health services but not in managerial positions were purposively selected to submit further insights into expectant mother-ANC provider relationships and uptake of medical advice.

A summary of all participants can be found in Table 1.

Table 1: Participants groups

Participants	Age range (years)	Number	Data type	Sex disaggregation	No. of Communities
Opinion leaders	18-59	80	Qualitative	22 females, 58 males	8
Non-pregnant women	18-59	80	Qualitative	All females	8
Youth	18-35	80	Qualitative	40 females;	8

				40 males	
Expectant mothers	18-49	80	Quantitative	All females	8
Healthcare staff	25-59	13	Quantitative & qualitative	11 females 2 males	10 (8 communities and two district health administrations)

Research instruments

A semi-structured survey conducted in ‘Dagaare’ (the local language) comprising multiple closed-ended questions and four open-ended questions was used for the expectant mothers²⁶.

This focused on understanding the mother’s opinions on birth preparedness and complication readiness, health facility resources (staffing and logistical capacities), the potentials and challenges to service delivery related to community cooperation in the continuum of care provision and timely uptake of care, health service financing, and transport management in the study communities. The survey was pretested prior to data collection.

An interview schedule containing structured and unstructured questions were used by health professionals and encompassed staffing and logistical capacities to provide quality maternal health services, health care financing issues and preparedness for birth and complications.

A semi-structured discussion guide was utilised in FGDs, enabling the collection of community views on BP/CR interventions, the causes of maternal and neonatal morbidities

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3 and mortalities, sociocultural beliefs and practices impacting the use of maternal and
4 newborn health services, and any issues emerging from expectant mothers' interviews.²⁶ The
5 semi-structured interview guide were not pretested.
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10 11 12 13 **Data collection**

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16 Quantitative data were collected first, before the semi-structured FGDs and IDIs. This
17 arrangement gave the chance to cross-examine relevant issues emerging from the survey of
18 the pregnant women.
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23 Convenient venues were arranged within the communities for the FGDs. All discussions and
24 surveys were in the local language (*Dagaare*), as illiteracy was high.^{24 25} However, the IDIs
25 were conducted in English at scheduled locations in the health facilities. Two experienced
26 researchers collected both quantitative and qualitative data for the study, with one carrying
27 out the interviews and the other serving as a co-moderator, a scribe and picture-taker during
28 the FGDs. All quantitative surveys, IDIs and FGDs, were completed as planned, thereby
29 resulting in a higher than anticipated response rate.
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39 **Data processing**

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42 All interviews and group sessions were tape-recorded with the informed consent of the
43 participants. To achieve accuracy and dependability of the data, all audio recordings, except
44 those of the health professionals were first transcribed (hand-written) in "Dagaare" and then
45 translated into English. The principal investigator is a native and writes and speaks the local
46 dialect. However, the interviews with healthcare staff were transcribed in English. The
47 quantitative data were checked each day for completion before leaving the community.
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3 Emergent issues were also noted for the few (5) semi-structured questions in each
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5 questionnaire.
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8 **Data analysis**

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10 Analysis of the qualitative data began in the field. After each interview, notes were made
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12 containing: a) emerging opinions from the participants and how they could be noted and
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14 applied to other interviews,⁵ b) what went well or not-so-well; c) what should be done
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16 differently in future interviews and d) physical observations of health facilities, surface nature
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18 of roads, interactions among participants and nurses. This interim analysis enabled the
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20 researcher to add follow up questions to the interview schedule to clarify issues as they
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22 emerged.
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26 SPSS (version 20) and Nvivo (version 7.5) were used to analyse the quantitative and
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28 qualitative data, respectively. Basic descriptive statistical tools (frequency and percentages)
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30 were used to present the quantitative data while analytical text categories and themes related
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32 to “logistics, equipment, staffing, essential medicines” emerged from a computerised coding
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34 using the Nvivo, which were complementary themes to *a priori* topics and sub-themes
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36 identified in the quantitative analysis and existing literature and experience. The different
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38 factors affecting service delivery and skilled health care utilisation emerged as significant
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40 themes from the data (interview/FGDs transcripts, field notes, field observations/reflections).
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42 They were thoroughly read and re-read to identify and index topics and categories.
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44 Participant opinions were subsequently chosen to support the themes. Finally, both the
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46 predetermined and emerged themes were pooled together to address the research question.
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50 **Conceptual framework**

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52 The monitoring and evaluation framework for accessing health facility practices in relation to
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54 the birth preparedness and complication readiness strategy (BPCR),²⁷ WHO standards of care
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and referral guidelines by Ghana's Ministry of Health aimed at improving maternal and newborn quality of care in facilities.^{22 28 29} were adapted to guide the study (Table 2).

Table 2. Indicators for monitoring health facility practice of BPCR

Factors on BPCR of health facilities	Definition
Skilled human resource base of health facilities	Availability of midwives, anaesthetists and specialist's doctors
Health facility infrastructure	Ready lighting system in facilities, spacious labour rooms
Logistics and equipment availability	Health facilities are equipped with the needed logistics and equipment for providing quality and timely MNH care
Referral management	Transport or ambulance availability for efficient and effective transfer of emergency obstetric cases

Source: Adapted from existing literature and the BPCR toolkit by JHPIEGO²⁷

RESULTS

Four congruent themes with the conceptual framework featured prominently in the results, and these, along with related sub-themes, are presented below.

Human resource capacities in health facilities

Nadowli district hospital

At the time of the survey (2016), there were three resident medical doctors (1 female and two males) in the hospital (Table 3). Ten midwives provided care at the maternity ward to clients, conducting labours and deliveries including general gynaecological cases on admission. Non-midwives (Community health and Enrolled nurses) did not attend to childbirths or provide any other support in managing labour at the maternity unit (because of the definition of skilled attendance) regardless of the number of midwives that may be on-duty. Two anaesthetics nurses go on-duty in turns throughout the weekdays for eight hours daily (Table 3). The number of professional staffing has been unstable over the years (2013-2016) with the number of Midwives and Medical Doctors decreasing than increasing (Table 3).

Table 3: Available staff at Nadowli district hospital (from 2013-2016)

Year/ Core staff	2013 Number (%)	2014 Number (%)	2015 Number (%)	2016 Number (%)
Doctors (General practitioners)	1 (1.72)	2 (2.25)	3 (2.54)	3 (2.86)
Physician Assistants	1 (1.72)	2 (2.25)	2 (1.69)	3 (2.86)
Midwives	4 (6.91)	8 (8.98)	13 (11.02)	10 (9.52)
Registered General Nurses	20 (34.48)	30 (33.71)	39 (33.05)	39 (37.14) [3, 7.7% on study leave]

Enrolled nurses	31 (53.45)	46 (51.69)	59 (50.00) [11, 18.6% on study leave]	48 (45.71)
Anaesthetists	1 (1.72) [on duty for 8 hours daily]	1 (1.12) [on duty for 8 hours daily]	2 (1.70) [1 on duty at a time for 8 hours daily]	2 (1.90) [1 on duty at a time for 8 hours daily]
Total (%)	58 (100.00)	89 (100.00)	118 (100.00)	105 (100.00)

Source: Field survey, May 2017.

Effects of staff shortages on service delivery

The professional staff shortages at Nadowli hospital were found to be contributing to staff role stress and unnecessary referrals of pregnancy and newborn cases to other hospitals (mostly to Wa or Jirapa hospitals).

It is only two anaesthetists that are in the hospital. Sometimes, one will be on leave leaving only one. We could call the anaesthetist, and it [the phone] is switched off. Other times, he will tell us he is very far away. The doctors too are sometimes few, maybe the doctor is gone on official duty and very far away from the hospital or maybe throughout the day and night; the doctor might have worked so hard that if he tries to attend to the next case, the outcome may be severe. Therefore, it is referred out of the facility [IDIs, other nurses].

Midwife shortages prolong the time mothers spend accessing ANC services.

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3 *Due to a shortage of midwives, pregnant women can spend the full day seeking care*
4 *[at the hospital], which discourages the very distant communities from seeking care*
5 *[IDIs, other nurses].*
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10 **Staffing at the sub-district health facilities**

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13 Data from the eight sub-district health facilities indicated shortages of skilled healthcare staff
14 was a persistent challenge to health care management. Among the surveyed health facilities,
15 62.5% (5) (3 health centres and 2 CHPS compounds) had resident midwives while Nanvilli
16 health centre, Duang and Jimpensi CHPS compounds (JCHPS) had no midwife. Jang Health
17 centre (JHC) had two midwives (but one at post). The midwife was assigned to each health
18 facility to provide all MNH services to clients - ANC, labour, childbirth care, other general
19 ailments from the populace, in addition to performing administrative roles as facility head.
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29 Almost all health facilities had Community Health Nurses (CHNs) (13 in total) and Enrolled
30 nurses (ENs) (6 in total). There was also one Registered General Nurse, one Physician
31 Assistant, two field technicians and one mental health professional located in the region.
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36 ***Effects of staffing situation on skilled attendance at birth***

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39 The World Health Organisation's definition of "skilled attendance" at birth denotes
40 employing the services of a midwife or doctor, which is a significant challenge in rural
41 Ghana. The staffing challenges motivate the health service management at the district level to
42 endorse Community Health Nurse and Enrolled Nurse supervised delivery as skilled birth,
43 even if they had no midwifery training.
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51 *How about the CHNs we put at the CHPS compound and ask them, when a woman is*
52 *delivering, they should catch (receive)? Therefore, I [DoN] think any delivery that is*
53 *supervised by a trained health worker should be considered skilled delivery. So, the*
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3 *CHNs are forced to always refer to facilities with midwives, and considering the*
4 *distances, we record poor outcomes or home births. Will they go? [IDIs, other nurses,*
5 *DoN, male, DBID].*
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10 The number of midwives in the Daffiama/Bussie/Issa district was deemed inadequate to serve
11 the numbers of pregnant women:
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15 *The district has five health centres and twelve CHPS compounds. However, we*
16 *currently have seven (7) midwives at the post which is inadequate to provide maternal*
17 *health care to many pregnancy issues we face each day. Even the district capital,*
18 *Issa needs more than one midwife; but we are forced to make do with just one. [IDIs,*
19 *other nurses, DoN, male, DBID].*
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26 The midwives themselves agree with the above assessment:
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29 *I am the only midwife and always stressed up. Whenever I have two or three labour*
30 *cases at the same time, it is stressful working all the time. Also, if I am conducting*
31 *ANC and a labour case is brought in, I suspend the ANC and attend to that one.*
32 *Sometimes, expectant mothers default ANC when it happens that way, and it becomes*
33 *difficult tracing them because I am alone [IDIs, In-charge, midwife, WCHPS].*
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41 The skills shortage affects the quality of prenatal and postnatal services delivery:
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44 *We do not have enough skilled staff. Therefore, the expectations of clients are*
45 *sometimes not met. As I said earlier, one midwife is unable to explain certain issues*
46 *clearly for pregnant women to understand because she has limited time to carry out*
47 *all education and detail[ed] explanations [IDIs, Other nurses].*
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3 The IDIs with the Directors of Nursing (DoN), often called “district director of health
4 services” in the Ghanaian context, suggested that while slow progress has been achieved
5 towards training skilled staff for MNH care, the districts still need more midwives.
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10 *It is better now than in the past; some CHPS zones even have midwives. We are still*
11 *not enough as desired because some midwives at a point attend funerals or other*
12 *pressing issues leaving the facility. When clients go for care during midwife’s*
13 *absence, the CHNs and ENs have to refer [IDIs, other nurses, DoN, female, NKD].*
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18 19 ***Nurses -client relationships***

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22 Negative attitudes of nurses towards pregnant women can act as a deterrent to expectant
23 mothers:
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27 *Expectant mothers receive cheeky words from the nurses, so some do not receive*
28 *maternal health care at the clinic because they have received enough of the insults.*
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30 *They are afraid to divulge the truth for fear of receiving worse treatments in*
31 *subsequent attendance [FGDs, non-pregnant women, Naro/Korinyiri].*
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37 Discussants in another community suffered similar treatments:
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40 *I have not been to other clinics, but the nurses in our clinic do not give us attention at*
41 *all whenever we seek care at night or evening. They might not even utter a word,*
42 *before going back into their residences. When the client or family insist, they just*
43 *write a referral letter. Given the odd hour, how are we going to manage the case to*
44 *Wa or Nadowli hospital? [FGDs, non-pregnant women, Jang].*
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51 Although health centres and CHPS compounds are expected to provide a 24-hour service to
52 communities, some clients were denied care.
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3 *Some nurses would even tell us they do not run shifts and so will not work after 2 pm*
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5 *[FGDs, non-pregnant women, Jang].*
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10 **Basic and emergency obstetric case management at sub-district health facilities**

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13 As illustrated in Table 4, among the eight sub-district health facilities (health centres and
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15 CHPS compounds), 7 (85.5%) regularly only received primary obstetric cases, and 1(12.5%)
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17 received both basic and comprehensive emergency obstetric cases. However, half of the
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19 health facilities managed one comprehensive emergency obstetric case each in three years
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21 (2013-2015) preceding the study; two health centres confirmed they had managed five or
22
23 more obstetric complications in the same time frame. Three-quarters of the sub-district
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25 healthcare settings did not have the necessary skilled staff to manage obstetric cases (Table
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31 **Table 4: Obstetric histories and health facility capacities**

32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	Category	Number health facilities	% of health facilities
	Type of obstetric care		
	Usually providing basic obstetric care	5	62.5
	Able to provide comprehensive obstetric care	2	25
	Not providing obstetric care	1	12.5

Available staff to provide basic emergency obstetric care		
Yes	2	25
No	6	75
Number of comprehensive emergency obstetric cases received		
One case	4	50
Two cases	1	12.5
Five cases and above	2	25
Sub-total	7	87.5

Health facility infrastructure

Service space in maternity units

Nadowli district hospital was the only public hospital serving the two districts and was the highest referral facility. It had 76 beds, including 12 beds for the maternity ward and two delivery beds in the labour section.

For the labour ward, we have only three beds, out of which only two are used. We use the third bed as a last resort, although it is not meant for childbirth. It is for examination. In critical situations, we are forced to conduct delivery in the manual vacuum aspiration (MVA) room [IDIs, Other Nurses].

Availability of water

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3 None of the sub-district health facilities had potable water for usage by the workers and
4 cleaning of the premises, meaning that expectant and postnatal mothers were often found
5 drawing water for the health facilities or returned home to draw water for nurses if they
6 sought care without it. Alternatively, the midwives would have to leave the mothers in the
7 healthcare setting in search of water for cleaning. Thus, “*some expectant mothers get*
8 *discouraged from giving birth there.*” [IDIs, other nurses, DoN, male, DBID].
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16 ***Inadequate lighting***

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19 Ghana government’s rural electrification initiatives were understood to have covered a
20 significant part of the countryside. Despite this, not all old and recently constructed health
21 facilities were securely connected to the national grid. For instance, Duang CHPS was
22 inaugurated around 2015 but continues to experience intermittent power outages from faulty
23 wiring system. A similar limitation was found at Charikpong health centre (one of the
24 premier health facilities in the district), and Nanvilli health centre depended on patients to
25 provide fuel to power the facility generator; without fuel, either the delivery would have to be
26 transferred elsewhere or be carried out in the presence of often inappropriate family
27 members:
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40 *We do not have a source of water and light. When I am conducting delivery, I use a lamp*
41 *or generator. However, the generator must be fuelled by the relative of the expectant*
42 *mother. Due to the cost, they are not able to afford. I use torchlight when there is a tear. I*
43 *had a labour case where the mother sustains some lacerations which I have to suture.*
44 *Sometimes, I involve the relatives because I cannot hold the torchlight while suturing,*
45 *and patients’ rights are violated, because that may not be the right person to see her*
46 *nakedness [IDIs, midwife, NHC].*
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Medical equipment and logistics availability and functionality

Nadowli hospital

The hospital has inadequate equipment despite the significant threshold population it serves. The entire hospital operated on one used anaesthetic machine, a dysfunctional haematology analyser at the laboratory and an incomplete resuscitation table, all of which affects service delivery. Despite the occurrence of stillbirths and neonatal deaths, there was no neonatal intensive care unit in the hospital. Other challenges included:

Frequent power fluctuations are causing significant breakdowns in the equipment, i.e. blood bank refrigerators, autoclaves, air conditioners and theatre lamps. It further affects service delivery in the maternity section [IDIs, other nurses].

Only a poorly supplied resuscitation table for preterm delivery care is available:

Resuscitation table requires many items so that in case a baby is born and is asphyxiated; we can conduct it with ease. The table we have now is not well-equipped. We are only managing to save lives [IDIs, other nurses].

All the Health Centres (HCs) had midwives and conducted childbirths. While the CHPS compounds without midwives were not allowed to conduct childbirths or deal with other emergency obstetric situations, a basic bed and set of delivery equipment were provided for all compounds. Only two HCs had a manual vacuum aspiration kit. There was other basic (and essential) equipment available for checking vital signs at the health centres: blood pressure (BP) apparatus, thermometer, weighing scale, including foetus cope and foetal Doppler, but not all were in usable condition. Some CHPS compounds did not have necessary logistics such as vaccine fridge:

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3 *“There is electricity here now, but we do not have a vaccine fridge. When we even*
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5 *conduct a childbirth, we have to ride to Kojokpere health centre for poliomyelitis*
6
7 *vaccine for the newborn and return the remaining for storage. When expectant*
8
9 *mothers are around the 20th week of gestation, we administer tetanus toxoid injection*
10
11 *(TTI), but the vaccine cannot be stored here” [IDIs, In-Charge, male, JKCHPS].*
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14 Similarly, the CHPS compounds often did not have mandatory equipment to manage
15 emergency deliveries or resuscitate asphyxiated newborns, such as Ambu bags, meaning that
16 at times *“we see that the woman will be struggling and we cannot do anything to help”* (IDIs,
17 In-charge NCHPS).
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23 ***Effects of logistics shortages on infection control procedures***

24 Some health facilities did not have necessary daily non-drug consumables for administering
25 care. While Rapid Diagnostics Test (RDT) kits (for malaria) were readily supplied to some
26 facilities, infection control items such as facilities for handwashing and hand gloves were
27 often not provided for some facilities:
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36 *We have had consignments on the RDT which had no gloves included. Therefore, we*
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38 *do use bare hands to conduct the tests. The improvised hand gloves you saw me wear,*
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40 *were old gloves I found because we do not have hand gloves in the entire facility and*
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42 *the current RDT kits were not supplied with gloves [IDIs, In-charge, male, JKCHPS].*
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45 Another identified how shortage of gloves was *“the reason I improvised with hazardous*
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47 *materials (rubber bag) to conduct HIV/AIDS and Syphilis tests” (IDIs, In-charge, male,*
48
49 *JKCHPS).*
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52 The National Malaria Control Programme (NMCP) scaled-up access and universal coverage
53 to provide long-lasting insecticide bed nets (LLINs) to all expectant mothers and children
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3 who are under five years of age, however, some pregnant women in these districts were
4 denied access to these services. Some health facilities were not included in the regular
5 consignments of supplies.
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10 *When I came here, there were no mosquito nets in the facility. We do not also have*
11 *sulphadoxine-pyrimethamine (SP); it is a prophylaxis for malaria prevention in*
12 *pregnancy. Since I came to the installation, there has not been any SP for the*
13 *pregnant women [IDIs, midwife, NHC].*
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18 ***Essential medicines at the sub-district level***

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20 While “the WHO protocol recommends antibiotics for pregnant women who give birth
21 newly” [IDIs, other nurses], the National Health Insurance Drug lists for CHPS compounds
22 prohibits prescription of antibiotics to newly delivered mothers, although it is mandatory for
23 mothers who give birth. This is because the “CHPS compound is a small facility. When we
24 prescribe it, NHIS refuse to pay. Therefore, we sell it to them [the patient] which they always
25 complain they do not have money to pay for medicines” [IDIs, other nurses].
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36 Some health facilities did not have other essential medicinal products for conducting
37 childbirth.
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41 *I came in December 2015, and there was no oxytocin, no Vitamin K₁ for the newly*
42 *born babies. As at now, still, there is no vitamin K₁ in the facility [IDIs, midwife,*
43 *NHC].*
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48 As a result of other changes in health policy there were other limitations placed health centre
49 midwives prescribing certain essential medicines to manage labours.
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53 *At the health centre, we cannot use the Zeamatin (if the woman is having preterm, we*
54 *cannot give, we have to refer to Nadowli Hospital) [IDIs, Midwife, CHC].*
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Transport services

The majority of the health facilities did not provide transport (for example, motor bikes) for midwives to visit communities, thereby restricting their ability to engage in health education, to follow up on women not attending ANC, and to carry out routine immunisations:

We have so many maternal and newborn programmes that require motorbikes, but we do not have enough motorbikes for all the facilities. Aside from the bikes, some of the communities are hard-to-reach [IDIs, DoN, other nurses, female].

