

# Community health worker service delivery for maternal and child health: an observational study from Afghanistan

Clare B Kelly <sup>1</sup>, Shafiqullah Hemat,<sup>2</sup> Malalai Naziri,<sup>3</sup> Khaksar Yousufi,<sup>3</sup> Karen M Edmond<sup>1</sup>

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/archdischild-2021-322968>).

<sup>1</sup>Department of Women's and Children's Health, Faculty of Life Sciences & Medicine, King's College London, London, UK

<sup>2</sup>Ministry of Public Health, Kabul, Afghanistan

<sup>3</sup>UNICEF, Afghanistan, Kabul, Afghanistan

## Correspondence to

Professor Karen M Edmond; [karen.edmond@kcl.ac.uk](mailto:karen.edmond@kcl.ac.uk)

Received 4 August 2021

Accepted 25 November 2021

Published Online First

16 December 2021

## ABSTRACT

**Objective** To understand the reach of the community health worker (CHW) programme in remote and non-remote districts of Afghanistan.

**Methods** Using data collected from the Ministry of Public Health's National Health Management Information System, we conducted a population-based study from 2018 to 2019 in 401 districts across 34 provinces of Afghanistan. We assessed the availability of CHWs, antenatal visits (ANV) and postnatal visits (PNV) conducted by the CHWs, and the availability of CHW supplies. Districts were classified as remote if the district centre was >2 hours by any form of transport from provincial capital, and non-remote if <2 hours. Data were analysed using multivariable regression models.

**Results** 15 562 CHWs were working in the districts of Afghanistan, 13 482 (87%) in remote and 2080 (13%) in non-remote districts. The mean of the proportion of CHWs per pregnant woman was higher in remote (0.019 (SD 0.011)) compared with non-remote (0.012 (SD 0.006)) districts (adjusted mean difference (AMD) 0.008, 95% CI 0.004 to 0.01). The mean of the proportion of ANVs received from a CHW per pregnant women was higher in remote (0.88 (SD 0.82)) compared with non-remote (0.62 (SD 0.50)) districts (AMD 0.28, 95% CI 0.02 to 0.54). The mean of the proportion of PNVs received from a CHW per pregnant women was higher in remote (0.54 (SD 0.53)) compared with non-remote (0.36 (SD 0.25)) districts (AMD 0.19, 95% CI 0.02 to 0.36). The mean of the proportion of CHWs who reported that they had stocks of cotrimoxazole and oral contraceptives in the previous month per district was higher in remote compared with non-remote districts.

**Conclusions** In Afghanistan, the CHW programme appears to be effective and proportionate to need in remote regions.

## BACKGROUND

Afghanistan has among the highest maternal and newborn mortality rates globally (maternal ~600 per 100 000 live births, infant ~50 per 1000 live births, in 2017).<sup>1–3</sup> Improvements in the provision of maternal and newborn healthcare in Afghanistan have been made in recent years,<sup>4</sup> however, key indicators such as rates of antenatal care (ANC) and postnatal care (PNC) remain low.<sup>1</sup>

Afghanistan continues to have a fragile and challenging environment for women and children wishing to obtain healthcare. Afghanistan is mountainous and landlocked country, with 77% of the

## What is already known on this topic?

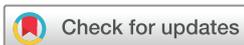
- ⇒ Afghanistan has among the highest maternal and newborn mortality rates globally.
- ⇒ Our recent community health worker (CHW) intervention study conducted in two provinces in Afghanistan reported CHWs home visiting could increase maternal and newborn health (MNH) services by 5%–10% over a 12-month period.
- ⇒ However, to our knowledge there are no published studies of the distribution of CHWs, or their effectiveness in providing MNH services, in remote and non-remote districts in conflict-affected countries.

## What this study adds?

- ⇒ There is a higher proportion of CHWs per pregnant women in remote than non-remote regions of Afghanistan.
- ⇒ CHWs appear to be effective and able to provide antenatal and postnatal visits in the home in remote areas in Afghanistan.
- ⇒ The Ministry of Public Health's initiative to introduce CHWs in Afghanistan appears to be working well; the CHW programme appears to be effective and proportionate to need in remote regions.

population living in rural areas. Maternal, infant and neonatal mortality rates are substantially higher in rural compared with urban areas.<sup>1</sup> Providing primary healthcare in these contexts is essential but not easily implemented. Reasons include persistent levels of violence and conflict, restricting many mothers and family's ability to leave home for health and social care.<sup>4,5</sup> Other barriers are limited access/transport (due to mountainous terrain), poverty and lack of decision-making 'power' of women within the family.<sup>1,5</sup>

Since 2003, community health workers (CHWs) have been a part of delivering the Ministry of Public Health (MoPH) standard package of health services in Afghanistan.<sup>4,6–8</sup> CHWs are volunteer health workers based in communities, trained to provide basic healthcare and medicines.<sup>9</sup> We recently showed that CHWs home visiting could



© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Kelly CB, Hemat S, Naziri M, et al. *Arch Dis Child* 2022;**107**:726–731.

increase maternal and newborn health (MNH) services by 5%–10% over a 12-month period.<sup>10</sup> The introduction of CHWs enabled outreach to the most vulnerable women and children in remote areas. In addition, the MoPH has recently had success with performance-based cash incentives for CHWs providing care, and financial incentives to encourage mothers to attend ANC and PNC, and delivering their child at a health facility.<sup>11</sup> However, impacts have been lower in the poorest quintiles and most remote areas, where the need is the greatest.

The overall aim of this study was to understand the reach of the CHW programme in Afghanistan. The primary objective was to assess availability of CHWs in remote and non-remote districts across Afghanistan. Secondary objectives were to assess the effect of remoteness on: CHWs visits during the antenatal period (ANV) and postnatal period (PNV); and provision of supplies and essential drugs to CHWs. We also described the provision of other maternal and child health services by CHWs.

## METHODS

### Design and study setting

This was a non-randomised, population-based observational study conducted over a 12-month period from September 2018 to September 2019 in the 34 provinces of Afghanistan. Kabul, the capital city of Afghanistan (population ~4 million), was excluded from this study as it has few CHWs, and a different health system based primarily on the large hospitals and clinics in the city.

The basic health system in Afghanistan includes district hospitals, health centres and outreach services and volunteer CHW based at 'health posts' (usually the CHW home) in each village. CHWs are trained in their local district over a 3-month period, after which they will continue to receive supportive supervision

and monitoring by a paid Ministry community health supervisor (CHS). All CHWs are volunteers and receive no salary. The CHWs are trained to provide basic healthcare such as health promotion advice and treatment to their local community.<sup>12–16</sup> CHWs also provide basic medicines such as iron and folic acid, antibiotics for pneumonia and oral rehydration therapy for diarrhoea.

### Data collection

Definitions of key variables (including ANVs and PNVs) collected in this study are displayed in [table 1](#). Remote districts were classified as district where the capital or centre was >2 hours by any form of transport from provincial capital (also included in [table 1](#)). Non-remote districts would be classified as a district where the capital or centre was <2 hours by any form of transport from provincial capital. District-level data on remoteness, mountainous access and security risk were obtained from the Afghanistan Demographic and Health Survey 2015 and the World Bank.<sup>17–20</sup> Population denominators per district were obtained from the Afghanistan Health Management Information System (HMIS) facility survey reports.<sup>18–20</sup>

Data on service provision were obtained from the HMIS. Each health service provider in Afghanistan records deidentified data on the services they provide using standardised forms uploaded to the electronic HMIS by provincial data managers. CHWs record their ANVs, PNVs, treatments, referrals and the status of their essential drugs ([table 1](#)).<sup>17</sup> CHWs also record their support from locally funded family health action groups (FHAGs). All CHW data are checked monthly by their CHS prior to submission to the provincial HMIS.