Management of referrals of emergency obstetric and newborn complications

The referral hospital reported receiving emergency obstetric cases from the health centres and CHPS compounds. Expectant mothers referred during labour were 54 (5.22% of births) in 2012, 36 out of (10% of births) in 2013, 24 (7.09% of births) in 2014 and 17 (7.13% of births) in 2015.

Typical referral management procedure at the sub-district health care level

The model below typifies the referral pattern which pertains in the communities, with a focus on worst case scenario (Figure 2).

Figure 2: Pictorial view of a typical referral management in study area

All four health centres received labouring mothers and obstetric referrals from the CHPS compounds and across all communities in their catchment area, with the number of referrals significantly influenced by their geographical location. Nearly all maternity cases brought to the health centres originated from the remotest communities.

Availability of transport during referrals

Transport provided by health care service to nearest referral facility

There were two groups of ambulance services operating in both districts to improve health service delivery; the hospital ambulance service and the National Ambulance Service (NAS) station. Each of them had one vehicle serving the two districts and other districts which were within its catchment area. The NAS station was situated at Nadowli but served any other district that gave them a call for emergency case(s) within the UWR. Meaning, the hospital vehicle and the NAS vehicle were both stationed at Nadowli leaving the far hinterland without ready access to vehicular transport during emergencies. There was one dysfunctional ambulance vehicle for all referrals to and from the Nadowli hospital. Daffiama health centre was the only health facility in Daffiama/Bussie/Issa district with double cabin pickup for emergency referrals of all patients and day-to-day operations of the facility. There were no available means of transport in any of the sub-districts except Daffiama health centre, with their car serving as an official vehicle as well as transferring emergency obstetric and newborn complications. However, the location of Daffiama health centre is within 20 minutes' drive of Nadowli hospital, closest than all other communities in the district.

Public and private transport

Lack of ambulances means that the majority of clients are reliant on public means of transport. This implies the client and family will usually have to wait until certain hours in the day to access transport:

If we are to send someone to a referral facility and it is around 10 am, the client cannot get means because all the vehicles go to Wa [region's capital]. Unless in the evening that they return to the community [IDIs, In-Charge, CHO, Duang].

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3 The search for affordable transport, whether it be by tricycle, motor bike or pick up car, can
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5 often result in a delay in accessing the next level of care.
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8 *During referrals, we wait for several hours before they can get modes of transport to*
9 *the next level of healthcare. We do not also have laboratory services in the entire*
10 *district so for us to conduct the routine laboratory investigations, we refer expectant*
11 *mothers to Nadowli or Wa which becomes a challenge for many pregnant women.*
12 *Even for pregnant women to get money to arrange for means of transport to the next*
13 *level of care is always a problem [IDIs, midwife, WCHPS].*
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21 As a general rule, it was the responsibility of the expectant mother (or their family) to arrange
22 for means of transport during emergency referrals, because of a shortage of emergency
23 vehicles. The cost often limited the ability of the expectant mother to receive care.
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28 ***Managing information and communication during emergency obstetric referral***

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31 The telecommunication sector presents a significant challenge in managing referrals in some
32 communities. Vodafone and MTN Ghana telecommunication service providers had network
33 coverage in the communities, although some communities had challenges accessing
34 networks. During the field data collection exercise, the first author found that Charikpong,
35 Nanvilli/Siruu, Jimpensi/Kenkelley and Duang communities had intermittent telecom
36 networks. Therefore, mobile phone users had the option to either climb up a tree in a strategic
37 area or hover around various signal hotspots (identified by the community) to make a phone
38 call. The facility heads agreed with this observation, noting that:
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49 *Our mobile phones network is a serious challenge...Therefore, when we have an*
50 *emergency case, how to link with the national ambulance or the ambulance at*
51 *Nadowli hospital is always a problem [IDIs, In-charge, WCHPS].*
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56 **DISCUSSION**

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3 By utilizing the structure of the BPCR monitoring and evaluation framework for health
4 facilities, the results of this study provide an insight into the preparedness of health care
5 facilities to provide efficient obstetric and newborn to the communities.
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10 As far as we know, this study is one of the first to assess health facility preparedness for birth
11 complication readiness in the Nadowli-Kaleo and Daffiama-Bussie-Issa districts of Ghana.
12 The barriers to improved maternal health service utilisation and the potential to address these
13 complexities are well documented in the literature. Extrinsic and intrinsic inequities in access
14 including transport arrangements and management of referrals are also identified to support
15 existing findings in related districts of the Upper West Region (UWR).¹² While this study did
16 not focus primarily on assessing the bottlenecks on and the capacities of health facilities to
17 provide maternal and newborn health services in the study area, the findings presented
18 provides significant signals and insights into situational issues impacting on maternal and
19 neonatal health care delivery and utilization.
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32 Despite a skill upgrade programme by the GHS for sub-district level staff (since 2004),^{17 30}
33 inadequate numbers of skilled health staff (i.e. licensed midwives and medical doctors)
34 continue to, which provide many challenges for the few staff available, including role stress
35 and undignifying behaviour patterns towards mothers, which support previous observations.²²
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40 At the hospital, one midwife may be on duty to manage all admissions, including new
41 admissions and emergency referrals for the entire maternity unit. There were no remuneration
42 packages to motivate the few skilled staff, aside from the average monthly wage. The impact
43 of shortages is compounded when referrals are made between district hospitals because of
44 lack of staff at the referring hospital or to other facilities with insufficient staff. These
45 findings are consistent with other studies in ten referral district hospitals in Ghana,¹⁸ India,
46 Tanzania and Ethiopia³¹ and other developing countries.^{15 32 33} Shortage of, and limited access
47 to, licensed staff lends support to the view of some writers that, utilising appropriately trained
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3 TBAs, CHNs and ENs in the mainstream childbirth care in Ghana could reduce some of the
4 current frustrations associated with managing obstetric complications and referral
5 processes,¹³ although this is not without its challenges. It was found that poor treatment of
6 pregnant women discouraged skilled maternal health service utilisation with its attendant
7 implications on the health outcomes in the rural communities.²³ While many of these
8 behaviours could be attributed to the role stress identified in this study, it nevertheless defies
9 professional codes of conduct and the priorities of the country and stakeholders in general.²³

10
11 The Ministry of Health is a policy oriented-body while Ghana Health Service implements the
12 initiatives. Based on the Ministry's Programme of Work (POW, 2014-2017), there were
13 initiatives by Ghana Health Service (GHS) to increase the country's performance on MNH
14 indicators in particular, through ANC defaulter-tracing, home-visiting, free ANC services for
15 all mothers with active National Health Insurance Scheme (NHIS) subscription, focussing on
16 preventive care through the sub-district structures.^{12 22} Despite this, many factors limit the
17 quality of care provided at the facilities, such as disrespect, irregular service availability at
18 sub-district facilities, midwife absenteeism, and lack of necessary medical equipment and
19 essential medicines.

20
21 While efficient lighting systems, water facilities and essential medicines motivates the
22 utilisation of skilled health services, conversely, reduced laboratory services and inadequate
23 space and equipment in childbirth rooms in all health care settings provided limited
24 confidence to women accessing ANC and contemplating birthing in the health facility.
25 Similar findings were reported elsewhere in the Upper West Region of Ghana and Kenya.^{12 13}
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34 The challenges motivated born-before-arrival syndrome in the Upper West Region.¹³ An
evaluation in Ghana, Malawi and Kenya also found informal cost and cultural
appropriateness of ANC services as key motivators to patronising skilled maternity care.³⁵ In
most locations, health care facilities were rudimentary, and while the hospital had better

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3 equipment and amenities (compared to the health centres and CHPS compounds), irregular
4 power supply had similar negative impacts on service delivery.⁵ The health facilities with
5 intermittent electricity supply were unable to conduct deliveries at night. Most sub-district
6 health facilities (CHPS compounds) had inadequate access to vaccine fridge and the power
7 grid to store vaccines, and having to travel for long distances for necessary vaccines such as
8 tetanus toxoid injection (TTI) vaccines and other anti-malaria prophylaxis diminished
9 efficacy and efficiency of the healthcare delivery system³⁶. Conversely, some facilities had no
10 readily available medicines such as oxytocin to induce labours. Other referrals were
11 prompted by NHIS drug policy which prevents the staff at CHPS compounds from
12 prescribing necessary antibiotics to newly delivered women, suggesting that revision of the
13 NHIS user-fee exemption policy on maternal and neonatal health care would be
14 appropriate.¹² These findings are congruent with other studies in India and a systematic
15 review on this subject.^{15 37} An earlier evaluation in district hospitals in Ghana revealed that
16 they were the highest referral point for many obstetric complications. Meanwhile, many of
17 them did not have the requisite logistics and staff to manage normal childbirth labour and
18 complications.¹⁸

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38 The project for improvement of maternal and child health in the Upper West Region by JICA
39 provided elaborate education for district and sub-district healthcare staff on managing
40 emergency referrals³⁸. A fundamental requirement was to have the midwife accompany the
41 client to the receiving facility. However, considering the staffing inadequacies and the lack of
42 transport services linking the communities coupled with the behavioural norms on early
43 utilisation of health facility care, the approach may further intensify the current shortages of
44 midwives and result in poor health care outcomes due to the distances and lack of
45 complication readiness interventions identified in another component of the study.^{5 26} Despite
46 the geographical isolation of communities to referral centres, and between health facilities,
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3 much like those experienced in other isolated locations, such as Uttar Pradesh, India.³² A key
4 difference may be the fact that the main referral hospital (at Nadowli) serving both districts
5 had no ambulance facility to conduct the timely transfer of obstetric emergencies and preterm
6 babies to appropriate health facilities such as Jirapa Hospital or Wa Hospital which were the
7 nearest.
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14 Although by convention, all health facilities in Ghana operate twenty-four hours for all days,
15 there was the tendency to deny clients seeking emergency care at certain times, thereby
16 defying the core mandate of the sub-district health structures of providing preventive and
17 basic curative care including obstetric first aid.^{13 22 29} The common limitations connecting
18 with referral hospitals (mostly Nadowli or Wa) and means of transport create dissonance
19 between the already aggrieved expectant mother in pain and the possibly stressed Nurse who
20 provides care to a large number of population on the one hand, and the healthcare
21 targets/indicators on the other.
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32 Non-availability and affordability of transport and telecommunication systems during
33 obstetric emergencies were a contemporary issue between Nadowli or Wa hospital (the
34 closest to study communities) and sub-district health facilities. Demand for skilled care was
35 on the increase, but the absence of ambulance/vehicular linkage and coverage could delay or
36 cancel obstetric referrals despite regular demand for transfers from lower level facilities. The
37 challenges identified in this study correspond to those already identified elsewhere in rural
38 Ghana, suggesting the need to streamline referral management systems which are critical to
39 reducing avoidable mortalities and inequities in access.^{5 12 22} Buor and colleagues^{39 40} their
40 studies in Ghana and sub-Saharan Africa and another study in the Upper West region
41 demonstrated that distances to health facilities contributed to reduced utilisation and
42 outcomes of obstetric referrals,⁴¹ thereby providing pregnant women to fewer alternatives
43 during complications and childbirth labour.¹³ This study may have underestimated the impact
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3 of these barriers compared with previous evaluations on this subject, but the negative effects
4 of home or born-before-arrival syndrome at the health facility is consistent with other
5 research.^{13 37}
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10 **Implications for future research, policy and maternal health service delivery**

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12 While reports show that Ghanaians have increased utilisation of skilled maternal health care
13 than previously, it also implies that, policy initiatives at improving upon current systemic
14 bottlenecks would provide a way forward towards achieving global goals for the country.
15 This is particularly important because the majority of the chronic health cases leading to life-
16 threatening disabilities and mortalities are found in the hard-reach communities of the
17 country³⁰. An evaluation in Ghana also noted that, although the national health insurance fee-
18 exemption policy have increased service uptake, inequities and geographical disparities in
19 access continue to exist between the rural poor and nonpoor, thereby causing low use among
20 the poor due to the informal costs on services and medicines.³⁰
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35 The many barriers in this study are interdependent and addressing them will require holistic
36 approach including community awareness and proactivity during obstetric complications to
37 help the health providers tackle the issues appropriately and on time. While these shortages in
38 the health facilities may not be addressed in the short-medium term due to cost implications,
39 preventative measures could be facilitated at the community level to influence behaviour and
40 cultural change (as identified in other components of the study)²⁶ to help improve maternal
41 and neonatal health outcomes.
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52 While motivational packages (housing, additional allowances, and career opportunities) for
53 Physicians and Midwives may have some potential in encouraging them to accept postings to
54 rural areas, the lack of equipment and essential medicines for continued knowledge and skill
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3 development could serve as a limitation. Global technological advancement and professional
4 networking through the social media, telecommunication and the general internet services via
5 reliable internet networks engenders increased ambitions to advance in skill through
6 education and career. However, the gap in these services to the district level was extensive,
7 suggesting that improving the mobile telecommunication network and general internet
8 services at the district level could also motivate acceptability of postings to these locations.
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16 17 18 **CONCLUSION**

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21 The health facilities at both grassroots and referral hospital levels in the districts were not
22 adequately prepared to provide quality maternal and neonatal health care, contributing, at
23 least in part, to the preference of many mothers for choosing not to take up ANC and
24 favouring a home birth. These factors may also contribute to the difficulties experienced in
25 implementing Ghana's health service first referral policy guidelines launched in 2014²⁹.
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32 The findings suggest that the health services require adequate funding to achieve existing
33 institutionalised guidelines and the broader national objective on maternal and newborn care.
34 Improving MNH services provided at the healthcare facilities, including increasing the
35 availability of doctors, midwives, anaesthetists, labour beds, resuscitation equipment,
36 essential medicines, ambulance van and improving access to basic amenities such as
37 electricity and water facilities, along with efforts to address other barriers on BPCR identified
38 elsewhere, will assist rural Ghana to achieve the critical Sustainable Development Goal
39 (SDG) three (targets one and two) by 2030. The study recommends in-depth evaluations of
40 operational procedures of the NHIS, and further research exploring ethical issues faced by
41 nurses as well as the management of staff postings.
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54 55 **Strengths and limitations of this study**

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3 This study has several strengths amidst limitations. It contributes to the scant literature on
4 supply-side factors impacting MNH care in the Upper West Region of Ghana. The majority
5 of obstetric complications and problems affecting the indicators are predominant in the rural
6 communities. Therefore, a brief assessment of what pertains in the health centres and CHPS
7 zones could trigger policy initiatives and district level oversight responsibilities. Data were
8 obtained from healthcare professionals through a purposive sampling approach. Critics
9 question the credibility of data through such sampling procedure, but this study was the first
10 of its kind in these districts, and considering the findings, supported by general facility
11 observation and cues during the interview, it is reasonable to say relevant data was generated
12 through the approach to support the research objective. The sample was relatively small
13 compared to the established norm, however, as a mixed method study, data from the other
14 participant groups were used to support and cross-validate those of the healthcare settings;
15 these results are reported elsewhere ⁵.

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32 **Figure 1. Study communities and health facilities**

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36 **Figure 2: Pictorial view of a typical referral management in study area**

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42 **Acknowledgement:**

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47 Sanwuok for their contribution to the study.

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53 collection, analysis, interpretation and writing of first draft of the manuscript: JS.

Contribution to study interpretation and manuscript review: JS, JC, SW. All authors contributed substantially to the writing of the manuscript, reviewed and approved the final write-up for submission.

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Figure 1. Study communities and health facilities

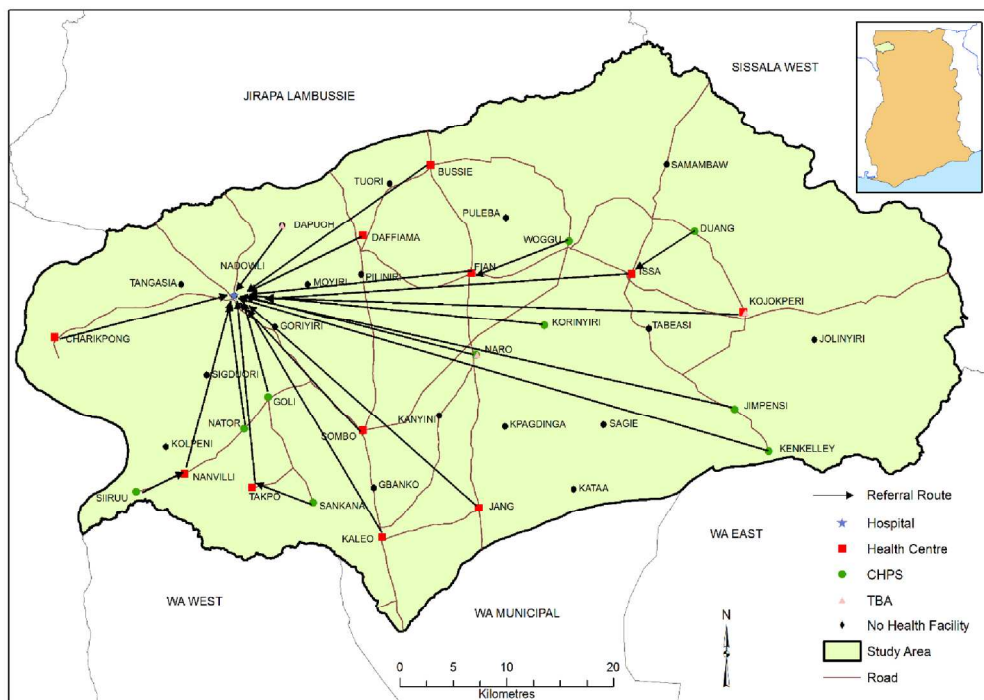
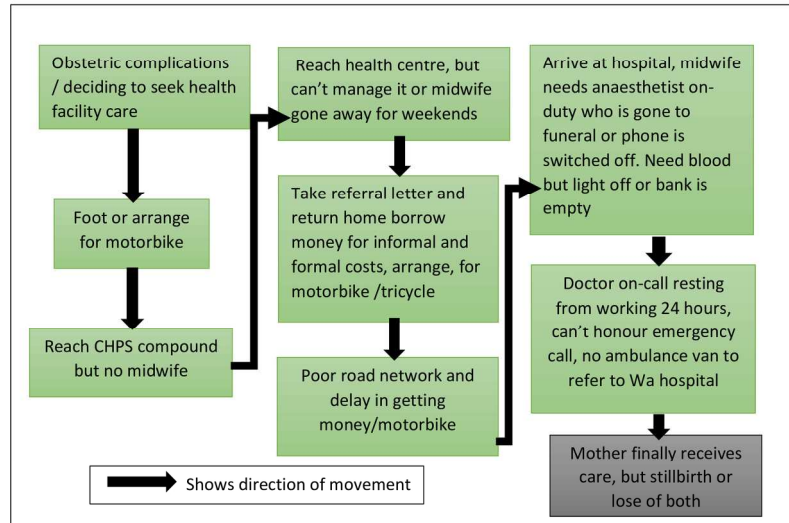


Figure 1. Study communities and health facilities

158x121mm (300 x 300 DPI)

Figure 2: Pictorial view of referral management in study area



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Figure 2: Pictorial view of a typical referral management in study area

146x222mm (300 x 300 DPI)

Checklist of SQUIRE Guidelines followed in preparing the manuscript

S/N	Item	Page number
1	Title: the manuscript concerns an initiative to improve healthcare	1
2	Abstract	2
3	Introduction: Explains the aim of the study which emerge from existing unsatisfactory and unacceptable maternal and newborn service delivery in the study area.	4
4	Methods	6
5	Setting, participants and participant selection, data collection, processing and analysis.	7
6	Results: presents the findings of study	13
7	Discussion comprising the main findings and interpretation in relation to previous knowledge on the subject.	27
8	Conclusion	33
9	Limitations	33
10	Statements	34

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1 **Perceived barriers to maternal and newborn health services delivery: a qualitative**
2 **study of health workers and community members in low and middle-income settings**

3

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3 **21 Abstract**
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5 **22 Objectives:** Considering the explanations for poor maternal and newborn health outcomes,
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many investigations focused on decision-making patterns and actions of expectant mothers and families as opposed to exploring the “supply side” (health service provider) barriers. Thus, we examined the health system factors impacting access to, and quality maternal and newborn healthcare delivery in rural settings.