**Table 1** Definitions

Antenatal visit	Visit received by a woman at home from a CHW during the antenatal period. Visits are focused on health education and promotion. This includes counselling and referral to a health facility for care from a trained nurse or doctor. At least one of the following interventions by a CHW would be considered as antenatal visit: (a) screening and orienting on major complications, (b) supplying iron and folic acid tablets if applicable, (c) counselling balanced diet, (d) birth plan.
Antenatal care	Clinical care (including blood pressure measurement, urinalysis) received by a woman at a health facility during the antenatal period from a trained nurse or doctor.
Essential drugs	Drugs that must be in a CHW kit: chloroquine, cotrimoxazole, oral contraceptives, oral rehydration solution, zinc tablets and vitamin A tablets.
Family health action groups	Groups of women selected by CHWs who provide: community mobilisation for antenatal and postnatal visits, advice about the need for antenatal and postnatal care, and transport of mothers to health posts and health clinics. There is one family health action group per CHW health post.
High security risk	Use of armed force between warring parties in a conflict dyad, be it state based or non-state, resulting in deaths; 25 deaths or less in the previous 12 months is categorised as low intensity, 25–100 is categorised as moderate intensity and 100+ is categorised as high intensity.
Health Management Information System	A system based on qualitative and quantitative indicators in which routine health information is collected, processed, analysed, interpreted, disseminated and used to improve the provision of health services according to the MoPH's priorities and ultimately to improve the health of the population.
Mountainous districts	Districts with access restricted by mountains that are >1800 km elevation at highest point of district.
Postnatal visit	Visit received by a woman at home from a CHW during the first week postnatal. This includes counselling and referral to a health facility for care from a trained nurse or doctor. The CHW can assess for signs of illness, help the mother with breast feeding and prevent breastfeeding problems and advise on optimal care for the mother and her baby.
Postnatal care	Care received by a woman at a health facility during the first 2 days postnatal from a trained nurse or doctor. A health professional would examine the mother and baby's health. The mother would also get iron and folic acid tablets and advice on family planning, and the baby would receive necessary vaccinations.
Remote district	District capital or centre >2 hours by any form of transport from provincial capital.
Status of stock of essential drugs	Recording of the availability of any essential drugs in the previous month—using a stock tally sheet to record, for each drug, recording the number of health providers that reported that the drug was not present 1 day or more in the last month or the drug was present every single day of the last month.
Definitions modified from the WHO 'Community Health Worker Manual' <sup>16</sup> and the MoPH's Procedures Manual. <sup>17</sup> CHW, community health worker; MoPH, Ministry of Public Health.	

### Statistical analysis

The primary outcome measure was the mean of the proportion of CHWs per pregnant woman in remote versus non-remote districts of Afghanistan. Secondary outcome measures were the mean of the proportion of pregnant women receiving an ANV per district, the mean of the proportion of postpartum women receiving a PNV per district and the mean of the proportion of CHWs who reported that they had stocks of cotrimoxazole and oral contraceptives in the previous month per district. The mean of the proportions were calculated as follows: for example, for the mean of the proportion of pregnant women receiving an ANV—the proportion for each district was calculated, that is, # ANVs divided by # pregnant women in district 'A'. This was repeated for district 'B', district 'C', etc. The proportions were summed (#ANV A/#pregnant women A+#ANV B/#pregnant women B+#ANV C/#pregnant women C, etc) and then divided by the total number of districts. This was carried out for remote districts and then for non-remote districts. The same method was used to calculate the other mean of the proportions.

Remote and non-remote districts were compared using unpaired Student's t-tests for continuous measures and the  $\chi^2$  test for categorical measures. For non-normally distributed variables, we analysed the data in two ways: 'parametric after transformation' and 'non-transformed, parametric': the conclusions were unchanged by transformation, and so results of non-transformed parametric analysis have been presented. Multivariable linear regression was used to adjust by district and potential confounders decided a priori ((i) mountainous geographic location; (ii) number of FHAGs active in the catchment area of the CHWs and (iii) security risk (high security risk—yes/no)), to calculate adjusted mean differences (AMD), 95% CI and corresponding p values. Statistical analyses were performed using Stata V.16 (StataCorp, College Station, Texas, USA).