27 Design: A semi-structured qualitative study using face-to-face in-depth interviews with
28 health professionals and focus group sessions with community members in eight project sites
29 in two districts of Upper West Region, Ghana. Participants were purposively selected
30 generate relevant data that will help address the study objective. The survey was guided by
31 the WHO standard procedures and Ghana’s Health Ministry operational work plan for
32 maternal and newborn care.

33 Setting: Nadowli-Kaleo and Daffiama-Bussie-Issa districts in Upper West Region, Ghana.

34 Participants: Two hundred and fifty-three participants were engaged in the study through
35 convenient and purposive sampling: healthcare professionals (Pharmacist, Medical doctor,
36 two district directors of health services, Midwives, Community health and Enrolled Nurses)
37 (n=13), and community members comprising opinion leaders, youth leaders and adult non-
38 pregnant women (n = 240 in 24 units of focus groups).

39 Results: Results show significant barriers affecting the quality and appropriateness of
40 maternal and neonatal health services in the rural communities and the Nadowli district
41 hospital. The obstacles were inadequate medical equipment and essential medicines,
42 infrastructural challenges, shortage of skilled staff and high informal costs on essential
43 medicines and general limited capacities to provide care.

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3 44 **Conclusion:** Implementation of BPCR strategy is in its infancy at the health facility level in
4
5 45 the study areas. Increasing resources at the health provider level are essential to achieving
6
7 46 international targets on maternal and neonatal health outcomes and bridging inequities in
8
9 47 access to essential maternal and newborn health care.

10
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12 48 **Keywords:** Health facilities; Birthing centres; maternal care patterns; newborn care; Health
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14 49 attitude; Ghana

15 16 17 50 **Strengths and limitations of the study**

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19
20 51 • The study provides the first comprehensive assessment of maternal and neonatal
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22 52 health delivery from the perspectives of community residents and healthcare providers
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24 53 in the two districts.
- 25
26 54 • The findings focus exclusively on participants' views from sub-district health
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28 55 facilities, the district hospital, health service management and community members.
- 29
30 56 • The study aims to identify factors affecting maternal and newborn health outcomes
31
32 57 and thus, health facilities capacities to provide quality health services, was a
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34 58 component of the multisite study into community perspectives on BPCR interventions
35
36 59 in the rural communities, which may not incorporate all the issues rigorously as a
37
38 60 stand-alone evaluation of the health system.
- 39
40 61 • The results represent the views of health facility managerial and another frontline
41
42 62 healthcare professionals which may not reflect the views of all staff in the two
43
44 63 districts.
- 45
46 64 • Much of this component of the study is qualitative which has both strengths and
47
48 65 limitations regarding processing and interpretation; thus, it lacks statistical rigour.

49 50 51 66 **INTRODUCTION**

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3 67 There are increasingly renewed commitments towards achieving the Sustainable
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5 68 Development Goals in advanced countries, however, in low and middle-income economies,
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7 69 inadequate services delivery initiatives persist.¹ Globally, about 15% of obstetric
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9 70 complications occurred during pregnancy, labour and childbirth and the early postnatal
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11 71 period,^{2 3} and approximately 800 girls and women died as a result of pregnancy, and
12
13 72 childbirth-related complications in 2015.^{4 5} An estimated 99% of all maternal deaths occur in
14
15 73 developing countries and more than half occur in sub-Saharan Africa (SSA).¹ Although
16
17 74 advanced countries recorded an estimated 11 to 14 deaths per 100,000 in 2015, 511 to 652
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19 75 deaths per 100,000 were recorded in SSA within the same period. Consequently, Ghana's
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21 76 maternal mortality rate (MMR) was estimated between 358 and 319 per 100,000 in 2015.^{5 6}
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25 77 WHO noted that 75% of these deaths occur due to avoidable causes including severe
26
27 78 bleeding, sepsis, pre-eclampsia, unsafe abortion and complications in childbirth.¹ Another
28
29 79 65% of women die in Ghana due to similar causes¹. The UNFPA found that maternal deaths
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31 80 in Ghana could further be reduced by 90% if expectant mothers are given ready access to
32
33 81 emergency healthcare.⁷
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37 82 In 2015 the Sustainable Development Goals or Global goals negotiated new targets of
38
39 83 reducing maternal deaths ratio to less than 70 per 100,000 live births as well as ending
40
41 84 preventable deaths of newborns by 2030.^{1 5} There are two maternal healthcare strategies
42
43 85 proposed in the renewed commitments to stakeholders, with the high potential for preventing
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45 86 avoidable obstetric deaths: skilled attendance at birth and emergency obstetric health care.^{8 9}
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47 87 These measures are promoted through effective antenatal education and efficient
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49 88 management of referrals, coupled with adequate skilled healthcare professional attendance to
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51 89 both normal childbirths and those with obstetric complications.^{10 11} In many countries, these
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53 90 interventions form part of the birth preparedness and complication readiness (BPCR)
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55 91 strategy; a component of the antenatal care (ANC) program.^{4 12 13}
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3 92 Although factors such as social, economic and cultural issues impact on using ANC and
4
5 93 implementing BPCR¹⁴⁻¹⁶, there are also “supply side” (healthcare provider factors) barriers
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7 94 to improving maternal health outcomes. These include commodities/logistics (drugs and non-
8
9 95 drugs consumables, medical equipment), skilled human resources, appropriate technology
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11 96 and the capacity to handle maternity cases.¹⁷ Availability of accessible emergency obstetric
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13 97 services (such as parenteral oxytocics, antibiotics and anticonvulsants; assisted deliveries,
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15 98 manual extraction of the placenta, blood transfusions, and so on) are mandatory on the
16
17 99 continuum of quality maternity healthcare.^{3 18} That said, preference for facility-based
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19 100 childbirth can be high when there is the appropriate quality of care with the necessary
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21 101 medical facilities such as equipment for surgery and blood transfusion services.^{19 20}

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25 102 For childbirth to be called skilled birth, the attendant must receive training from an accredited
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27 103 health institution and be licensed to practice.^{20 21} The inadequacy of trained healthcare
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29 104 workers, including midwives, was identified as a significant barrier to improved MNH
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31 105 outcomes. Although public and private sector efforts have recently increased skilled birth
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33 106 attendants (SBAs) on the global front, the opposite exists in some sub-Saharan African
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35 107 countries. There, the nurse/midwife to population ratio was estimated by the World Bank (for
36
37 108 the periods of 2008-2014) as 0.9 per 1,000 for Ghana,²² and less than one to over 95,000
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39 109 people in the study area since 2010,²³ compared to the global standard of 4.45 per 1,000
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41 110 people.²⁴

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45 111 Ghana began an innovative decentralised health programme in 2004 aimed at addressing
46
47 112 problems related to utilisation of skilled birth attendants by upgrading the skills of
48
49 113 Community Health Nurses (CHNs) to Community Health Officers (CHOs) with basic
50
51 114 midwifery skills. The essence was to equip CHNs with the core competencies in managing
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53 115 labours and deliveries during emergencies.^{25 26} The policy coincided with a ban on the
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55 116 utilisation of traditional birth attendants (TBAs) and further challenged by an ongoing

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3 117 shortage of physicians. For example, in 2012, Upper West Region (UWR) had eleven times
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5 118 fewer doctors compared to Greater Accra (nation's capital) and Ashanti region; well over
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7 119 50% of all doctors live in Greater Accra with 20% in Ashanti Region. The remaining 30%
8
9 120 resided in the other eight health/geographic regions.²³

11 121 Despite the implementation of the decentralised initiative, access to health facilities for
12
13 122 delivery is still comparatively low, with approximately 44% of women in UWR giving birth
14
15 123 in a healthcare facility.^{5 25} The rate is the second lowest in Ghana, compared to about 83% in
16
17 124 the Greater Accra Region, and 68% in the country.²³ Many women in the rural communities
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19 125 continue to prefer care from traditional birth attendants (TBAs).⁵ In many cases, women
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21 126 chose other alternatives due to demand-side barriers such as decisions on choice of facility,
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23 127 financial and physical access to services, which frustrate utilisation of appropriate
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25 128 healthcare.⁵

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30 129 There are also many supply-side barriers despite local community potentials in rural
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32 130 communities such as those of the Upper West Region (UWR) of Ghana, including direct
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34 131 bottlenecks of the health service delivery system impacting on potential service users such as
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36 132 physical infrastructure, drugs, equipment, finances, human resources^{9 17} and appropriate
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38 133 transfer arrangements.¹⁴ The UWR has 174 health facilities with five district hospitals out of
39
40 134 the ten districts and one municipality. Further, the region has the smallest number of
41
42 135 kilometres of tarred roads compared to the other nine regions of Ghana, with only Nadowli
43
44 136 and Jirapa townships having a direct link to the regional hospital via tarred road.²³ Before the
45
46 137 study, an ex-post evaluation on the Country Programme Five (CP5) for Ghana by the United
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48 138 Nations Population Fund (UNFPA) found thirty-six (90%) poor performing districts out of
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50 139 forty districts in five regions (eight districts in each) regarding MNH indicators.²⁷ Three
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52 140 (about 8%) of these underperforming districts were in UWR (Nadowli, Sissala East and Wa
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54 141 West). CP5 (2006-2010) focused on three areas: a) reproductive health, population and
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3 142 development; b) gender equity and women empowerment and c) reproductive health and
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5 143 HIV/AIDS²⁷ As a result of the limitations, UNFPA implemented the Country Programme
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7 144 Six (2012-2016) in those locations, which included the two study districts; Nadowli/Kaleo
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9 145 and Daffiama/Bussie/Issa. Although the package included key logistics and equipment as
10
11 146 well as skill upgrade of staff, there has not been any known investigation into the current
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13 147 state of maternal healthcare delivery services.^{19 25 28} Therefore, this study answered the
14
15 148 question: "what are the perceived barriers to maternal and newborn service delivery in
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17 149 Nadowli-Kaleo and Daffiama-Bussie-Issa Districts of Ghana". Key indicators covered were:
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19 150 staff capacities, basic equipments, service space/beds capacities, water and lighting facilities,
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21 151 medicines and other essential supplies for service delivery as well as staff relations with
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23 152 mothers.
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30 154 **METHODS**

31 32 33 155 **Study setting**

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36 156 The study was semi-structured qualitative using face-to-interviews to explore into barriers to
37
38 157 skilled service delivery and utilisation in eight purposively selected study sites in the Upper
39
40 158 West Region of Ghana; four in Nadowli/Kaleo and four in Daffiama/Bussie/Issa. The study
41
42 159 area had two-tier health system; the district level (the hospital) and 29 sub-district level health
43
44 160 facilities (13 health Centre and 16 CHPS compounds are the lowest order in the Ghana
45
46 161 Health Service structure)^{29 30} (Figure 1). The CHPS compounds provide preventive services
47
48 162 and obstetric first aid including immunisations, vaccinations, health promotion and health
49
50 163 education activities, whilst the health centres provide both preventive and curative services to
51
52 164 the communities. Six of these communities did not have access roads to the nearest hospital
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54 165 (Nadowli Hospital).
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166 The population of Nadowli/Kaleo district was 61,561 (46.7% males and 53.3% females),
 167 constituting 8.8 percent of the region's population.³⁰ Daffiama/Bussie/Issa Districts also had
 168 a population of 32,827 (48.7% males and 51.3% females) representing 4.7% of the people of
 169 UWR.²⁹

170 **Figure 1. Study communities and health facilities**

171

172 **Conceptual framework**

173 The monitoring and evaluation framework for accessing health facility practices in relation to
 174 BPCR,³¹ WHO standards of care and Ghana's Ministry of Health operational work plan were
 175 adapted to guide the conduct the instrumentation and reporting of the findings. These policy
 176 documents prioritise timely access to relevant and quality care in compliance with infection
 177 control procedures and strict adherence to the appropriate protocols and professional
 178 standards (Table 1). These guidelines aim to improve maternal and newborn quality of care in
 179 facilities.^{23 32 33}

180 **Table 1. Indicators for monitoring health facility practice of BPCR**

Factors on BPCR of health facilities	Definition
Skilled human resource base of health facilities	Availability of midwives, anaesthetists and specialist's doctors
Health facility infrastructure	Ready lighting system in facilities, spacious labour rooms
Logistics and equipment availability	Health facilities are equipped with the needed logistics and equipment for providing quality and timely MNH care

Referral management	Transport or ambulance availability for efficient and effective transfer of emergency obstetric cases
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181 Source: Adapted from existing literature and the BPCR toolkit by JHPIEGO³¹

182

183 ***Study design***

184 Health services delivery and related factors influencing BPCR are complex^{19 20 23 25}, which
 185 necessitates the need to explore them from the perspectives of community members and
 186 service providers a qualitative approach was considered to be most appropriate, using focus
 187 groups discussions (FGDs) and in-depth interviews (IDIs). The district health management
 188 provided time series data to a structured survey question on their resource capacities and
 189 logistics and referral management prospects and challenges.

190 **Participant selection**

191 Following appropriate ethical approvals, (Charles Sturt Human Research Ethics Committee
 192 2016/013 and H16178; Regional Health Directorate of Upper West Region) participants were
 193 selected in the following ways. Written informed consent was obtained from each participant.

194 ***Focus group participants***

195 A combination of key informant and purposive sampling procedures were adopted to identify
 196 and select a convenient sample of; opinion leaders (n=80), youth leaders aged 18-35 (n=80)
 197 and nonpregnant women (who had childbirth experiences) (n=80) to provide data in 24
 198 different group discussions, three in each community. The community representative, who is
 199 a nonpartisan but statutorily elected official representing each community at the District
 200 level, assisted in identifying potential participants for the FGDs. The sample sizes were pre-

201 determined to facilitate data saturation and potential transferability of the findings to other
 202 contexts and settings (see the link for the detailed questionnaire and interview guide for all
 203 participant groups <https://doi.org/10.1371/journal.pone.0185537.s001>).

204 ***Healthcare staff***

205 Skilled healthcare staff were included in the study to provide their opinions on health services
 206 delivery and the outcomes. Upon receiving written support from the Health Directorates, the
 207 staff in charge of each of the healthcare facilities in the study area were asked to participate in
 208 the study. Three “other nurses” that were providing health services but not in managerial
 209 positions were purposively selected to submit further insights into expectant mother-ANC
 210 provider relationships and uptake of medical advice.

211 A summary of all participants can be found in Table 2.

212 **Table 2: Study participants, data types and sex disaggregation**

Participants	Age range (years)	Number	Data type	Sex disaggregation	No. of Communities
Opinion leaders	18-59	80	Qualitative	22 females, 58 males	8
Non-pregnant women	18-59	80	Qualitative	All females	8
Youth	18-35	80	Qualitative	40 females; 40 males	8
Healthcare staff	25-59	13	Qualitative	11 females 2 males	10 (8 communities and two district health administrations)

213 **Research instruments**

214 An interview schedule containing structured and unstructured questions were used by health
215 professionals and encompassed staffing and logistical capacities to provide quality maternal
216 health services, healthcare financing issues and preparedness for birth and complications.

217 A similar semi-structured discussion guide was used for the FGDs with the community
218 members, which enabled in-depth investigation into community perspectives on BPCR
219 interventions, the causes of maternal and neonatal morbidities and mortalities, sociocultural
220 beliefs and practices impacting the use of maternal and newborn health services, and barriers
221 to healthcare uptake. The semi-structured interview guides were not pretested and were
222 conducted in ‘Dagaare’ (the local language).

223

224 **Data collection**

225 The FGDs were completed first before the IDIs with the healthcare providers. This
226 arrangement gave the chance to cross-examine relevant issues emerging from the discussions.
227 Some of the key emergent issues identified included the sale of ANC routine drugs and other
228 essential medicines to clients with active health insurance subscriptions and the challenges
229 associated with the insurance scheme as well as patronage the services of traditional birth
230 attendants.

231 Convenient venues were arranged within the communities for the FGDs. All discussions and
232 surveys were in the local language (*Dagaare*), as illiteracy was high.^{29 30} However, the IDIs
233 were conducted in English at scheduled locations in the health facilities. JS received training
234 from Charles Sturt University Research Office on survey designs, data collection and
235 analysis, supervised by JC and SW. However, two experienced researchers (JS and FT)

236 collected both quantitative and qualitative data. All quantitative surveys, IDIs and FGDs,
237 were completed as planned, thereby resulting in a higher than anticipated response rate. Data
238 were collected within two periods: February to June 2016 and January to May 2017.

239 **Data processing**

240 All interviews and group sessions were tape-recorded with the informed consent of the
241 participants. To achieve accuracy and dependability of the data, all audio recordings, except
242 those of the health professionals were first transcribed (hand-written) in “Dagaare” and then
243 translated into English by JS. JS is a native and writes and speaks the local dialect. However,
244 the interviews with healthcare staff were transcribed in English. Two separate individuals
245 from the Ghana Institute of Languages were engaged to verify the recordings with the
246 transcripts. WHO’s four-stage process for translation and adaptation of instruments guided
247 the transcription process.³⁴

248 **Data analysis**

250 Analysis of the qualitative data began in the field. After each interview, notes were made
251 containing: a) emerging opinions from the participants and how they could be noted and
252 applied to other interviews,⁵ b) what went well or not-so-well; c) what should be done
253 differently in future interviews and d) physical observations of health facilities, surface nature
254 of roads, interactions among participants and nurses. This interim analysis enabled the
255 researcher to add follow up questions to the interview schedule to clarify issues as they
256 emerged.

257 Nvivo (version 7.5) was used to analyse the qualitative data. Analytical text categories and
258 themes related to “logistics, equipment, staffing, essential medicines” emerged from the
259 computerised coding using the Nvivo, which were complementary themes to *a priori* topics

260 and sub-themes identified in the quantitative analysis and existing literature and experience.

Theme	Sub-themes (factors)
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261 The different factors affecting service delivery and skilled healthcare utilisation emerged as
 262 significant themes from the data (interview/FGDs transcripts, field notes, field
 263 observations/reflections). They were thoroughly read and re-read to identify and index topics
 264 and categories. Participant opinions were subsequently chosen to support the themes. Finally,
 265 both the predetermined and emerged themes were pooled together to address the research
 266 question.

267 **Patient and Public Involvement**

268 The findings of the study would contribute to policy and service delivery interventions in
 269 Ghana and similar geographical locations. It is the more reason that the views of the intended
 270 beneficiaries (women) were obtained for the study. District level briefings would be
 271 organised to disseminate the findings to health workers and opinions leaders (as some may
 272 not have access to published findings) to help re-pattern service delivery activities.

273 **RESULTS**

274 Four congruent themes under the conceptual framework gives the order of the results. The
 275 issues identified are categorised into 1) human resources, 2) facility infrastructure, 3) health
 276 logistics and equipment and 4) referral management (Table 3).

277 Table 3: Major theme and sub-themes (factors)

Human resource capacities in health facilities	Nadowli district hospital <ul style="list-style-type: none"> • Staff shortages on service delivery Staffing and the effects on sub-district health facilities <ul style="list-style-type: none"> • Skilled attendance at birth • Nurses – expectant mother relationships • Management of basic and emergency obstetric cases
Health facility infrastructure	<ul style="list-style-type: none"> • Service space in maternity units • Water supply • Lighting system
Medical equipment and logistics availability and functionality	Nadowli District Hospital <ul style="list-style-type: none"> • Logistics shortages on infection control procedures Sub-district health facilities <ul style="list-style-type: none"> • Essential medicines at the sub-district level • Transport services
Management of referrals of emergency obstetric and newborn complications	<ul style="list-style-type: none"> • Typical referral management procedure at the sub-district healthcare level Transport services during referrals <ul style="list-style-type: none"> • National ambulance services • Public and private transport services • Managing information and communication during emergency obstetric referral

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279

1. Human resource capacities in health facilities

281 Nadowli district hospital

282 At the time of the survey (2016), there were three resident medical doctors (1 female and two
 283 males) in the hospital (Table 3). Ten midwives provided care at the maternity ward to clients,
 284 conducting labours and deliveries including general gynaecological cases on admission. Non-
 285 midwives (Community health and Enrolled nurses) did not attend to childbirths or provide
 286 any other support in managing labour at the maternity unit (because of the definition of
 287 skilled attendance) regardless of the number of midwives that may be on-duty. Two

288 anaesthetics nurses go on-duty in turns throughout the weekdays for eight hours daily (Table
 289 4). The number of professional staffing has been unstable over the years (2013-2016) with
 290 the number of Midwives and Medical Doctors decreasing than increasing (Table 4).

291 **Table 4: Available staff at Nadowli district hospital (from 2013-2016)**

Year/ Core staff	2013 Number (%)	2014 Number (%)	2015 Number (%)	2016 Number (%)
Doctors (General practitioners)	1 (1.72)	2 (2.25)	3 (2.54)	3 (2.86)
Physician Assistants	1 (1.72)	2 (2.25)	2 (1.69)	3 (2.86)
Midwives	4 (6.91)	8 (8.98)	13 (11.02)	10 (9.52)
Registered General Nurses	20 (34.48)	30 (33.71)	39 (33.05)	39 (37.14) [3, 7.7% on study leave]
Enrolled nurses	31 (53.45)	46 (51.69)	59 (50.00) [11, 18.6% on study leave]	48 (45.71)
Anaesthetists	1 (1.72) [on duty for 8 hours daily]	1 (1.12) [on duty for 8 hours daily]	2 (1.70) [1 on duty at a time for 8 hours]	2 (1.90) [1 on duty at a time for 8 hours]

			daily]	daily)
Total (%)	58 (100.00)	89 (100.00)	118 (100.00)	105 (100.00)

292 Source: Field survey, May 2017.

293 ***Staff shortages on service delivery***

294 The professional staff shortages at Nadowli district hospital were found to be contributing to
 295 staff role stress and unnecessary referrals of pregnancy and newborn cases to other hospitals
 296 (mostly to Wa regional or Jirapa district hospitals).

297 *“It is only two anaesthetists that are in the hospital. Sometimes, one will be on leave leaving
 298 only one. We could call the anaesthetist, and it [the phone] is switched off. Other times, he
 299 will tell us he is very far away. The doctors too are sometimes few, maybe the doctor is gone
 300 on official duty and very far away from the hospital or maybe throughout the day and night;
 301 the doctor might have worked so hard that if he tries to attend to the next case, the outcome
 302 may be severe. Therefore, it is referred out of the facility”* [IDIs, other nurses].

303 Midwife shortages prolong the time mothers spend accessing ANC services.

304 *“Due to a shortage of midwives, pregnant women can spend the full day seeking care [at the
 305 hospital], which discourages the very distant communities from seeking care”* [IDIs, other
 306 nurses].

307 **Staffing and the effects on sub-district health facilities**

308 Data from the eight sub-district health facilities indicated shortages of skilled healthcare staff
 309 was a persistent challenge to healthcare management. Among the surveyed health facilities,
 310 62.5% (5) (3 health centres and 2 CHPS compounds) had resident midwives while Nanvilli
 311 health centre, Duang (DCHPS) and Jimpensi CHPS compounds (JCHPS) had no midwife.

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3 312 Jang Health centre (JHC) had two midwives (but one at post). The midwife was assigned to
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5 313 each health facility to provide all MNH services to clients - ANC, labour, childbirth care,
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7 314 other general ailments from the populace, in addition to performing administrative roles as
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9 315 facility head.

10
11
12 316 Almost all health facilities had Community Health Nurses (CHNs) (13 in total) and Enrolled
13
14 317 nurses (ENs) (6 in total). There was also one Registered General Nurse, one Physician
15
16 318 Assistant, two field technicians and one mental health professional located in the region.

19 319 *Skilled attendance at birth*

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22 320 WHO's definition of "skilled attendance" at birth denotes employing the services of a
23
24 321 midwife or doctor, which is a significant challenge in rural Ghana. The staffing challenges
25
26 322 motivate the health service management at the district level to endorse Community Health
27
28 323 Nurse and Enrolled Nurse supervised delivery as skilled birth, even if they had no midwifery
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30 324 training.

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34 325 *"How about the CHNs we put at the CHPS compound and ask them, when a woman is*
35
36 326 *delivering, they should catch (receive)? Therefore, I [DoN] think any delivery that is*
37
38 327 *supervised by a trained health worker should be considered skilled delivery. So, the CHNs*
39
40 328 *are forced to always refer to facilities with midwives, and considering the distances, we*
41
42 329 *record poor outcomes or home births. Will they go?"* [IDIs, other nurses, DoN, male, DBID].

43
44
45 330 The number of midwives in the Daffiama/Bussie/Issa district was deemed inadequate to serve
46
47 331 the numbers of pregnant women:

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49
50 332 *"The district has five health centres and twelve CHPS compounds. However, we currently*
51
52 333 *have seven (7) midwives at the post which is inadequate to provide maternal healthcare to*
53
54 334 *many pregnancy issues we face each day. Even the district capital, Issa needs more than one*
55
56 335 *midwife; but we are forced to make do with just one"* [IDIs, other nurses, DoN, male, DBID].

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3 336 The midwives themselves agree with the above assessment:
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6 337 *“I am the only midwife and always stressed up. Whenever I have two or three labour cases at*
7 338 *the same time, it is stressful working all the time. Also, if I am conducting ANC and a labour*
8 339 *case is brought in, I suspend the ANC and attend to that one. Sometimes, expectant mothers*
9 340 *default ANC when it happens that way, and it becomes difficult tracing them because I am*
10 341 *alone”* [IDIs, In-charge, midwife, WCHPS].
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14 342 The skills shortage affects the quality of prenatal and postnatal services delivery:
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16

17 343 *“We do not have enough skilled staff. Therefore, the expectations of clients are sometimes not*
18 344 *met. As I said earlier, one midwife is unable to explain certain issues clearly for pregnant*
19 345 *women to understand because she has limited time to carry out all [the] education and*
20 346 *detail[ed] explanations”* [IDIs, Other nurses].
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28 348 ***Nurses – expectant mother relationships***
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31 349 Negative attitudes of some nurses towards pregnant women can act as a deterrent to expectant
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33 350 mothers:
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36 351 *“Expectant mothers receive cheeky words from the nurses, so some do not receive maternal*
37 352 *healthcare at the clinic because they have received enough of the insults. They are afraid to*
38 353 *divulge the truth for fear of receiving worse treatments in subsequent attendance”* [FGDs,
39 354 non-pregnant women, Naro/Korinyiri].
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43 355 Discussants in another community suffered similar treatments:
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46 356 *“I have not been to other clinics, but the nurses in our clinic do not give us attention at all*
47 357 *whenever we seek care at night or evening. They might not even utter a word, before going*
48 358 *back into their residences. When the client or family insist, they write a referral letter. Given*
49 359 *the odd hour, how are we going to manage the case to Wa or Nadowli hospital?”* [FGDs,
50 360 non-pregnant women, Jang].
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3 361 Although health centres and CHPS compounds are expected to provide a twenty-four-hour
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5 362 service to communities, some clients were denied care.

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8 363 *“Some nurses would even tell us they do not run shifts and so will not work after 2 pm”*
9 364 [FGDs, non-pregnant women, Jang].

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11 365

12 13 14 366 ***Management of basic and emergency obstetric cases***

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16 367 Among the eight sub-district health facilities (health centres and CHPS compounds), 7
17
18 368 (85.5%) regularly only received primary obstetric cases, and 1(12.5%) received both basic
19
20 369 and comprehensive emergency obstetric cases. However, half of the health facilities managed
21
22 370 one comprehensive emergency obstetric case each in three years (2013-2015) preceding the
23
24 371 study; two health centres confirmed they had managed five or more obstetric complications
25
26 372 in the same time frame. Three-quarters of the sub-district healthcare settings did not have the
27
28 373 necessary skilled staff to manage obstetric cases.

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33 34 35 375 **2. Health facility infrastructure**

36 37 38 376 ***Service space in maternity units***

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41 377 Nadowli district hospital was the only public hospital serving the two districts and was the
42
43 378 highest referral facility. It had 76 beds, including 12 beds for the maternity ward and two
44
45 379 delivery beds in the labour section.

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49 380 *“For the labour ward, we have only three beds, out of which only two are used. We use the*
50 381 *third bed as a last resort, although it is not meant for childbirth. It is for examination. In*
51 382 *critical situations, we are forced to conduct delivery in the manual vacuum aspiration (MVA)*
52 383 *room”* [IDIs, Other Nurses].

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3 385 ***Water supply***
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6 386 None of the sub-district health facilities had potable water for usage by the workers and
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8 387 cleaning of the premises, meaning that expectant and postnatal mothers were often found
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10 388 drawing water for the health facilities or returned home to draw water for nurses if they
11
12 389 sought care without it. Alternatively, the midwives would have to leave the mothers in the
13
14 390 healthcare setting in search of water for cleaning. Thus, “*some expectant mothers get*
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16 391 *discouraged from giving birth there.*” [IDIs, other nurses, DoN, male, DBID].
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19 392 ***Lighting system***
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22 393 Ghana government’s rural electrification initiatives were understood to have covered a
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24 394 significant part of the countryside. Despite this, not all old and recently constructed health
25
26 395 facilities were connected to the national grid. For instance, Duang CHPS was inaugurated
27
28 396 around 2015 but continues to experience intermittent power outages from faulty wiring
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30 397 system. A similar limitation was found at Charikpong health centre (one of the premier health
31
32 398 facilities in the district), and Nanvilli health centre depended on patients to provide fuel to
33
34 399 power the facility’s generator; without fuel, either the delivery would have to be transferred
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36 400 elsewhere or be carried out in the presence of often inappropriate family members:
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39
40 401 “*We do not have a source of water and light. When I am conducting delivery, I use a lamp or*
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42 402 *generator. However, the generator must be fuelled by the relative of the expectant mother.*
43
44 403 *Due to the cost, they are not able to afford. I use torchlight when there is a tear. I had a*
45
46 404 *labour case where the mother sustains some lacerations which I have to suture. Sometimes, I*
47
48 405 *involve the relatives because I cannot hold the torchlight while suturing, and patients’ rights*
49
50 406 *are violated, because that may not be the right person to see her nakedness*” [IDIs, midwife,
51
52 407 NHC].
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3. Medical equipment and logistics availability and functionality

Nadowli District Hospital

The hospital has inadequate equipment despite the significant threshold population it serves. The entire hospital operated on one anaesthetic machine, a dysfunctional haematology analyser at the laboratory and an incomplete resuscitation table, all of which affects service delivery. Despite the occurrence of stillbirths and neonatal deaths, there was no neonatal intensive care unit in the hospital. Other challenges included:

“Frequent power fluctuations are causing significant breakdowns in the equipment, i.e. blood bank refrigerators, autoclaves, air conditioners and theatre lamps. It further affects service delivery in the maternity section” [IDIs, other nurses].

Only a poorly supplied resuscitation table for preterm delivery care is available:

“Resuscitation table requires many items so that in case a baby is born and is asphyxiated; we can conduct it with ease. The table we have now is not well-equipped. We are only managing to save lives” [IDIs, other nurses].

Sub-district health facilities

All the Health Centres (HCs) had midwives and conducted childbirths. While the CHPS compounds without midwives were not allowed to conduct childbirths or deal with other emergency obstetric situations, a bed and set of delivery equipment were provided for all compounds. Only two HCs had a manual vacuum aspiration kit. There was other necessary (and essential) equipment available for checking vital signs at the health centres: blood pressure (BP) apparatus, thermometer, weighing scale, including foetus cope and foetal Doppler, but not all were in usable condition. Some CHPS compounds did not have necessary logistics such as vaccine fridge:

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3 433 *“There is electricity here now, but we do not have a vaccine fridge. When we even conduct*
4 434 *childbirth, we have to ride to Kojokpere health centre for poliomyelitis vaccine for the*
5 435 *newborn and return the remaining for storage. When expectant mothers are around the 20th*
6 436 *week of gestation, we administer tetanus toxoid injection (TTI), but the vaccine cannot be*
7 437 *stored here”* [IDIs, In-Charge, male, JKCHPS].

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11 438 Similarly, the CHPS compounds often did not have the mandatory equipment to manage
12 439 emergency deliveries or resuscitate asphyxiated newborns, such as Ambu bags, meaning that
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14 440 at times *“we see that the woman will be struggling and we cannot do anything to help”* (IDIs,
15
16 441 In-charge NCHPS).

21 442 ***Logistics shortages on infection control procedures***

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24 443 Some health facilities did not have necessary daily non-drug consumables for administering
25 444 care. While Rapid Diagnostics Test (RDT) kits (for malaria) were readily supplied to some
26 445 facilities, infection control items such as facilities for handwashing and hand gloves were
27 446 often not provided for some facilities:

28 447 *“We have had consignments on the RDT which had no gloves included. Therefore, we do use*
29 448 *bare hands to conduct the tests. The improvised hand gloves you [interviewer] saw me wear,*
30 449 *were old gloves I found because we do not have hand gloves in the entire facility and the*
31 450 *current RDT kits were not supplied with gloves”* [IDIs, In-charge, male, JKCHPS].

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38 451 Another identified how a shortage of gloves was *“the reason I improvised with hazardous*
39 452 *materials (rubber bag) to conduct HIV/AIDS and Syphilis tests”* [IDIs, In-charge, male,
40 453 JKCHPS].

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50 454 The National Malaria Control Programme (NMCP) scaled-up access and universal coverage
51 455 to provide long-lasting insecticide bed nets (LLINs) to all expectant mothers and children
52 456 who are under five years of age, however, some pregnant women in these districts were

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2
3 457 denied access to these services. Some health facilities were not included in the regular
4
5 458 consignments of supplies.
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8 459 *“When I came here, there were no mosquito nets in the facility. We do not also have*
9
10 460 *sulphadoxine-pyrimethamine (SP); it is prophylaxis for malaria prevention in pregnancy.*
11 461 *Since I came to the installation, there has not been any SP for the pregnant women”* [IDIs,
12
13 462 midwife, NHC].
14

15 463 ***Essential medicines at the sub-district level***

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18 464 While *“the WHO protocol recommends antibiotics for pregnant women who give birth*
19
20 465 *newly”* [IDIs, other nurses], the National Health Insurance Drug lists for CHPS compounds
21
22 466 prohibit prescription of antibiotics to newly delivered mothers, although it is mandatory for
23
24 467 mothers who give birth. This is because the CHPS *“compound is a small facility. When we*
25
26 468 *prescribe it, NHIS refuse to pay. Therefore, we sell it to them [the patient] which they always*
27
28 469 *complain they do not have money to pay for medicines”* [IDIs, other nurses].
29
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31
32 470 Some health facilities did not have other essential medicinal products for conducting
33
34 471 childbirth.
35
36

37 472 *“I came in December 2015, and there was no oxytocin, no Vitamin K₁ for the newly born*
38
39 473 *babies. As at now, still, there is no vitamin K₁ in the facility”* [IDIs, midwife, NHC].
40

41 474 As a result of other changes in health policy, there were other limitations placed health
42
43 475 centre midwives prescribing certain essential medicines to manage labours.
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45

46 476 *“At the health centre, we cannot use the Zeamatin (if the woman is having preterm, we*
47
48 477 *cannot give, we have to refer to Nadowli Hospital)”* [IDIs, Midwife, CHC].
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50 478 ***Transport services***

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3 479 The majority of the health facilities did not provide transport (for example, motorbikes) for
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5 480 midwives to visit communities, thereby restricting their ability to engage in health education,
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7 481 to follow up on women not attending ANC, and to carry out routine immunisations:
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9

10 482 *“We have so many maternal and newborn programmes that require motorbikes, but we do*
11
12 483 *not have enough motorbikes for all the facilities. Aside from the bikes, some of the*
13
14 484 *communities are hard-to-reach”* [IDIs, DoN, other nurses, female].
15

16 485 **4. Management of referrals of emergency obstetric and** 17 18 19 486 **newborn complications**

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22 487 The referral hospital reported receiving emergency obstetric cases from the health centres and
23
24 488 CHPS compounds. Expectant mothers referred during labour were 54 (5.22% of births) in
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26 489 2012, 36 out of (10% of births) in 2013, 24 (7.09% of births) in 2014 and 17 (7.13% of
27
28 490 births) in 2015.
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31 491 **Typical referral management procedure at the sub-district healthcare level**

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34 492 The model below typifies the referral pattern which pertains to the communities, with a focus
35
36 493 on worst case scenario (Figure 2).
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40 494 **Figure 2: Pictorial view of typical referral management in the study area**

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45 496 All four health centres received labouring mothers and obstetric referrals from the CHPS
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47 497 compounds and across all communities in their catchment area, with the number of referrals
48
49 498 significantly influenced by their geographical location. Nearly all maternity cases brought to
50
51 499 the health centres originated from the remotest communities.
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55 500 ***Transport services during referrals***

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3 501 *National ambulance service*
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6 502 There were two groups of ambulance services operating in both districts to improve health
7
8 503 service delivery; the hospital ambulance service and the National Ambulance Service (NAS)
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10 504 station. Each of them had one vehicle serving the two districts and other districts which were
11
12 505 within its catchment area. The NAS station was situated at Nadowli but served any other
13
14 506 district that gave them a call for emergency case(s) within the UWR. Meaning, the hospital
15
16 507 vehicle and the NAS vehicle were both stationed at Nadowli leaving the far hinterland
17
18 508 without ready access to vehicular transport during emergencies. There was one dysfunctional
19
20 509 ambulance vehicle for all referrals to and from the Nadowli hospital. Daffiama health centre
21
22 510 was the only health facility in Daffiama/Bussie/Issa district with double cabin pickup for
23
24 511 emergency referrals of all patients and day-to-day operations of the facility. There were no
25
26 512 available means of transport in any of the sub-districts except Daffiama health centre, with
27
28 513 their car serving as an official vehicle as well as transferring emergency obstetric and
29
30 514 newborn complications. However, the location of Daffiama health centre is within twenty
31
32 515 minutes' drive of Nadowli hospital, closest than all other communities in the district.
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37 516 *Public and private transport services*
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39
40 517 Lack of ambulances means that the majority of clients are reliant on public means of
41
42 518 transport. This implies the client and family will usually have to wait until certain hours in
43
44 519 the day to access transport:
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46

47 520 *"If we are to send someone to a referral facility and it is around 10 am, the client cannot get*
48 521 *means because all the vehicles go to Wa [region's capital]. Unless in the evening that they*
49 522 *return to the community"* [IDIs, CHO, DCHPS].
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52 523 The search for affordable transport, whether it be by tricycle, motorbike or pick-up car, can
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54 524 often result in a delay in accessing the next level of care.
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3 525 “During referrals, we wait for several hours before they can get modes of transport to the
4 526 next level of healthcare. We do not also have laboratory services in the entire district so for
5 527 us to conduct the routine laboratory investigations, we refer expectant mothers to Nadowli or
6 528 Wa which becomes a challenge for many pregnant women. Even for pregnant women to get
7 529 money to arrange for means of transport to the next level of care is always a problem” [IDIs,
8 530 midwife, WCHPS].