### RESULTS

In the study area, 3 996 750 women of reproductive age lived in the 359 remote districts and 1 194 771 lived in the 42 non-remote districts. There were 799 350 pregnant women who lived in remote districts and 238 954 pregnant women who lived in non-remote districts (table 2). Security risk was higher in remote (73%) than non-remote (36%) districts ( $p < 0.001$ ). Mountainous terrain conditions (remote 71%, non-remote 62%) and the number of women with no formal education (remote 72%, non-remote 69%) were not associated with remoteness ( $p > 0.05$  for both) (table 2). There were 9344 FHAG in remote districts and 1857 FHAG in non-remote districts. There were 13 482 (87%) CHWs who worked in remote districts and 2080 (13%) who worked in non-remote districts (table 2) (CHWs per district, median (25th–75th centile): 29.0 (18.8–49.0) remote districts, 40.0 (22.5–72.0) non-remote districts).

There were, on average, almost two CHWs per 100 pregnant women in remote versus only 1.2 in non-remote districts (AMD 0.008, 95% CI 0.004 to 0.01) (table 3). The mean of the proportion of pregnant women receiving an ANV from a CHW per district was also higher in remote (0.88 [0.82]) vs non-remote (0.62 [0.50]) districts (AMD 0.28, 95% CI 0.02 to 0.54). The mean of the proportion of pregnant women receiving a PNV from a CHW was again higher in remote (0.54 [0.53]) vs non-remote (0.36 [0.25]) districts (AMD 0.19, 95% CI 0.02 to 0.36).

The ratio of CHWs supplies per pregnant woman was also higher in remote versus non-remote districts (table 3). Cotrimoxazole supplies per pregnant woman (0.19 [0.20] vs 0.11

**Table 2** Characteristics of remote and non-remote districts

	Remote districts	Non-remote districts*
Total districts	359	42
Total population	19 983 749	5 973 855
Population per district (SD)	55 665 (39 961)	142 235 (150 794)
Total CHWs	13 482	2080
CHWs per district (SD)	39.0 (31.9)	50.7 (35.8)
Total women of reproductive age	3 996 750	1 194 771
Women of reproductive age per district (SD)	11 133 (7992)	28 447 (30 159)
Total number of pregnant women	799 350	238 954
Pregnant women per district (SD)	2227 (1598)	5689 (6032)
Total family health action groups	9344	1857
Family health action groups per district (SD)	27.2 (44.8)	45.3 (102.8)
High security risk (%)	262 (73%)	15 (36%)
Mountainous (%)	254 (71%)	26 (62%)
Women of reproductive age who have received no formal education (%)	2 796 626 (70%)	860 379 (72%)
Women of reproductive age with any contraception use (%)	715 280 (18%)	242 868 (20%)
Data are presented as totals, means (SD) or means (%).		
*Excluding the capital city of Kabul.		
CHW, community health worker.		

[0.07]) and oral contraceptives supplies per pregnant woman (0.19 [0.13] vs 0.12 [0.08]) were both higher in remote versus non-remote districts. Data on other commodities (oral rehydration solution, vitamin A, zinc, condoms and chloroquine) were similarly higher in remote versus non-remote districts (table 3).

There were more referrals to health facilities for normal deliveries in remote versus non-remote districts, but no differences in referral for obstetric complications. For children, there was overall more referral and treatment for diarrhoea, acute respiratory tract infections (ARI) and malnutrition in remote areas. No difference noted in malaria referral or treatment. There were more FHAG active per pregnant woman in remote versus non-remote districts (table 3).

### DISCUSSION

To our knowledge, this is one of the first studies to compare the reach of CHWs in remote and non-remote areas in a conflict-affected country. Using a population-based database, we investigated if there was a disproportionate number of CHWs between remote and non-remote districts, and how this would translate to service delivery in the antenatal and postnatal periods.

Overall, we found that, on average, there were more CHWs per pregnant women in remote versus non-remote districts and greater provision of supplies and commodities. ANVs and PNVs per pregnant woman were also more prevalent in remote areas. There were more referrals to health facilities for normal deliveries in remote areas, but no differences in referral for obstetric complications which require further investigation. ANVs and PNVs from CHWs are provided 'in addition' to ANC and PNC from doctors and nurses so these findings can not be explained by access to alternative maternal care providers in non-remote areas. For children, there was overall more referral and treatment for diarrhoea, ARI and malnutrition in remote areas. The most likely reasons are the higher burden of disease in children and higher CHW workload in remote areas. However, families in non-remote districts have more options for healthcare provision and may seek care from alternate health professionals,

**Table 3** District service provision per pregnant woman or child, compared between remote and non-remote districts

	Remote districts n=359 (mean (SD))		Non-remote districts n=42 (mean (SD))		Minimally adjusted means*			Fully adjusted means†		
	Mean difference	95% CI	Mean difference	95% CI	Mean difference	95% CI	P value	Mean difference	95% CI	P value
Ratio of CHWs per pregnant woman	0.019 (0.011)		0.012 (0.006)		0.007	0.003 to 0.01	<0.001	0.008	0.004 to 0.01	<0.001
Ratio of CHW essential drugs per pregnant woman										
Cotrimoxazole	0.19 (0.20)		0.11 (0.07)		0.08	0.02 to 0.14	0.014	0.081	0.02 to 0.14	0.011
Oral contraceptives	0.19 (0.13)		0.12 (0.08)		0.07	0.03 to 0.11	0.001	0.076	0.04 to 0.12	<0.001
Oral rehydration solution	0.20 (0.13)		0.13 (0.08)		0.07	0.03 to 0.11	<0.001	0.07	0.03 to 0.11	<0.001
Vitamin A	0.18 (0.12)		0.12 (0.08)		0.07	0.03 to 0.10	<0.001	0.072	0.04 to 0.11	<0.001
Zinc	0.20 (0.14)		0.13 (0.08)		0.07	0.03 to 0.12	0.002	0.076	0.03 to 0.12	0.001
Condoms	0.69 (0.70)		0.49 (0.39)		0.20	(-0.15 to 0.42)	0.07	0.23	(0.006 to 0.44)	0.044
Chloroquine	0.18 (0.12)		0.11 (0.08)		0.07	0.03 to 0.10	<0.001	0.07	0.03 to 0.11	<0.001
Proportion of pregnant women who received CHW services										
Antenatal visits from CHW	0.88 (0.82)		0.62 (0.50)		0.26	0.001 to 0.51	0.049	0.28	0.02 to 0.54	0.034
Postnatal visits from CHW	0.53 (0.53)		0.36 (0.25)		0.18	0.01 to 0.34	0.037	0.19	0.02 to 0.36	0.025
Referred to a health facility by CHW for obstetric complications	0.03 (0.04)		0.02 (0.03)		0.009	-0.005 to 0.022	0.21	0.009	-0.005 to 0.023	0.20
Referred to a health facility by CHW for advice regarding normal deliveries	0.18 (0.18)		0.13 (0.10)		0.05	-0.003 to 0.11	0.06	0.06	0.002 to 0.12	0.043
Proportion of children aged under 5 years who received CHW services										
Referred to a health facility by CHW for acute diarrhoea	0.43 (0.41)		0.26 (0.22)		0.17	0.04 to 0.29	0.011	0.18	0.05 to 0.31	0.008
Referred by CHW to a health facility for malnutrition	0.25 (0.22)		0.13 (0.09)		0.13	0.06 to 0.20	<0.001	0.13	0.06 to 0.20	<0.001
Referred by CHW to a health facility for acute respiratory infection	0.67 (0.60)		0.47 (0.39)		0.20	0.02 to 0.39	0.032	0.233	0.04 to 0.42	0.016
Referred by CHW to a health facility for malaria	0.03 (0.08)		0.01 (0.02)		0.02	-0.003 to 0.05	0.08	0.021	-0.004 to 0.05	0.102
Mean services provided to children aged under 5 years										
Treated by CHW for acute diarrhoea	2.13 (1.69)		1.42 (1.04)		0.70	0.18 to 1.23	0.009	0.69	0.16 to 1.23	0.011
Screened by CHW for malnutrition	2.03 (1.91)		1.88 (1.69)		0.16	-0.45 to 0.76	0.61	0.19	-0.43 to 0.81	0.54
Treated by CHW for acute respiratory infection	3.23 (2.51)		2.16 (1.78)		1.07	0.28 to 1.85	0.008	1.10	0.30 to 1.90	0.007
Treated by CHW for malaria	0.14 (0.39)		0.03 (0.08)		0.11	-0.12 to 0.23	0.08	0.10	-0.02 to 0.23	0.097
Community services										
Ratio of FHAGs per pregnant woman	0.011 (0.014)		0.008 (0.007)		0.003	-0.001 to 0.007	0.15	-	-	-
Mean household visits from FHAG member	19.9 (15.1)		12.6 (11.0)		7.4	2.6 to 12.1	0.003	8.19	3.43 to 12.95	0.001

p values &gt;0.05 (statistically significant) are highlighted in bold

\* Adjusted for random effects by district.