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13 531 As a general rule, it was the responsibility of the expectant mother (or their family) to arrange
14 532 for means of transport during emergency referrals, because of a shortage of emergency
15 533 vehicles. The cost often limited the ability of the expectant mother to receive care.

20 534 *Managing information and communication during emergency obstetric referral*

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22
23 535 The telecommunication sector presents a significant challenge in managing referrals in some
24 536 communities. Vodafone and MTN Ghana telecommunication service providers had network
25 537 coverage in the communities, although some communities had challenges accessing
26 538 networks. During the field data collection exercise, the first author found that Charikpong,
27 539 Nanvilli/Siruu, Jimpensi/Kenkelley and Duang communities had intermittent telecom
28 540 networks. Therefore, mobile phone users had the option to either climb up a tree in a strategic
29 541 area or hover around various signal hotspots (identified by the community) to make a phone
30 542 call. The facility heads agreed with this observation, noting that:

31
32 543 “Our mobile phones network is a serious challenge...Therefore, when we have an emergency
33 544 case, how to link with the national ambulance or the ambulance at Nadowli hospital is
34 545 always a problem” [IDIs, midwife, WCHPS].

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47 48 49 547 **DISCUSSION**

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3 548 By utilising the structure of the BPCR monitoring and evaluation framework for health
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5 549 facilities, the results of this study provide an insight into the preparedness of healthcare
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7 550 facilities to provide efficient obstetric and newborn to the communities.
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9

10 551 As far as we know, this study is one of the first to assess health facility preparedness for birth
11
12 552 complication readiness in the Nadowli-Kaleo and Daffiama-Bussie-Issa districts of Ghana.
13

14 553 The barriers to improved maternal health service utilisation and the potential to address these
15
16 554 complexities are well documented in the literature. Extrinsic and intrinsic inequities in access
17
18 555 including transport arrangements and management of referrals are also identified to support
19
20 556 existing findings in related districts of the Upper West Region (UWR).¹⁴
21
22

23
24 557 Skills upgrading programme by the GHS for sub-district level staff (since 2004),^{19 35} sort to
25
26 558 increase skilled staffing capacities of the facilities, however, there were inadequate skilled
27
28 559 health staff (i.e. licensed midwives and medical doctors) , which provide many challenges for
29
30 560 the few staff available, including role stress and undignifying behaviour patterns towards
31
32 561 mothers, which support previous observations.²³ At the hospital, one midwife may be on duty
33
34 562 to manage all admissions, including new admissions and emergency referrals for the entire
35
36 563 maternity unit. There were no remuneration packages to motivate the few skilled staff, aside
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38 564 from the average monthly salary. The impact of shortages is compounded when referrals are
39
40 565 made between district hospitals because of lack of staff at the referring hospital or to other
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42 566 facilities with insufficient staff. Similar gaps exist in the Upper East Northern Regions. ²³
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45 567 These findings are consistent with other studies in ten referral district hospitals in Ghana,²⁰
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47 568 India, Tanzania and Ethiopia³⁶ and other developing countries.^{17 37 38} Shortage of, and limited
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49 569 access to licensed staff lends support to the view of some writers that, utilising appropriately
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51 570 trained TBAs, CHNs and ENs in the mainstream childbirth care in Ghana could reduce some
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53 571 of the current frustrations associated with managing obstetric complications and referral
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55 572 processes,²⁵ although this is not without its challenges. It was found that poor treatment of
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3 573 pregnant women discouraged skilled maternal health service utilisation with its attendant
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5 574 implications on the health outcomes in the rural communities.²⁸ Although many of these
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7 575 behaviours could be attributed to the role stress identified in this study, it nevertheless defies
8
9 576 professional codes of conduct and the priorities of the country and stakeholders in general.²⁸

11
12 577 The Ministry of Health is a policy oriented-body while Ghana Health Service implements the
13
14 578 initiatives. Based on the Ministry's Programme of Work (POW, 2014-2017), there were
15
16 579 initiatives by Ghana Health Service (GHS) to increase the country's performance on MNH
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18 580 indicators in particular, through ANC defaulter-tracing, home-visiting, free ANC services for
19
20 581 all mothers with active National Health Insurance Scheme (NHIS) subscription, focussing on
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22 582 preventive care through the sub-district structures.^{14 23}

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25
26 583 Despite these, many factors limit the quality of care provided at the facilities, such as general
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28 584 under-investments in the health system concerning health workforce, medical equipment,
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30 585 medicines, coupled with other multi-sectoral constraints such as poor road infrastructure,
31
32 586 electricity and water. Systemic issues including disrespect, irregular service availability at
33
34 587 sub-district facilities and, midwife absenteeism had a significant impact on service delivery.

35
36
37 588 Efficient lighting systems, water facilities and essential medicines reportedly motivate and
38
39 589 increase skilled health services uptake. However, reduced laboratory services and inadequate
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41 590 space and equipment in childbirth rooms in all healthcare settings provided limited
42
43 591 confidence to women accessing ANC and contemplating birthing in the health facility.

44
45 592 Similar findings were reported elsewhere in the Upper West Region of Ghana and Kenya.^{14 25}

46
47 593 ³⁹ The challenges motivated born-before-arrival syndrome in the Upper West Region.²⁵ An
48
49 594 evaluation in Ghana, Malawi and Kenya also found informal cost and cultural
50
51 595 appropriateness of ANC services as key motivators to patronising skilled maternity care.⁴⁰ In
52
53 596 most locations, healthcare facilities were rudimentary, and while the hospital had better
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3 597 equipment and amenities (compared to the health centres and CHPS compounds), irregular
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5 598 power supply had similar negative impacts on service delivery.⁵ The health facilities with
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7 599 intermittent electricity supply were unable to conduct deliveries at night. Most sub-district
8
9 600 health facilities (CHPS compounds) had inadequate access to vaccine fridge and the power
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11 601 grid to store vaccines, and having to travel for long distances for necessary vaccines such as
12
13 602 tetanus toxoid injection (TTI) vaccines and other anti-malaria prophylaxis diminished
14
15 603 efficacy and efficiency of the healthcare delivery system⁴¹. Conversely, some facilities had no
16
17 604 readily available medicines such as oxytocin to induce labours. Other referrals were
18
19 605 prompted by NHIS drug policy which prevents the staff at CHPS compounds from
20
21 606 prescribing necessary antibiotics to newly delivered women, suggesting that revision of the
22
23 607 NHIS user-fee exemption policy on maternal and neonatal healthcare would be appropriate.¹⁴
24
25 608 These findings are congruent with other studies in India and a systematic review on this
26
27 609 subject.^{17 42} An earlier evaluation in district hospitals in Ghana revealed that they were the
28
29 610 highest referral point for many obstetric complications. Meanwhile, many of them did not
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31 611 have the necessary logistics and staff to manage normal childbirth labour and
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33 612 complications.²⁰
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37
38 613 The project for improvement of maternal and child health in the Upper West Region by JICA
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40 614 provided elaborate education for district and sub-district healthcare staff on managing
41
42 615 emergency referrals⁴³. A fundamental requirement was to have the midwife accompany the
43
44 616 client to the receiving facility. Nevertheless, considering the staffing inadequacies and the
45
46 617 lack of transport services linking the communities coupled with the behavioural norms on
47
48 618 early decisions to seek care,^{5 16} the approach may further intensify the current shortages of
49
50 619 midwives and result in adverse outcomes due to the distances and lack of readiness for
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52 620 complication, identified in another component of the study.^{5 44} Despite the geographical
53
54 621 isolation of communities to referral centres, and between health facilities, much like those

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2
3 622 experienced in other isolated locations, such as Uttar Pradesh, India.³⁷ A key difference may
4
5 623 be the fact that the main referral hospital (at Nadowli) serving both districts had no
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7 624 ambulance facility to conduct timely transfer of obstetric emergencies and preterm babies to
8
9 625 appropriate health facilities such as Jirapa Hospital or Wa Hospital which were the nearest.

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11
12 626 Although by convention, all health facilities in Ghana operate twenty-four hours for all days,
13
14 627 there was the tendency to deny clients seeking emergency care at certain times, thereby
15
16 628 defying the core mandate of the sub-district health structures of providing preventive and
17
18 629 basic curative care including obstetric first aid.^{23 25 33} The common limitations connecting
19
20 630 with referral hospitals (mostly Nadowli or Wa) and means of transport create dissonance
21
22 631 between the already aggrieved expectant mother in pain and the possibly stressed Nurse who
23
24 632 provides care to a large number of population on the one hand, and the healthcare
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26 633 targets/indicators on the other.

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30 634 Non-availability and affordability of transport and telecommunication systems during
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32 635 obstetric emergencies were a contemporary issue between Nadowli or Wa hospital (the
33
34 636 closest to study communities) and sub-district health facilities. The findings demonstrate that
35
36 637 demand for skilled care was on the increase, but the absence of ambulance/vehicular linkage
37
38 638 and coverage could delay or cancel obstetric referrals despite regular demand for transfers
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40 639 from lower level facilities. The challenges identified in this study correspond to those already
41
42 640 identified elsewhere in rural Ghana, suggesting the need to streamline referral management
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44 641 systems which are critical to reducing avoidable mortalities and inequities in access.^{5 14 23}

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46
47 642 Studies by Buor and colleagues^{45 46} in Ghana and sub-Saharan Africa and another study in the
48
49 643 Upper West region demonstrated that distances to health facilities contributed to reduced
50
51 644 utilisation and outcomes of obstetric referrals,⁴⁷ thereby providing pregnant women to fewer
52
53 645 alternatives during complications and childbirth labour.²⁵ This study may have
54
55 646 underestimated the impact of these barriers compared with previous evaluations on this

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3 647 subject, but the adverse effects of home or born-before-arrival syndrome at the health facility
4
5 648 are consistent with other research.^{25 42}
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7

8 649 **Implications for future research, policy and maternal health service delivery**

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10
11 650 Reports show that Ghanaians have increased utilisation of skilled maternal healthcare^{23 27}, it
12
13 651 also implies that policy initiatives at improving upon current systemic bottlenecks would
14
15 652 provide a way forward towards achieving global goals for the country. This is particularly
16
17 653 important because the majority of the chronic health cases leading to life-threatening
18
19 654 disabilities and mortalities are found in the hard-to-reach communities of the country³⁵. For
20
21 655 example, an evaluation in Ghana also noted that, although the national health insurance fee-
22
23 656 exemption policy has increased service uptake, inequities and geographical disparities in
24
25 657 access continue to exist between the rural poor and nonpoor, thereby causing low use among
26
27 658 the poor due to the informal costs on services and medicines.³⁵
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30 659
31
32 660 The many barriers in this study are interdependent and addressing them will require holistic
33
34 661 approach including community awareness and proactivity in managing obstetric
35
36 662 complications to help the health providers tackle the issues appropriately and on time.
37
38 663 Whereas these shortages in the health facilities may not be addressed in the short to medium
39
40 664 term due to cost implications, preventative measures could be facilitated at the community
41
42 665 level to influence behaviour and cultural change (as identified in other components of the
43
44 666 study)^{5 16 44} to help improve maternal and neonatal health outcomes.
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49 668 Instituting motivational packages (housing, additional allowances, and career
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51 669 opportunities) for Physicians and Midwives may have some potential to encourage staff to
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53 670 accept postings to rural areas, but the lack of equipment and essential medicines for
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3 671 continued knowledge and skill development could serve as a limitation. Global technological
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5 672 advancement and professional networking through the social media, telecommunication and
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7 673 the general internet services via reliable internet networks engender increased ambitions to
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9 674 advance in skill through education and career. However, the gap in these services to the
10
11 675 district level was extensive, suggesting that improving the mobile telecommunication
12
13 676 network and general internet services at the district level could also motivate acceptability of
14
15 677 postings to these locations. That aside, facilitating emergency referrals from the sub-district
16
17 678 health facilities to the health centres and the hospital could also improve with improved and
18
19 679 reliable telecommunication networks.
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22 680

23 24 681 **CONCLUSION**

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26
27 682 The health facilities at both grassroots and referral hospital levels in the districts were not
28
29 683 adequately prepared to provide quality maternal and neonatal healthcare, contributing, at least
30
31 684 in part, to the preference of many mothers for choosing not to take up ANC and favouring a
32
33 685 home birth. These factors present a discrepancy between policy and implementation. Some
34
35 686 policies and health reforms identified in the study including task-shifting, the twenty-four-
36
37 687 hour policy, drug prescriptions, staff relocation and the legal restrictions on antibiotic
38
39 688 prescriptions under NHIS reimbursement mechanisms had a profound impact on health
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41 689 system performance and adequate and quality MNH care as well as affecting referral
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43 690 management.
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47
48 691 Improving MNH services provided at the healthcare facilities by increasing the availability of
49
50 692 doctors, midwives, anaesthetists, labour beds, resuscitation equipment, essential medicines,
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52 693 ambulance services and improving access to basic amenities such as electricity and water
53
54 694 facilities, will assist rural Ghana to achieve the critical Sustainable Development Goal (SDG)
55
56 695 three (targets one and two) by 2030. The study recommends revisions to the prescription
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696 components of the NHIS, investigate codes of conducts of nurses and increased investment in
697 logistics as well as the management of staff postings.

698 **Strengths and limitations of this study**

699 This study has several strengths. It contributes to the scant literature on the barriers to service
700 delivery and access to, which impacts on MNH care in the Upper West Region of Ghana. The
701 majority of obstetric complications with profound impacts on MNH indicators are
702 predominant in the rural communities. Therefore, a brief assessment of what pertains to the
703 health centres and CHPS zones could trigger policy initiatives and district level oversight
704 responsibilities.

705 Despite the strengths, the study has limitations. Purposive sampling approach was used to
706 obtain data from the participants. Critics question the credibility of data through such
707 sampling procedure,⁴⁸ but this study was the first of its kind in these districts and considering
708 the findings, supported by general facility observation and cues during the interview, it is
709 reasonable to say relevant data was generated through the approach to support the research
710 objective. The sample was relatively small compared to the established norm, however, as a
711 mixed method study, data from the other participant groups were used to support and cross-
712 validate those of the healthcare settings; these results are reported elsewhere⁵.

713 **Figure 1. Study communities and health facilities**

714

715 **Figure 2: Pictorial view of a typical referral management in the study area**

716

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17
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19
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21
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36 732 **Data sharing statement:** No additional data are available.

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40 41 42 734 **References**

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Figure 1. Study communities and health facilities

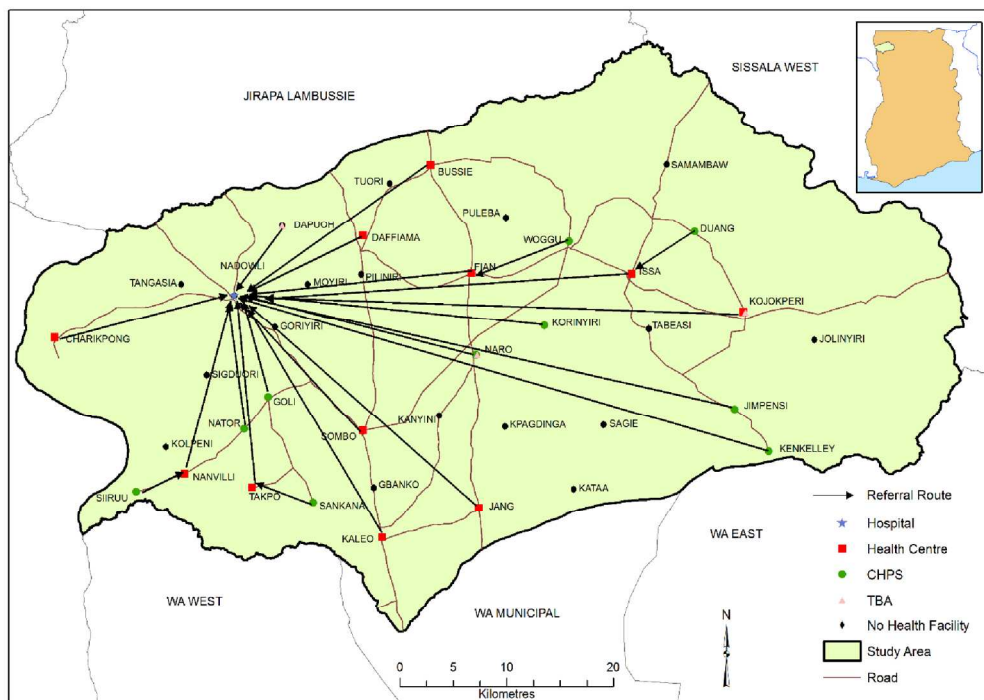
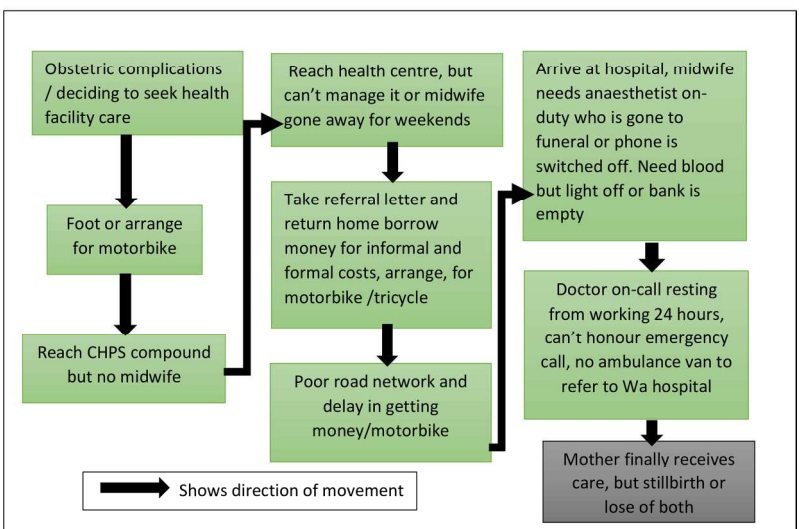


Figure 1. Study communities and health facilities

158x121mm (300 x 300 DPI)

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Figure 2: Pictorial view of referral management in study area



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Figure 2: Pictorial view of a typical referral management in study area

146x222mm (300 x 300 DPI)

Checklist of SQUIRE Guidelines followed in preparing the manuscript

S/N	Item	Page number
1	Title: the manuscript concerns an initiative to improve healthcare	1
2	Abstract	2
3	Introduction: Explains the aim of the study which emerge from existing unsatisfactory and unacceptable maternal and newborn service delivery in the study area.	4
4	Methods	6
5	Setting, participants and participant selection, data collection, processing and analysis.	7
6	Results: presents the findings of study	13
7	Discussion comprising the main findings and interpretation in relation to previous knowledge on the subject.	27
8	Conclusion	33
9	Limitations	33
10	Statements	34

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Perceived barriers to maternal and newborn health services delivery: a qualitative study of health workers and community members in low and middle-income settings

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Keywords:	Health facilities, Birthing centres, maternal care patterns, newborn care, Health attitude, Ghana

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1 **Perceived barriers to maternal and newborn health services delivery: a qualitative**
2 **study of health workers and community members in low and middle-income settings**

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2
3 21 **Abstract**
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6 22 **Objectives:** In considering explanations for poor maternal and newborn health outcomes,
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8 23 many investigations have focused on the decision-making patterns and actions of expectant
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10 24 mothers and families, as opposed to exploring the “supply side” (health service provider)
11
12 25 barriers. Thus, we examined the health system factors impacting on access to, and delivery of
13
14 26 quality maternal and newborn healthcare in rural settings.

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16
17 27 **Design:** A semi-structured qualitative study using face-to-face in-depth interviews with
18
19 28 health professionals, and focus group sessions with community members, in eight project
20
21 29 sites in two districts of Upper West Region, Ghana was employed. Participants were
22
23 30 purposively selected to generate relevant data to help address the study objective. The survey
24
25 31 was guided by WHO standard procedures and Ghana Health Ministry’s operational work plan
26
27 32 for maternal and newborn care.

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30
31 33 **Setting:** Nadowli-Kaleo and Daffiama-Bussie-Issa districts in Upper West Region, Ghana.
32
33

34 34 **Participants:** Two hundred and fifty-three participants were engaged in the study through
35
36 35 convenient and purposive sampling: healthcare professionals (pharmacist, medical doctor,
37
38 36 two district directors of health services, midwives, community health and enrolled nurses) (n
39
40 37 = 13), and community members comprising opinion leaders, youth leaders and adult non-
41
42 38 pregnant women (n = 240 in 24 units of focus groups).
43
44

45
46 39 **Results:** Results show significant barriers affecting the quality and appropriateness of
47
48 40 maternal and neonatal health services in the rural communities and the Nadowli District
49
50 41 Hospital. The obstacles were inadequate medical equipment and essential medicines,
51
52 42 infrastructural challenges, shortage of skilled staff, high informal costs of essential medicines
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54 43 and general limited capacities to provide care.
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2
3 44 **Conclusion:** Implementation of the birth preparedness and complication readiness (BPCR)
4
5 45 strategy is in its infancy at the health facility level in the study areas. Increasing the resources
6
7 46 at the health provider level is essential to achieving international targets for maternal and
8
9 47 neonatal health outcomes, and for bridging inequities in access to essential maternal and
10
11 48 newborn health care.

12
13
14 49 **Keywords:** Health facilities; birthing centres; maternal care patterns; newborn care; health
15
16 50 attitudes; Ghana

51 **Strengths and limitations of the study**

- 52 • The study provides the first comprehensive assessment of maternal and neonatal
53 health delivery from the perspectives of community residents and healthcare providers
54 in the two districts.
- 55 • The findings focus exclusively on views of participants' from sub-district health
56 facilities, the district hospital, health service management and the community.
- 57 • The study aims to identify factors affecting maternal and newborn health outcomes,
58 and thus the capacities of health facilities to provide quality health services was a
59 component of the multisite study into community perspectives on BPCR interventions
60 in the rural communities. This may not have rigorously incorporated all the issues
61 required for a stand-alone evaluation of the health system.
- 62 • The results represent the views of health facility managerial and another frontline
63 healthcare professionals, which may not reflect the views of all staff in the two
64 districts.
- 65 • Much of this component of the study is qualitative, which has both strengths and
66 limitations regarding processing and interpretation; hence it lacks statistical rigour.

67 **INTRODUCTION**

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2
3 68 Increasingly there are renewed commitments towards achieving the Sustainable Development
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5 69 Goals in advanced countries, however, in low and middle-income economies, inadequate
6
7 70 services delivery initiatives persist.¹ Globally, about 85% of obstetric complications occurred
8
9 71 during pregnancy, labour and childbirth and the early postnatal period in 2015.^{2 3 4}
10
11 72 Approximately 800 girls and women died as a result of pregnancy and childbirth-related
12
13 73 complications in 2015 in sub-Saharan Africa.^{4 5} An estimated 99% of all maternal deaths
14
15 74 occur in developing countries and more than half occur in sub-Saharan Africa (SSA).¹
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17 75 Although advanced countries recorded an estimated 11 to 14 deaths per 100,000 in 2015, 511
18
19 76 to 652 deaths per 100,000 were recorded in SSA within the same period. Ghana's maternal
20
21 77 mortality rate (MMR) was estimated to be between 358 and 319 per 100,000 in 2015.^{5 6}
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24
25 78 WHO noted that 75% of maternal deaths occur due to avoidable causes including severe
26
27 79 bleeding, sepsis, pre-eclampsia, unsafe abortion and complications in childbirth.¹ Sixty-five
28
29 80 percent of women die in Ghana due to similar causes¹. The United Nations Population Fund
30
31 81 (UNFPA) found that maternal deaths in Ghana could be reduced by 90% if expectant mothers
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33 82 were given ready access to emergency healthcare.⁷
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35
36
37 83 In 2015 the Sustainable Development Goals negotiated new targets of reducing the maternal
38
39 84 deaths ratio to less than 70 per 100,000 live births, as well as ending preventable deaths of
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41 85 newborns by 2030.^{1 5} There are two maternal healthcare strategies proposed in the renewed
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43 86 commitments to stakeholders, with a high potential for preventing avoidable obstetric deaths:
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45 87 skilled attendance at birth and emergency obstetric health care.^{8 9} These measures are
46
47 88 promoted through effective antenatal education and efficient management of referrals,
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49 89 coupled with adequate skilled healthcare professional attendance to both normal childbirths
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51 90 and those with obstetric complications.^{10 11} In many countries, these interventions form part
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53 91 of the birth preparedness and complication readiness (BPCR) strategy, a component of the
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55 92 antenatal care (ANC) program.^{4 12 13}
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1
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3 93 Although factors such as social, economic and cultural issues impact on the use of ANC and
4
5 94 implementation of BPCR¹⁴⁻¹⁶, there are also “supply side” (healthcare provider factors)
6
7 95 barriers to improving maternal health outcomes. These include commodities/logistics (drugs
8
9 96 and non-drug consumables, medical equipment), skilled human resources, appropriate
10
11 97 technology and the capacity to handle maternity cases.¹⁷ Availability of accessible emergency
12
13 98 obstetric services (such as parenteral oxytocics, antibiotics and anticonvulsants, assisted
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15 99 deliveries, manual extraction of the placenta, blood transfusions, and so on) are mandatory
16
17 100 for the continuum of quality maternity healthcare.^{3 18} Preference for facility-based childbirth
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19 101 can be high when there is the appropriate quality of care, with the necessary medical
20
21 102 facilities, such as equipment for surgery and blood transfusion services.^{19 20}

22
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25 103 For childbirth to be called skilled birth, the attendant must receive training from an accredited
26
27 104 health institution and be licensed to practice.^{20 21} The inadequacy of trained healthcare
28
29 105 workers, including midwives, was identified as a significant barrier to improved maternal and
30
31 106 neonatal health (MNH) outcomes. Although public and private sector efforts have recently
32
33 107 increased the numbers of skilled birth attendants (SBAs) on the global front, the opposite
34
35 108 exists in some sub-Saharan African countries. There, the nurse/midwife to population ratio
36
37 109 was estimated by the World Bank (for the periods of 2008-2014) as 0.9 per 1,000 for
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39 110 Ghana,²² and less than one to over 95,000 people in the study area since 2010,²³ compared to
40
41 111 the global standard of 4.45 per 1,000 people.²⁴

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45 112 Ghana began an innovative decentralised health programme in 2004 aimed at addressing
46
47 113 problems related to utilisation of skilled birth attendants, by upgrading the skills of
48
49 114 Community Health Nurses (CHNs) to Community Health Officers (CHOs) with basic
50
51 115 midwifery skills. The essence of this initiative was to equip CHNs with the core
52
53 116 competencies for managing labours and deliveries during emergencies.^{25 26} The policy
54
55 117 coincided with a ban on the utilisation of traditional birth attendants (TBAs), and was further

1
2
3 118 challenged by an ongoing shortage of physicians. For example, in 2012, the Upper West
4
5 119 Region (UWR) had eleven times fewer doctors compared to the Greater Accra (Ghana's
6
7 120 capital) and Ashanti regions; well over 50% of all doctors lived in Greater Accra with 20% in
8
9 121 the Ashanti Region. The remaining 30% resided in the other eight health/geographic
10
11 122 regions.²³

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13
14 123 Despite the implementation of the decentralised initiative, access to health facilities for
15
16 124 delivery is still comparatively low, with approximately 44% of women in UWR giving birth
17
18 125 in a healthcare facility.^{5 25} The rate is the second lowest in Ghana, and compares to 83% in
19
20 126 the Greater Accra Region, and 68% in the country overall.²³ Many women in the rural
21
22 127 communities continue to prefer care from traditional birth attendants (TBAs).⁵ In many cases,
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24 128 women choose other alternatives due to demand-side barriers, such as lack of autonomy in
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26 129 decision-making and financial and physical barriers to services, which discourages the
27
28 130 utilisation of appropriate healthcare.⁵

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32 131 There are also many supply-side barriers, despite local community potentials in rural
33
34 132 communities such as those of the Upper West Region (UWR) of Ghana. These include direct
35
36 133 bottlenecks in the health service delivery system impacting on potential service users, such as
37
38 134 physical infrastructure, drugs, equipment, finances, human resources^{9 17} and appropriate
39
40 135 transfer arrangements.¹⁴ The UWR has 174 health facilities with five district hospitals in the
41
42 136 ten districts and one municipality. However the region has the smallest number of kilometres
43
44 137 of tarred roads compared to the other nine regions of Ghana, with only Nadowli and Jirapa
45
46 138 townships having a direct link to the regional hospital via tarred road.²³ Before the study, an
47
48 139 ex-post evaluation of Country Programme Five (CP5) for Ghana by the United Nations
49
50 140 Population Fund (UNFPA) found thirty-six (90%) poor performing districts out of forty
51
52 141 districts in five regions (eight districts in each) with regard to MNH indicators.²⁷ Three (about
53
54 142 8.3%) of these underperforming districts were in UWR (Nadowli, Sissala East and Wa West).

1
2
3 143 CP5 (2006-2010) focused on three areas: a) reproductive health, population and development;
4
5 144 b) gender equity and women's empowerment and c) reproductive health and HIV/AIDS²⁷ As
6
7 145 a result of these limitations, UNFPA implemented Country Programme Six (2012-2016) in
8
9 146 those locations, which included the two study districts: Nadowli/Kaleo and
10
11 147 Daffiama/Bussie/Issa. Although the package included key logistics and equipment, as well as
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13 148 skills upgrade of staff, there has not been any known investigation into the current state of
14
15 149 maternal healthcare delivery services in these regions.^{19 25 28} Therefore, this study answered
16
17 150 the question: "what are the perceived barriers to maternal and newborn service delivery
18
19 151 in Nadowli-Kaleo and Daffiama-Bussie-Issa Districts of Ghana". Key indicators covered
20
21 152 were: staff capacities, basic equipment, service space/bed capacities, water and lighting
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23 153 facilities, medicines and other essential supplies for service delivery, as well as staff/maternal
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25 154 relations.
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32 156 **METHODS**

33 157 **Study setting**

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38 158 The study was a semi-structured qualitative design using face-to-interviews to explore
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40 159 barriers to skilled service delivery and utilisation in eight purposively selected study sites in
41
42 160 the Upper West Region of Ghana; four in Nadowli/Kaleo and four in Daffiama/Bussie/Issa.
43
44 161 The study area had a two-tier health system; the district level (the hospital) and 29 sub-
45
46 162 district level health facilities (13 health centres, and 16 Community-Based Health Planning
47
48 163 and Services (CHPS) compounds which are the lowest order in the Ghana Health Service
49
50 164 structure)^{29 30} (Figure 1). The CHPS compounds provide preventive services and obstetric
51
52 165 first aid including immunisations, vaccinations, health promotion and health education
53
54 166 activities, whilst the health centres provide both preventive and curative services to the
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167 communities. Six of these communities did not have access roads to the nearest hospital
168 (Nadowli Hospital).

169 The population of Nadowli/Kaleo district was 61,561 (46.7% males and 53.3% females),
170 constituting 8.8 percent of the region's population.³⁰ Daffiama/Bussie/Issa Districts had a
171 population of 32,827 (48.7% males and 51.3% females) representing 4.7% of the people of
172 UWR.²⁹

173 **Figure 1. Study communities and health facilities**

174

175 **Conceptual framework**

176 Health facility outputs are measured by the number of interventions for normal and
177 emergency healthcare provision^{31 32 33}. In order to achieve skilled maternal and newborn
178 attendance, a prerequisite to reducing avoidable infections and other morbidities and
179 mortalities, the Ghana Health Service, in accordance with WHO policies, instituted measures
180 to improve access to skilled and quality care in the country. The quality of MNH service
181 delivery is assessed using benchmarks; human resources, logistics, referral policy/processes,
182 and service delivery space/physical infrastructure^{24,31,32}. The monitoring and evaluation
183 frameworks for accessing health facility practices in relation to BPCR by JHPIEGO³¹ was
184 adapted to guide the design, interpretation and reporting of the findings. The policy document
185 prioritise timely access to relevant and quality care, in compliance with referral procedures,
186 management of emergency obstetric complications, infection control procedures and strict
187 adherence to the appropriate protocols and professional standards (Table 1), to improve
188 maternal and newborn care quality in facilities.^{23 32 33}

189 **Table 1. Indicators for monitoring health facility practice of BPCR**

Factors affecting BPCR of health facilities	Definition
Skilled human resource base of health facilities	Availability of midwives, anaesthetists and specialist doctors
Health facility infrastructure	Ready lighting system in facilities, spacious labour rooms
Logistics and equipment availability	Health facilities equipped with logistics and equipment necessary for providing quality and timely MNH care
Referral management	Transport or ambulance availability for efficient and effective transfer of emergency obstetric cases

190 Source: Adapted from existing literature and the BPCR toolkit by JHPIEGO³¹

191

192 *Study design*

193 Health services delivery and related factors influencing BPCR are complex^{19 20 23 25}, which
 194 necessitates the need to explore them from the perspectives of both community members and
 195 service providers. A qualitative approach was considered to be most appropriate, using focus
 196 group discussions (FGDs) and in-depth interviews (IDIs). The district health management
 197 provided time series data using a structured survey of their resource capacities and logistics,
 198 and referral management prospects and challenges.

199 **Participant selection**

200 Written informed consent was obtained from each participant. Following appropriate ethical
 201 approvals from Charles Sturt Human Research Ethics Committee (protocol numbers:

202 2016/013 and H16178 and Regional Health Directorate of Upper West Region, participants
 203 were selected in the following ways:

204 *Focus group participants*

205 A combination of key informant and purposive sampling procedures was adopted to identify
 206 and select a convenient sample of opinion leaders (n = 80), youth leaders aged 18-35 (n = 80)
 207 and nonpregnant women (who had childbirth experiences) (n = 80) to provide data in 24
 208 different group discussions, three in each community. The community representative, who is
 209 a nonpartisan but statutorily elected official representing each community at the District
 210 level, assisted in identifying potential participants for the FGDs. The sample sizes were pre-
 211 determined to facilitate data saturation and potential transferability of the findings to other
 212 contexts and settings (see the link for the detailed questionnaire and interview guide for all
 213 participant groups <https://doi.org/10.1371/journal.pone.0185537.s001>).

214 *Healthcare staff*

215 Skilled healthcare staff were included in the study to provide their opinions on health services
 216 delivery and outcomes. Upon receiving written support from the Health Directorates, the staff
 217 in charge of each of the healthcare facilities in the study area were asked to participate in the
 218 study. Three “other nurses” who were providing health services but not in managerial
 219 positions were purposively selected to submit further insights into expectant mother-ANC
 220 provider relationships and uptake of medical advice.

221 A summary of all participants can be found in Table 2.

222 **Table 2: Study participants, data types and sex disaggregation**

Participants	Age range (years)	Number	Data type	Sex disaggregation	No. of Communities
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Opinion leaders	18-59	80	Qualitative	22 females, 58 males	8
Non-pregnant women	18-59	80	Qualitative	All females	8
Youth	18-35	80	Qualitative	40 females; 40 males	8
Healthcare staff	25-59	13	Qualitative	11 females 2 males	10 (8 communities and two district health administrations)

For peer review only

223 **Research instruments**

224 An interview schedule containing structured and unstructured questions was applied to health
225 professionals, and surveyed staffing and logistical capacities to provide quality maternal
226 health services, healthcare financing issues and preparedness for birth and complications.

227 A similar semi-structured discussion guide was used for the FGDs with the community
228 members, which enabled in-depth investigation into community perspectives of BPCR
229 interventions, the causes of maternal and neonatal morbidities and mortalities, sociocultural
230 beliefs and practices impacting the use of maternal and newborn health services, and barriers
231 to healthcare uptake. The semi-structured interview guides were not pretested and were
232 conducted in ‘Dagaare’ (the local language).

233

234 **Data collection**

235 The FGDs were completed first, before the IDIs with the healthcare providers. This
236 arrangement provided the opportunity to cross-examine relevant issues emerging from the
237 discussions. Some of the key emergent issues identified included the sale of ANC routine
238 drugs and other essential medicines to clients with active health insurance subscriptions, and
239 the challenges associated with the insurance scheme, as well as patronage of the services of
240 traditional birth attendants.

241 Convenient venues were arranged within the communities for the FGDs. All discussions and
242 surveys were in the local language (*Dagaare*), as illiteracy was high.^{29 30} The IDIs were
243 conducted in English at scheduled locations in the health facilities. JS received training from
244 the Charles Sturt University Research Office on survey design, data collection and analysis,
245 supervised by JC and SW. Two experienced researchers (JS and FT) collected the data. All

246 surveys, IDIs and FGDs, were completed as planned, thereby resulting in a higher than
247 anticipated response rate. Data were collected within two periods: February to June 2016 and
248 January to May 2017.

249 **Data processing**

250 All interviews and group sessions were tape-recorded with the informed consent of the
251 participants. To achieve accuracy and dependability of the data, all audio recordings, except
252 those of the health professionals, were first transcribed (hand-written) in “Dagaare” and then
253 translated into English by JS. JS is a native of the region and writes and speaks the local
254 dialect. The interviews with healthcare staff were transcribed in English. Two separate
255 individuals from the Ghana Institute of Languages were engaged to verify the recordings with
256 the transcripts. WHO’s four-stage process for translation and adaptation of instruments
257 guided the transcription process.³⁴

259 **Data analysis**

260 Analysis of the qualitative data began in the field. After each interview, notes were made
261 containing: a) emerging opinions from the participants and how they could be noted and
262 applied to other interviews,⁵ b) what went well or not so well; c) what should be done
263 differently in future interviews and d) physical observations of health facilities, surface nature
264 of roads, interactions among participants and nurses. This interim analysis enabled the
265 researcher to add follow up questions to the interview schedule to clarify issues as they
266 emerged.

267 NVivo (version 7.5) was used to analyse the qualitative data. Analytical text categories and
268 themes related to “logistics, equipment, staffing, essential medicines” emerged from the
269 computerised coding using the NVivo, which were complementary themes to *a priori* topics

270 and sub-themes identified in the quantitative analysis and existing literature and experience.

Theme	Sub-themes (factors)
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271 The different factors affecting service delivery and skilled healthcare utilisation emerged as
 272 significant themes from the data (interview/FGD transcripts, field notes, field
 273 observations/reflections). These were thoroughly read and re-read to identify and index topics
 274 and categories. Participant opinions were subsequently chosen to support the themes. Finally,
 275 both the predetermined and emerged themes were pooled together to address the research
 276 question.

277 **Patient and public involvement**

278 The study design emerged from the implementation of the UNFPA CP6. Thus, the
 279 participants and the public were not directly involved in the conceptualisation and design of
 280 the study. Nevertheless, the findings of the study would contribute to policy and service
 281 delivery interventions in Ghana and similar geographical locations, which is the reason that
 282 the views of the intended beneficiaries were obtained for the study.

283 **RESULTS**

284 Four congruent themes under the conceptual framework determine the order of the results.
 285 The issues identified are categorised as 1) human resources, 2) facility infrastructure, 3)
 286 health logistics and equipment and 4) referral management (Table 3).