† Adjusted for access (mountainous), number of FHAG, random effects by district.

CHW, community health worker; FHAG, family health action group.

rather than CHWs. There was no difference in malaria referral or treatment, likely due to small numbers.

Maternal, infant and neonatal mortality rates have previously been reported to be higher in rural versus urban areas of Afghanistan.<sup>1</sup> It is recognised that the distribution of high-skilled health workers is unequal, with the majority clustered in large cities located in local, provincial hospitals and health clinics.<sup>6–8</sup> Previous studies have reported that the health work force in the rural areas is 16.7 workers per 10 000 people compared with urban areas with 36 health workers per 10 000 people.<sup>6,7</sup> Intervention is necessary to improve health worker availability and accessibility in rural and hard-to-reach areas so that vulnerable women and children receive the primary care they require. While there have been improvements in accessibility in remote districts, there is still a wide distribution in the number of CHW present (median (25th–75th centile): 29.0 (18.8–49.0), minimum 0, maximum 198). CHWs have many important functions in remote areas including, but not limited to, helping the most marginalised families to access services, community monitoring of mobile services and providing basic medication and health promotion advice for the hard-to-reach families.<sup>1,7,15</sup>

Overall, our findings are encouraging that the MoPH initiative to introduce CHWs in Afghanistan appears to be working and that the number of CHWs per pregnant women is higher in rural districts where they are most needed. It has been reported that only 49% of women and only 9% of newborns in Afghanistan receive the recommended postnatal health check within 2 days of delivery.<sup>1</sup> CHWs have an important role in improving this through their ANVs and PNVs. As there are many factors, such as transportation, accessibility, money and permission, which can restrict mothers receiving ANC during their pregnancy, it is essential that CHWs are able to provide basic reproductive health services locally for women.

Currently in remote districts, there are less than half of births being delivered in a health facility (remote 40% vs non-remote 76%), with home deliveries being more common in remote versus non-remote areas of Afghanistan (59% vs 23%, respectively).<sup>1</sup> Studies focused on poor communities in south Asia and Africa have conclusively shown that CHWs home visiting during the antenatal and postnatal periods can improve both demand and use of ANC, delivery and PNC services and reduce maternal and newborn mortality by at least 15%–20%.<sup>21–23</sup> We recently showed that based on a CHWs intervention study carried out in two provinces in Afghanistan (improving existing CHWs training and capacity to provide MNH services and behavioural change communication), CHWs home visiting could increase the percentage of women accessing MNH services by 5%–10% over a 12-month period.<sup>10</sup> In 2015, the World Bank released the results of a survey which found that 80% of women were unaware of CHWs or health posts in the local community (independent to wealth quintiles or age of the women).<sup>24</sup> However, this perception is likely to have improved as we report a high proportion of pregnant women receiving ANV and PNV from CHWs in our study.

An important role of CHWs is to distribute drugs to the local community. One of the challenges CHWs face is a drug shortage in rural districts.<sup>12,13,15</sup> Even within remote districts, access to and provision of services and drugs can be low for some communities and higher for others. Although the overall stock volume is lower than expected, on average, per population, there were more stocks of essential drugs in remote versus non-remote districts. This is reassuring as without drugs and supplies, CHWs cannot be effective and often lose the trust of the community.<sup>8,13,15</sup> Provision of essential drugs is necessary for CHWs

to access in order to provide necessary care to their community, and to instil confidence in their ability. Given the difficulties with supply chains in remote areas, this is a very encouraging finding from our study.