287 Table 3: Major theme and sub-themes (factors)

Human resource capacities in health facilities	Nadowli District Hospital <ul style="list-style-type: none"> • Staff shortages on service delivery Staffing and the effects on sub-district health facilities <ul style="list-style-type: none"> • Skilled attendance at birth • Nurses – expectant mother relationships • Management of basic and emergency obstetric cases
Health facility infrastructure	<ul style="list-style-type: none"> • Service space in maternity units • Water supply • Lighting system
Medical equipment and logistics availability and functionality	Nadowli District Hospital <ul style="list-style-type: none"> • Logistics shortages on infection control procedures Sub-district health facilities <ul style="list-style-type: none"> • Essential medicines at the sub-district level • Transport services
Management of referrals of emergency obstetric and newborn complications	<ul style="list-style-type: none"> • Typical referral management procedure at the sub-district healthcare level Transport services during referrals <ul style="list-style-type: none"> • National ambulance services • Public and private transport services • Managing information and communication during emergency obstetric referral

288

289

290 **1. Human resource capacities in health facilities**

291 **Nadowli District Hospital**

292 At the time of the survey (2016), there were three resident medical doctors (one female and
 293 two males) in the hospital (Table 3). Ten midwives provided care in the maternity ward,
 294 conducting labours and deliveries as well as admissions and general gynaecological care.
 295 Non-midwives (community health and enrolled nurses) did not attend to childbirths or
 296 provide any other support in managing labour at the maternity unit (because of the definition
 297 of skilled attendance) regardless of the number of midwives on duty. Two anaesthetics nurses

298 were on duty in turns on weekdays for eight hours daily (Table 4). The number of
 299 professional staff has been unstable over the years (2013-2016) with the number of midwives
 300 decreasing (Table 4).

301 **Table 4: Available staff at Nadowli District Hospital (from 2013-2016)**

Year/ Core staff	2013 Number (%)	2014 Number (%)	2015 Number (%)	2016 Number (%)
Doctors (General practitioners)	1 (1.72)	2 (2.25)	3 (2.54)	3 (2.86)
Physician Assistants	1 (1.72)	2 (2.25)	2 (1.69)	3 (2.86)
Midwives	4 (6.91)	8 (8.98)	13 (11.02)	10 (9.52)
Registered General Nurses	20 (34.48)	30 (33.71)	39 (33.05)	39 (37.14) [3, 7.7% on study leave]
Enrolled nurses	31 (53.45)	46 (51.69)	59 (50.00) [11, 18.6% on study leave]	48 (45.71)
Anaesthetists	1 (1.72) [on duty for 8 hours daily]	1 (1.12) [on duty for 8 hours daily]	2 (1.70) [1 on duty at a time for 8 hours]	2 (1.90) [1 on duty at a time for 8 hours]

			daily]	daily)
Total (%)	58 (100.00)	89 (100.00)	118 (100.00)	105 (100.00)

302 Source: Field survey, May 2017.

303 ***The effect of staff shortages on service delivery***

304 The professional staff shortages at Nadowli District Hospital were found to be contributing to
 305 staff role stress and unnecessary referrals of pregnancy and newborn cases to other hospitals
 306 (mostly to Wa regional or Jirapa district hospitals).

307 *“It is only two anaesthetists that are in the hospital. Sometimes, one will be on leave leaving*
 308 *only one. We could call the anaesthetist, and it [the phone] is switched off. Other times, he*
 309 *will tell us he is very far away. The doctors too are sometimes few, maybe the doctor is gone*
 310 *on official duty and very far away from the hospital or maybe throughout the day and night;*
 311 *the doctor might have worked so hard that if he tries to attend to the next case, the outcome*
 312 *may be severe. Therefore, it is referred out of the facility” [IDIs, other nurses].*

313 Midwife shortages prolonged the time mothers spent accessing ANC services.

314 *“Due to a shortage of midwives, pregnant women can spend the full day seeking care [at the*
 315 *hospital], which discourages the very distant communities from seeking care” [IDIs, other*
 316 *nurses].*

317 **Staffing and the effects on sub-district health facilities**

318 Data from the eight sub-district health facilities indicated shortages of skilled healthcare staff
 319 were a persistent challenge to healthcare management. Among the surveyed health facilities,
 320 62.5% (5) (3 health centres and 2 CHPS compounds) had resident midwives while Nanvilli
 321 health centre, Duang (DCHPS) and Jimpensi CHPS compounds (JCHPS) had no midwife.

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3 322 Jang Health centre (JHC) had two midwives (but only one at post). The midwife was
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5 323 assigned to each health facility to provide all MNH services to clients (ANC, labour,
6
7 324 childbirth care), and to deal with other general ailments of the populace, in addition to
8
9 325 performing administrative roles as facility head.

11
12 326 Almost all health facilities had community health nurses (CHNs) (13 in total) and enrolled
13
14 327 nurses (ENs) (6 in total). There was also one registered general nurse, one physician assistant,
15
16 328 two field technicians and one mental health professional located in the region.

19 329 ***Skilled attendance at birth***

21
22 330 WHO's definition of "skilled attendance" at birth denotes employing the services of a
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24 331 midwife or doctor, which is a significant challenge in rural Ghana. The staffing challenges
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26 332 motivate the health service management at the district level to endorse community health
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28 333 nurse and enrolled nurse supervised delivery as skilled birth, even if they have had no
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30 334 midwifery training.

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34 335 *"How about the CHNs we put at the CHPS compound and ask them, when a woman is*
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36 336 *delivering, they should catch (receive)? Therefore, I [DoN] think any delivery that is*
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38 337 *supervised by a trained health worker should be considered skilled delivery. So, the CHNs*
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40 338 *are forced to always refer to facilities with midwives, and considering the distances, we*
41
42 339 *record poor outcomes or home births. Will they go?" [IDIs, other nurses, DoN 1].*

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44
45 340 The number of midwives in the Daffiama/Bussie/Issa district was deemed inadequate to serve
46
47 341 the numbers of pregnant women:

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49
50 342 *"The district has five health centres and twelve CHPS compounds. However, we currently*
51
52 343 *have seven (7) midwives at the post which is inadequate to provide maternal healthcare to*
53
54 344 *many pregnancy issues we face each day. Even the district capital, Issa needs more than one*
55
56 345 *midwife; but we are forced to make do with just one" [IDIs, other nurses, DoN 1].*

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3 346 The midwives themselves agreed with the above assessment:
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6 347 *“I am the only midwife and always stressed up. Whenever I have two or three labour cases at*
7 348 *the same time, it is stressful working all the time. Also, if I am conducting ANC and a labour*
8 349 *case is brought in, I suspend the ANC and attend to that one. Sometimes, expectant mothers*
9 350 *default ANC when it happens that way, and it becomes difficult tracing them because I am*
10 351 *alone”* [IDIs, midwife 3, CHPS].
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14
15 352 The skills shortage affected the quality of prenatal and postnatal service delivery:
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17 353 *“We do not have enough skilled staff. Therefore, the expectations of clients are sometimes not*
18 354 *met. As I said earlier, one midwife is unable to explain certain issues clearly for pregnant*
19 355 *women to understand because she has limited time to carry out all [the] education and*
20 356 *detail[ed] explanations”* [IDIs, other nurses].
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26 27 28 358 ***Nurses – expectant mother relationships***

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31 359 Negative attitudes of some nurses towards pregnant women can act as a deterrent to expectant
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33 360 mothers:
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35
36 361 *“Expectant mothers receive cheeky words from the nurses, so some do not receive maternal*
37 362 *healthcare at the clinic because they have received enough of the insults. They are afraid to*
38 363 *divulge the truth for fear of receiving worse treatments in subsequent attendance”* [FGDs,
39 364 non-pregnant women, Naro/Korinyiri].
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43 365 Discussants in another community suffered similar treatments:
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46 366 *“I have not been to other clinics, but the nurses in our clinic do not give us attention at all*
47 367 *whenever we seek care at night or evening. They might not even utter a word, before going*
48 368 *back into their residences. When the client or family insist, they write a referral letter. Given*
49 369 *the odd hour, how are we going to manage the case to Wa or Nadowli hospital?”* [FGDs,
50 370 non-pregnant women, Jang].
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3 371 Although health centres and CHPS compounds are expected to provide a twenty-four hour
4
5 372 service to communities, some clients were denied care.

6
7
8 373 *“Some nurses would even tell us they do not run shifts and so will not work after 2 pm”*
9 374 [FGDs, non-pregnant women, Jang].

10
11 375

12 13 14 376 ***Management of basic and emergency obstetric cases***

15
16 377 Among the eight sub-district health facilities (health centres and CHPS compounds), 7
17
18 378 (85.5%) regularly only received primary obstetric cases, and 1(12.5%) received both basic
19
20 379 and comprehensive emergency obstetric cases. However, half of the health facilities managed
21
22 380 one comprehensive emergency obstetric case each in the three years (2013-2015) preceding
23
24 381 the study and two health centres confirmed they had managed five or more obstetric
25
26 382 complications in the same time frame. Three-quarters of the sub-district healthcare settings
27
28 383 did not have the necessary skilled staff to manage obstetric cases.

29 30 31 32 384 **2. Health facility infrastructure**

33 34 35 36 385 ***Service space in maternity units***

37
38
39 386 Nadowli District Hospital was the only public hospital serving the two districts and was the
40
41 387 highest referral facility. It had 76 beds, including 12 beds for the maternity ward and two
42
43 388 delivery beds in the labour section.

44
45
46 389 *“For the labour ward, we have only three beds, out of which only two are used. We use the*
47
48 390 *third bed as a last resort, although it is not meant for childbirth. It is for examination. In*
49
50 391 *critical situations, we are forced to conduct delivery in the manual vacuum aspiration (MVA)*
51
52 392 *room”* [IDIs, other nurses].

53
54 393

55 56 394 ***Water supply***

1
2
3 395 None of the sub-district health facilities had potable water for usage by the workers and
4
5 396 cleaning of the premises, meaning that expectant and postnatal mothers were often found
6
7 397 drawing water for the health facilities, or were forced to return home to draw water for nurses
8
9 398 if they sought care without it. Alternatively, the midwives would have to leave the mothers
10
11 399 in the healthcare setting in search of water for cleaning. Thus, “*some expectant mothers get*
12
13 400 *discouraged from giving birth there.*” [IDIs, other nurses, DoN 1].

16 401 **Lighting system**

17
18
19 402 Ghana government’s rural electrification initiatives were understood to have covered a
20
21 403 significant part of the countryside. Despite this, not all old or even recently constructed health
22
23 404 facilities were connected to the national grid. For instance, Duang CHPS was inaugurated
24
25 405 around 2015 but continues to experience intermittent power outages from a faulty wiring
26
27 406 system. A similar limitation was found at Charikpong health centre (one of the premier health
28
29 407 facilities in the district), and Nanvilli health centre depended on patients to provide fuel to
30
31 408 power the facility’s generator; without fuel, either the delivery would have to be transferred
32
33 409 elsewhere or be carried out in the presence of often inappropriate family members:

34
35
36
37 410 “*We do not have a source of water and light. When I am conducting delivery, I use a lamp or*
38
39 411 *generator. However, the generator must be fuelled by the relative of the expectant mother.*
40
41 412 *Due to the cost, they are not able to afford. I use torchlight when there is a tear. I had a*
42
43 413 *labour case where the mother sustains some lacerations which I have to suture. Sometimes, I*
44
45 414 *involve the relatives because I cannot hold the torchlight while suturing, and patients’ rights*
46
47 415 *are violated, because that may not be the right person to see her nakedness*” [IDIs, midwife,
48
49 416 HC].

50 417

51 52 53 418 **3. Medical equipment and logistics availability and** 54 55 56 419 **functionality**

1
2
3 420 ***Nadowli District Hospital***
4

5
6 421 The hospital had inadequate equipment despite the significant threshold population it serves.
7

8 422 The entire hospital operated on one anaesthetic machine, a dysfunctional haematology
9
10 423 analyser at the laboratory and an incomplete resuscitation table, all of which had the potential
11
12 424 to affect service delivery. Despite the occurrence of stillbirths and neonatal deaths, there was
13
14 425 no neonatal intensive care unit in the hospital. Other challenges included:

15
16
17 426 *“Frequent power fluctuations are causing significant breakdowns in the equipment, i.e. blood*
18
19 427 *bank refrigerators, autoclaves, air conditioners and theatre lamps. It further affects service*
20
21 428 *delivery in the maternity section”* [IDIs, other nurses].
22

23 429 Only a poorly supplied resuscitation table for preterm delivery care was available:

24
25
26 430 *“Resuscitation table requires many items so that in case a baby is born and is asphyxiated;*
27
28 431 *we can conduct it with ease. The table we have now is not well-equipped. We are only*
29
30 432 *managing to save lives”* [IDIs, other nurses].
31

32 433 ***Sub-district health facilities***

33
34 434 All the health centres (HCs) had midwives and conducted childbirths. While the CHPS
35
36 435 compounds without midwives were not allowed to conduct childbirths or deal with other
37
38 436 emergency obstetric situations, a bed and set of delivery equipment were provided for all
39
40 437 compounds. Only two HCs had a manual vacuum aspiration kit. There were other necessary
41
42 438 (and essential) equipment available for checking vital signs at the health centres - blood
43
44 439 pressure (BP) apparatus, thermometer, weighing scale - including foetoscope and foetal
45
46 440 Doppler, but not all were in usable condition. Some CHPS compounds did not have necessary
47
48 441 logistics such as a vaccine fridge:

49
50
51
52 442 *“There is electricity here now, but we do not have a vaccine fridge. When we even conduct*
53
54 443 *childbirth, we have to ride to Kojokpere health centre for poliomyelitis vaccine for the*
55
56 444 *newborn and return the remaining for storage. When expectant mothers are around the 20th*
57

1
2
3 445 *week of gestation, we administer tetanus toxoid injection (TTI), but the vaccine cannot be*
4 446 *stored here” [IDIs, CHPS].*
5
6

7 447 Similarly, the CHPS compounds often did not have the mandatory equipment to manage
8
9 448 emergency deliveries or resuscitate asphyxiated newborns, such as Ambu bags, meaning that
10
11 449 at times “*we see that the woman will be struggling and we cannot do anything to help*” (IDIs,
12
13 450 In-charge, CHPS).
14
15

16 451 ***The effect of logistics shortages on infection control procedures***
17
18

19 452 Some health facilities did not have the necessary daily non-drug consumables for
20
21 453 administering care. While Rapid Diagnostic Test (RDT) kits (for malaria) were readily
22
23 454 supplied to some facilities, infection control items such as facilities for handwashing and
24
25 455 hand gloves were often not provided for some facilities:
26
27

28 456 “*We have had consignments on the RDT which had no gloves included. Therefore, we do use*
29
30 457 *bare hands to conduct the tests. The improvised hand gloves you [interviewer] saw me wear,*
31
32 458 *were old gloves I found because we do not have hand gloves in the entire facility and the*
33
34 459 *current RDT kits were not supplied with gloves” [IDIs, In-charge, male, CHPS].*
35
36
37

38 460 Another participant identified how a shortage of gloves was “*the reason I improvised with*
39
40 461 *hazardous materials (rubber bag) to conduct HIV/AIDS and Syphilis tests” [IDIs, In-charge,*
41
42 462 *male, CHPS].*
43
44

45 463 The National Malaria Control Programme (NMCP) scaled up access and universal coverage
46
47 464 to provide long-lasting insecticide bed nets (LLINs) to all expectant mothers and children
48
49 465 who under five years of age, however some pregnant women in these districts were denied
50
51 466 access to these services. Some health facilities were not included in the regular consignments
52
53 467 of supplies.
54
55
56
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1
2
3 468 “When I came here, there were no mosquito nets in the facility. We do not also have
4 469 sulphadoxine-pyrimethamine (SP); it is prophylaxis for malaria prevention in pregnancy.
5
6 470 Since I came to the installation, there has not been any SP for the pregnant women” [IDIs,
7
8 471 midwife 4, HC].
9

10 472 **Essential medicines at the sub-district level**

11
12
13 473 While “the WHO protocol recommends antibiotics for pregnant women who give birth
14
15 474 newly” [IDIs, other nurses], the National Health Insurance Drug lists for CHPS compounds
16
17 475 prohibit prescription of antibiotics to newly delivered mothers, despite it being mandatory.
18
19 476 This is because the CHPS “compound is a small facility. When we prescribe it, NHIS refuse
20
21 477 to pay. Therefore, we sell it to them [the patient] which they always complain they do not
22
23 478 have money to pay for medicines” [IDIs, other nurses].
24
25

26
27 479 Some health facilities did not have other essential medicinal products for conducting
28
29 480 childbirth.
30

31
32 481 “I came in December 2015, and there was no oxytocin, no Vitamin K₁ for the newly born
33
34 482 babies. As at now, still, there is no vitamin K₁ in the facility” [IDIs, midwife 3, HC].
35

36 483 As a result of other changes in health policy, there were other limitations placed on health
37
38 484 centre midwives prescribing certain essential medicines to manage labours.
39

40
41 485 “At the health centre, we cannot use the Zeamatin (if the woman is having preterm, we
42
43 486 cannot give, we have to refer to Nadowli Hospital)” [IDIs, midwife 1, HC].
44

45 487 **Transport services**

46
47
48 488 The majority of the health facilities did not provide transport (for example, motorbikes) for
49
50 489 midwives to visit communities, thereby restricting their ability to engage in health education,
51
52 490 to follow up on women not attending ANC, and to carry out routine immunisations:
53
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1
2
3 491 “We have so many maternal and newborn programmes that require motorbikes, but we do
4 492 not have enough motorbikes for all the facilities. Aside from the bikes, some of the
5 493 communities are hard-to-reach” [IDIs, DoN 2].
6
7

8 494 **4. Management of referrals of emergency obstetric and** 9 10 11 495 **newborn complications**

12
13
14
15 496 The referral hospital reported receiving emergency obstetric cases from the health centres and
16
17 497 CHPS compounds. Expectant mothers referred during labour were 54 (5.22% of births) in
18
19 498 2012, 36 (10% of births) in 2013, 24 (7.09% of births) in 2014 and 17 (7.13% of births) in
20
21 499 2015.
22

23 24 500 **Typical referral management procedure at the sub-district healthcare level**

25
26
27 501 The model below typifies the referral pattern which pertains to the communities, with a focus
28
29 502 on worst case scenario (Figure 2).
30

31 32 503 **Figure 2: Pictorial view of typical referral management in the study area**

33
34
35 504

36
37
38 505 All four health centres received labouring mothers and obstetric referrals from the CHPS
39
40 506 compounds and across all communities in their catchment area, with the number of referrals
41
42 507 significantly influenced by their geographical location. Nearly all maternity cases brought to
43
44 508 the health centres originated from the remotest communities.
45

46 47 509 **Transport services during referrals**

48 49 510 *National ambulance service*

50
51
52
53 511 There were two groups of ambulance services operating in both districts to improve health
54
55 512 service delivery; the hospital ambulance service and the National Ambulance Service (NAS).
56
57

1
2
3 513 Each of them had one vehicle serving the two districts and other districts within its catchment
4
5 514 area. The NAS station was situated at Nadowli but served any other district that called them
6
7 515 for emergencies within the UWR. Thus the hospital vehicle and the NAS vehicle were both
8
9 516 stationed at Nadowli leaving the far hinterland without ready access to vehicular transport
10
11 517 during emergencies. There was one dysfunctional ambulance vehicle for all referrals to and
12
13 518 from the Nadowli hospital. Daffiama health centre was the only health facility in
14
15 519 Daffiama/Bussie/Issa district with double cabin pickup for emergency referrals of all patients
16
17 520 as well as day-to-day operations of the facility. There were no available means of transport in
18
19 521 any of the sub-districts except Daffiama health centre, *with their car serving as an official*
20
21 522 *vehicle as well as transferring emergency obstetric and newborn complications.* However,
22
23 523 the location of Daffiama health centre is within twenty minutes' drive of Nadowli hospital,
24
25 524 closer than all other communities in the district, which leaves the remainder of the district
26
27 525 without any emergency vehicles.

31 526 *Public and private transport services*

32
33
34 527 Lack of ambulances means that the majority of clients are reliant on public means of
35
36 528 transport. This implies the client and family will usually have to wait until certain hours in
37
38 529 the day to access transport:

39
40
41 530 *“If we are to send someone to a referral facility and it is around 10 am, the client cannot get*
42
43 531 *means because all the vehicles go to Wa [region's capital]. Unless in the evening that they*
44
45 532 *return to the community”* [IDIs, CHO, CHPS].