Our study has several strengths. It is the first study, to investigate the difference in MNH service use in all remote and non-remote districts of Afghanistan. Data for this study were obtained from the MoPH National HMIS. Across health facilities in Afghanistan, all health service providers use standardised forms to record deidentified HMIS data. Our population-based and community-based data should therefore be accurately recorded and be of consistent quality across all health facilities. The sample across districts was large enough to draw nationally representative conclusions, however, we are aware, it only included a recent 12-month period.

This study has some limitations. Although our data were sourced from the HMIS, there was some key information that was not available. Our total population will only include those who have access to Afghanistan health services that report into HMIS. We were able to obtain accurate measures of the population in each district, however, the number of pregnant women and the number of women of childbearing age were calculated as 4% and 20% of the population per district, respectively. Additionally, there was no accurate measure of wealth status or economic quintile, and so we were unable to assess if CHWs were working in the poorest parts of the rural areas. It is often those women from lower wealth and economic quintiles that are relying on health services from CHWs, as they have limited access to all other providers. Up until 2017, WHO recommended that all women should receive four ANC clinic visits.<sup>14,25</sup> Unfortunately, the Afghanistan HMIS is not currently able to report on total ANC clinical visits, only whether a woman has received any/at least one ANV.<sup>17</sup> We did not have record of the gender of the CHWs in Afghanistan, which is important as it is a 'social norm' that women should provide services to women. The ratio of male-to-female CHWs per health post in Afghanistan is dependent on if the local custom allows participation of women to work outside the house, availability of a Mahram couple (a man and a woman who are allowed to interact according to Islamic law) or the attitude of the implementing organisation towards gender issues.<sup>26</sup> Finally, we were not able to assess the quality of care provided by CHWs in this study. However, there are many ongoing initiatives to improve the quality of care provided by community and health facility workers in Afghanistan.<sup>11</sup>

## CONCLUSIONS

Afghanistan has a high proportion of women and children living in deprived and conflict-affected areas, with limited access to primary healthcare. Our study demonstrates that there is a higher proportion of CHWs per pregnant women distributed across remote, hard-to-reach regions of Afghanistan. CHWs appear to be effective and to provide much-needed ANVs and PNVs, but improvement is still needed to encourage increased use of MNH service in remote areas overall. Methods to enhance training and quality of CHW services and understand effects on the overall long-term health of the mother and children are also urgently needed.

**Contributors** CBK and KME conceptualised and wrote the first draft of the paper and analyses. All the other authors wrote and commented on the manuscript. All authors reviewed and approved the final manuscript. KME is the guarantor of this study

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Not applicable.

**Ethics approval** Approvals for this study and for using deidentified HMIS data were provided by the Ministry of Public Health General Directorate of Policy and Planning.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available on reasonable request. The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