46
47 533 The search for affordable transport, whether it be by tricycle, motorbike or pick-up car, can
48
49 534 often result in a delay in accessing the next level of care.

50
51
52 535 *“During referrals, we wait for several hours before they can get modes of transport to the*
53
54 536 *next level of healthcare. We do not also have laboratory services in the entire district so for*
55
56 537 *us to conduct the routine laboratory investigations, we refer expectant mothers to Nadowli or*

1
2
3 538 *Wa which becomes a challenge for many pregnant women. Even for pregnant women to get*
4 539 *money to arrange for means of transport to the next level of care is always a problem”* [IDIs,
5 540 midwife, CHPS].
6
7

8 541 As a general rule, it was the responsibility of the expectant mother (or her family) to arrange
9 542 for means of transport during emergency referrals, because of a shortage of emergency
10 543 vehicles. The cost often limited the ability of the expectant mother to receive care.
11
12
13

14 544 ***Managing information and communication during emergency obstetric referral***

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16
17
18 545 The telecommunication sector presents a significant challenge to managing referrals in some
19 546 communities. Vodafone and MTN Ghana telecommunication service providers had network
20 547 coverage in the communities, although some communities had challenges accessing
21 548 networks. During the field data collection exercise, the first author found that Charikpong,
22 549 Nanvilli/Siruu, Jimpensi/Kenkelley and Duang communities had intermittent telecom
23 550 networks. Therefore, mobile phone users had the option to either climb up a tree in a strategic
24 551 area or hover around various signal hotspots (identified by the community) to make a phone
25 552 call. The facility heads agreed with this observation, noting that:
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36 553 *“Our mobile phones network is a serious challenge...Therefore, when we have an emergency*
37 554 *case, how to link with the national ambulance or the ambulance at Nadowli hospital is*
38 555 *always a problem”* [IDIs, midwife 2, CHPS].
39
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44 556

45 557 **DISCUSSION**

46
47 558 By utilising the structure of the BPCR monitoring and evaluation framework for health
48 559 facilities, the results of this study provide an insight into the preparedness of healthcare
49 560 facilities to provide efficient obstetric and newborn care to the communities.
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1
2
3 561 As far as we know, this study is one of the first to assess health facility preparedness for birth
4
5 562 complication readiness in the Nadowli-Kaleo and Daffiama-Bussie-Issa districts of Ghana.
6
7 563 The barriers to improved maternal health service utilisation and the potential to address these
8
9 564 complexities are well documented in the literature. Extrinsic and intrinsic inequities in access,
10
11 565 including transport arrangements and management of referrals, are also identified to support
12
13 566 existing findings in related districts of the Upper West Region (UWR).¹⁴
14
15

16 567 The skills upgrading programme introduced by the Ghana Health Service for sub-district
17
18 568 level staff (since 2004)^{19 35} sought to increase skilled staffing capacities of the facilities.
19
20 569 However there were inadequate numbers of skilled healthcare staff (i.e. licensed midwives
21
22 570 and medical doctors) in the study areas, which provided many challenges for the few staff
23
24 571 available, including role stress and undignifying behaviour patterns towards mothers. This
25
26 572 supports previous observations.²³ At the hospital, one midwife may be on duty to manage all
27
28 573 new admissions and emergency referrals for the entire maternity unit. There were no
29
30 574 remuneration packages to motivate the few skilled staff, aside from the average monthly
31
32 575 salary. The impact of shortages was compounded when referrals were made between district
33
34 576 hospitals because of lack of staff at both facilities. Similar gaps exist in the Upper East
35
36 577 Northern Regions.²³ These findings are consistent with other studies in ten referral district
37
38 578 hospitals in Ghana,²⁰ India, Tanzania and Ethiopia³⁶ and other developing countries.^{17 37 38}
39
40 579 Shortage of, and limited access to licensed staff lends support to the view of some writers that
41
42 580 utilising appropriately trained TBAs, CHNs and ENs in mainstream childbirth care in Ghana
43
44 581 could reduce some of the current frustrations associated with managing obstetric
45
46 582 complications and referral processes,²⁵ although this is not without its challenges. It was
47
48 583 found that poor treatment of pregnant women discouraged skilled maternal health service
49
50 584 utilisation with its attendant implications on health outcomes in the rural communities.²⁸
51
52 585 Although many of these behaviours could be attributed to the role stress identified in this
53
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1
2
3 586 study, they nevertheless defy professional codes of conduct and the priorities of the country
4
5 587 and stakeholders in general.²⁸
6
7

8 588 The Ministry of Health is a policy oriented body while Ghana Health Service implements its
9
10 589 initiatives. Based on the Ministry's Programme of Work (POW, 2014-2017), there were
11
12 590 initiatives by Ghana Health Service to increase the country's performance on MNH indicators
13
14 591 in particular, through ANC defaulter tracing, home-visiting, and free ANC services for all
15
16 592 mothers with active National Health Insurance Scheme (NHIS) subscriptions, focussing on
17
18 593 preventive care through the sub-district structures.^{14 23}
19
20

21 594 Despite these initiatives, many factors limited the quality of care provided at the facilities,
22
23 595 such as general under-investment in the health system regarding health workforce, medical
24
25 596 equipment and medicines, coupled with other multi-sectoral constraints such as poor road
26
27 597 infrastructure, electricity and water. Systemic issues including disrespect, irregular service
28
29 598 availability at sub-district facilities and midwife absenteeism had a significant impact on
30
31 599 service delivery.
32
33
34

35 600 Efficient lighting systems, water facilities and essential medicines reportedly motivate and
36
37 601 increase skilled health services uptake. However, reduced laboratory services and inadequate
38
39 602 space and equipment in childbirth rooms in all healthcare settings provided limited
40
41 603 confidence to women accessing ANC and contemplating birthing in the health facility.
42
43

44 604 Similar findings were reported elsewhere in the Upper West Region of Ghana and Kenya.^{14 25}
45

46 605 ³⁹ The challenges influenced born-before-arrival syndrome in the Upper West Region.²⁵ An
47
48 606 evaluation in Ghana, Malawi and Kenya also found informal cost and cultural
49
50 607 appropriateness of ANC services as key motivators to patronising skilled maternity care.⁴⁰ In
51
52 608 most locations in this study, healthcare facilities were rudimentary, and while the hospital had
53
54 609 better equipment and amenities (compared to the health centres and CHPS compounds),
55
56
57
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59
60

1
2
3 610 irregular power supply had similar negative impacts on service delivery.⁵ The health facilities
4
5 611 with intermittent electricity supply were unable to conduct deliveries at night. Most sub-
6
7 612 district health facilities (CHPS compounds) had inadequate access to vaccine fridges and the
8
9 613 power grid to store vaccines, and having to travel for long distances for necessary vaccines
10
11 614 such as tetanus toxoid injection (TTI) and anti-malaria prophylaxis diminished efficacy and
12
13 615 efficiency of the healthcare delivery system⁴¹. Some facilities had no readily available
14
15 616 medicines such as oxytocin to induce labours. Other referrals were prompted by NHIS drug
16
17 617 policy which prevents the staff at CHPS compounds from prescribing necessary antibiotics to
18
19 618 newly delivered women, suggesting that revision of the NHIS user-fee exemption policy on
20
21 619 maternal and neonatal healthcare would be appropriate.¹⁴ These findings are congruent with
22
23 620 other studies in India and a systematic review on this subject.^{17 42} An earlier evaluation in
24
25 621 district hospitals in Ghana revealed that they were the highest referral point for many
26
27 622 obstetric complications. Meanwhile, many of them did not have the necessary logistics and
28
29 623 staff to manage normal childbirth labour and complications.²⁰

30
31
32
33
34 624 The project for improvement of maternal and child health in the Upper West Region by the
35
36 625 Japan International Cooperation Agency (JICA) provided elaborate education for district and
37
38 626 sub-district healthcare staff on managing emergency referrals⁴³. A fundamental requirement
39
40 627 was to have the midwife accompany the client to the receiving facility. However, considering
41
42 628 the staffing inadequacies and the lack of transport services linking the communities, coupled
43
44 629 with the behavioural norms on early decisions to seek care,^{5 16} this approach may further
45
46 630 intensify the current shortages of midwives and result in adverse outcomes, due to the
47
48 631 distances and the lack of readiness for complications identified in another component of the
49
50 632 study.^{5 44} The geographical isolation of communities from referral centres, and between
51
52 633 health facilities, is much like those experienced in other isolated locations, such as Uttar
53
54 634 Pradesh, India.³⁷ A key difference from the Indian situation may be the fact that the main

1
2
3 635 referral hospital (at Nadowli) serving both districts had no ambulance facility to conduct
4
5 636 timely transfer of obstetric emergencies and preterm babies to appropriate health facilities
6
7 637 such as Jirapa Hospital or Wa Hospital which were the nearest regional hospitals.
8
9

10 638 Although by convention all health facilities in Ghana operate twenty-four hours a day, there
11
12 639 was the tendency to deny clients emergency care at certain times, thereby defying the core
13
14 640 mandate of the sub-district health structures of providing preventive and basic curative care
15
16 641 including obstetric first aid.^{23 25 33} The common limitations related to hospital referral (mostly
17
18 642 Nadowli or Wa) and means of transport create dissonance between the already aggrieved
19
20 643 expectant mother in pain and the possibly stressed nurse who provides care to a large
21
22 644 population on the one hand, and the healthcare targets/indicators on the other.
23
24
25

26 645 Non-availability and affordability of transport and telecommunication systems during
27
28 646 obstetric emergencies influenced referrals to Nadowli and Wa hospitals (the closest to study
29
30 647 communities) from sub-district health facilities. The findings demonstrated that demand for
31
32 648 skilled care was on the increase, but the absence of ambulance/vehicular linkage and
33
34 649 coverage could delay or cancel obstetric referrals despite regular demand for transfers from
35
36 650 lower level facilities. The challenges identified in this study corresponded to those already
37
38 651 identified elsewhere in rural Ghana, suggesting the need to streamline referral management
39
40 652 systems, which are critical to reducing avoidable mortalities and inequities in access.^{5 14 23}
41
42

43 653 Studies by Buor and colleagues^{45 46} in Ghana and sub-Saharan Africa, and another study in
44
45 654 the Upper West region, demonstrated that distances to health facilities contributed to reduced
46
47 655 utilisation and outcomes of obstetric referrals,⁴⁷ thereby providing pregnant women with
48
49 656 fewer alternatives during labour and in the event of complications and .²⁵ This study may
50
51 657 have underestimated the impact of these barriers compared with previous evaluations on this
52
53 658 subject, but the adverse effects of home or born-before-arrival syndrome at the health facility
54
55 659 are consistent with other research.^{25 42}
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660 **Implications for future research, policy and maternal health service delivery**

661 Reports show that Ghanaians have increased utilisation of skilled maternal healthcare^{23 27},
662 which implies that policy initiatives to address current systemic bottlenecks would provide a
663 way forward towards achieving global goals for the country. This is particularly important
664 because the majority of the chronic health cases leading to life-threatening disabilities and
665 mortalities are found in the hard-to-reach communities of the country³⁵. For example, an
666 evaluation in Ghana noted that although the national health insurance fee-exemption policy
667 has increased service uptake, inequities and geographical disparities in access continue to
668 exist between the rural poor and nonpoor, thereby causing low use among the poor due to the
669 informal costs of services and medicines.³⁵

670

671 The many barriers in this study are interdependent and addressing them will require a holistic
672 approach, including community awareness and proactivity in managing obstetric
673 complications, to help health providers tackle the issues appropriately and on time. Whereas
674 these shortages in the health facilities may not be addressed in the short to medium term due
675 to cost implications, preventative measures could be facilitated at the community level to
676 influence behaviour and cultural change (as identified in other components of the study)^{5 16 44}
677 to help improve maternal and neonatal health outcomes.

678

679 Instituting motivational packages (housing, additional allowances, and career opportunities)
680 for physicians and midwives may have some potential to encourage staff to accept postings to
681 rural areas, but the lack of equipment and essential medicines for service delivery, continued
682 knowledge and skill development could serve as a limitation. Global technological
683 advancement and professional networking through social media, telecommunication and
684 general internet services via reliable internet networks engender increased ambitions to

1
2
3 685 advance in skills through education and career. However, the gap in these services to the
4
5 686 district level was extensive, suggesting that improving the mobile telecommunication
6
7 687 network and general internet services at this level could also motivate acceptability of
8
9 688 postings to these locations. That aside, facilitating emergency referrals from the sub-district
10
11 689 health facilities to the health centres and the hospital could also improve with improved and
12
13 690 reliable telecommunication networks.

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16 691

18 692 **Strengths and limitations of this study**

21 693 This study has several strengths. It contributes to the scant literature on the barriers to service
22
23 694 delivery and access to services which impact MNH care in the Upper West Region of Ghana.

25 695 The majority of obstetric complications with profound impacts on MNH indicators occur in
26
27 696 the rural communities. Therefore, a brief assessment of issues pertaining to the health centres
28
29 697 and CHPS zones could trigger policy initiatives and district level oversight responsibilities.

32 698 Despite the strengths, the study has limitations. A purposive sampling approach was used to
33
34 699 obtain data from the participants. Critics question the credibility of data from such sampling
35
36 700 procedures,⁴⁸ but this study was the first of its kind in these districts and considering the
37
38 701 findings, supported by general facility observation and cues during the interviews, it is
39
40 702 reasonable to say relevant data were generated through the approach to support the research
41
42 703 objective. The sample was relatively small compared to the established norm, however, as a
43
44 704 mixed method study, data from the other participant groups were used to support and cross-
45
46 705 validate those of the healthcare settings; these results are reported elsewhere ⁵.

50 706 **Figure 1. Study communities and health facilities**

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53 707

55 708 **Figure 2: Pictorial view of a typical referral management in the study area**

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5
6 710 **CONCLUSION**

7
8 711 The health facilities at both grassroots and referral hospital levels in the districts were not
9
10 712 adequately prepared to provide quality maternal and neonatal healthcare, contributing, at least
11
12 713 in part, to the preference of many mothers to eschew ANC and favour a home birth. These
13
14 714 factors present a discrepancy between policy and implementation. Some policies and health
15
16 715 reforms identified in the study, including task-shifting, the twenty-four hour policy, drug
17
18 716 prescriptions, staff relocation and the legal restrictions on antibiotic prescriptions under NHIS
19
20 717 reimbursement mechanisms, had a profound impact on health system performance and
21
22 718 adequate and quality MNH care, as well as affecting referral management.

23
24
25
26 719 Improving MNH services provided at healthcare facilities by increasing the availability of
27
28 720 doctors, midwives, anaesthetists, labour beds, resuscitation equipment, essential medicines,
29
30 721 ambulance services and improving access to basic amenities such as electricity and water
31
32 722 facilities, will assist rural Ghana to achieve the critical Sustainable Development Goal (SDG)
33
34 723 three (targets one and two) by 2030. The study recommends revisions to the prescription
35
36 724 components of the NHIS, investigation of the code of conduct of nurses and increased
37
38 725 investment in logistics, as well as the management of staff postings.

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Figure 1. Study communities and health facilities

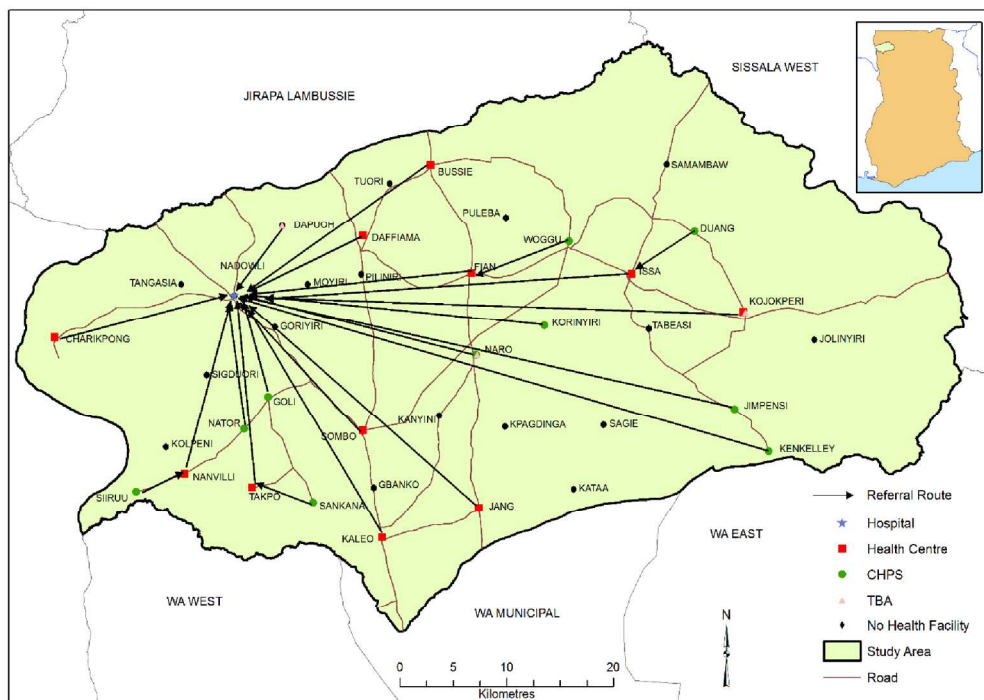
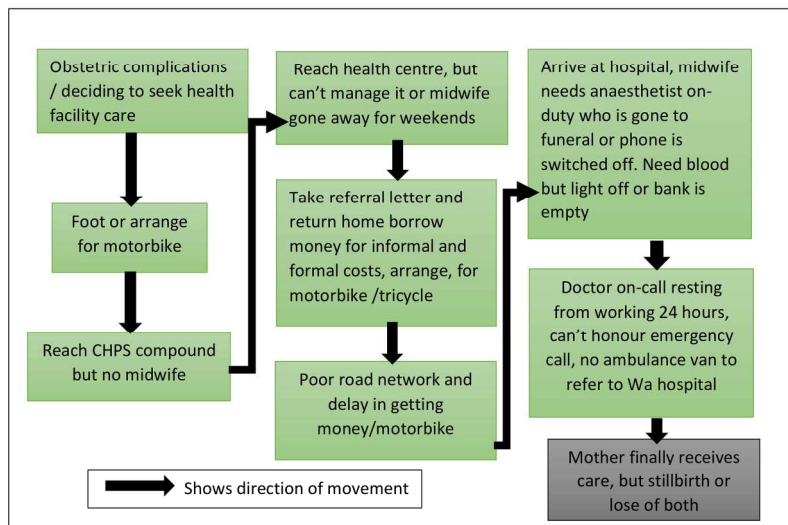


Figure 1. Study communities and health facilities

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Figure 2: Pictorial view of referral management in study area



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Figure 2: Pictorial view of a typical referral management in study area

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Standards for Reporting Qualitative Research (SRQR)*<http://www.equator-network.org/reporting-guidelines/srqr/>**Page/line
no(s).****Title and abstract**

Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pages 1, line numbers 1&2
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pages 2-3, line numbers 21 - 50

Introduction

Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pages 4-7, line numbers 67-152
Purpose or research question - Purpose of the study and specific objectives or questions	Page 7, line numbers 137-150

Methods

Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Pages 7- 14, line numbers 154 - 280
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Page 12, Line numbers 240-243
Context - Setting/site and salient contextual factors; rationale**	Pages 7&8, line numbers 155-170
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Pages 9-11, line numbers 196-219
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pages 9-10, line numbers 197-200
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Pages 12&13, line numbers 232-246

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Page 12, line numbers 221-230
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Page 10&11, line numbers 201-219
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Page 13, line numbers 27-255
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pages 13&14, line numbers 257-274
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Page 13, line numbers 248-255 & 262-272

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pages 14-27, line numbers 281-549
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pages 14-27, line numbers 281-549

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pages 27-33, line numbers 551-682
Limitations - Trustworthiness and limitations of findings	Page 33, line numbers 685-689

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Page 35, line number 733
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Page 35, line numbers 730-732