#### ORCID iD

Clare B Kelly <http://orcid.org/0000-0002-8215-4796>

#### REFERENCES

- Central Statistics Organization (CSO), Ministry of Public Health (MoPH) and ICF. 2017. *Afghanistan demographic and health survey*. Kabul, Afghanistan: Central Statistics Organization, 2015.
- WHO U, UNFPA, world bank group, and United nations population division maternal mortality estimation Inter-Agency group. maternal mortality in 1990-2015: Aghanistan. Available: [https://www.who.int/gho/maternal\\_health/countries/afg.pdf](https://www.who.int/gho/maternal_health/countries/afg.pdf) [Accessed 02 Jan 2020].
- (IGME). UI-ACMEG. levels and trends of child mortality, 2016. Available: <http://www.childmortality.org/> [Accessed 26 Feb 2020].
- Akseeer N, Salehi AS, Hossain SMM, *et al*. Achieving maternal and child health gains in Afghanistan: a countdown to 2015 country case study. *Lancet Glob Health* 2016;4:e395–413.
- Higgins-Steele A, Burke J, Foshanji AI, *et al*. Barriers associated with care-seeking for institutional delivery among rural women in three provinces in Afghanistan. *BMC Pregnancy Childbirth* 2018;18:246.
- Frost A, Wilkinson M, Boyle P, *et al*. An assessment of the barriers to accessing the basic package of health services (BPHS) in Afghanistan: was the BPHS a success? *Global Health* 2016;12:71.
- Newbrander W, Ickx P, Feroz F, *et al*. Afghanistan's basic package of health services: its development and effects on rebuilding the health system. *Glob Public Health* 2014;9 Suppl 1:S6–28.
- Najafizada SAM, Labonté R, Bourgeault IL. HRH dimensions of community health workers: a case study of rural Afghanistan. *Hum Resour Health* 2019;17:12.
- Scott K, Beckham SW, Gross M, *et al*. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. *Hum Resour Health* 2018;16:39.
- Edmond KM, Yousufi K, Anwari Z, *et al*. Can community health worker home visiting improve care-seeking and maternal and newborn care practices in fragile states such as Afghanistan? a population-based intervention study. *BMC Med* 2018;16:106.
- Edmond KM, Foshanji AI, Naziri M, *et al*. Conditional cash transfers to improve use of health facilities by mothers and newborns in conflict affected countries, a prospective population based intervention study from Afghanistan. *BMC Pregnancy Childbirth* 2019;19:193.
- Najafizada SAM, Labonté R, Bourgeault IL. Community health workers of Afghanistan: a qualitative study of a national program. *Confl Health* 2014;8:26.
- Edward A, Branchini C, Aitken I, *et al*. Toward universal coverage in Afghanistan: a multi-stakeholder assessment of capacity investments in the community health worker system. *Soc Sci Med* 2015;145:173–83.
- World Health Organization & United Nations Children's Fund (UNICEF). Caring for newborns and children in the community: a training course for community health workers: caring for the newborn at home. World Health Organization, 2015. Available: <https://apps.who.int/iris/handle/10665/204273> [Accessed 31 Jul 2021].
- Folz R, Ali M. Task sharing in health workforce: an overview of community health worker programmes in Afghanistan, Egypt and Pakistan. *East Mediterr Health J* 2018;24:940–50.
- World Health Organization. Caring for the newborn at home: a training course for community health workers. community health worker manual. who, 2012. Available: [https://www.who.int/maternal\\_child\\_adolescent/news/events/2012/CHW\\_Manual.pdf](https://www.who.int/maternal_child_adolescent/news/events/2012/CHW_Manual.pdf) [Accessed 30 Aug 2021].
- Islamic Republic of Afghanistan - Ministry of Public Health. National Health Management Information System - Procedures Manual Part I & II 2011. Available: [http://old.moph.gov.af/Content/Media/Documents/HMISProceduresManualIII-English-Revised\(final\)6122014101056476553325325.pdf](http://old.moph.gov.af/Content/Media/Documents/HMISProceduresManualIII-English-Revised(final)6122014101056476553325325.pdf)
- HMIS. Afghanistan health management information system, 2017. Available: <http://moph.gov.af/en/documents/category/health-management-information-system> [Accessed 02 Jan 2020].
- CSO. Afghanistan central statistics organisation, 2016. Available: <http://cso.gov.af/en> [Accessed 02 Jan 2020].
- Data TWB. Fragile and conflict affected situations, 2018. Available: <https://data.worldbank.org/region/fragile-and-conflict-affected-situations> [Accessed 02 Jan 2020].
- Gopalan SS, Das A, Howard N. Maternal and neonatal service usage and determinants in fragile and conflict-affected situations: a systematic review of Asia and the Middle-East. *BMC Womens Health* 2017;17:20.
- Lassi ZS, Bhutta ZA. Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes. *Cochrane Database Syst Rev* 2015;3:Cd007754.
- Glenton C, Colvin CJ, Carlsen B, *et al*. Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. *Cochrane Database Syst Rev* 2013;10:Cd010414.
- World Bank. 'Implementation Completion and Results Report on JSDF Grant No. TF095919 in the Amount of US\$17.65 Million to the Islamic Republic of Afghanistan for a Support to Basic Package of Health Services Project.'. Washington, DC: World Bank, 2015.
- WHO. WHO recommendations on antenatal care for a positive pregnancy experience. Available: <https://www.who.int/publications/i/item/9789241549912> [Accessed 30 Aug 2021].
- Najafizada SAM, Bourgeault IL, Labonté R. A gender analysis of a national community health workers program: a case study of Afghanistan. *Glob Public Health* 2019;14:23–36.