

The Quality of Service Provision to Newborns in the Primary Healthcare, West Gojjam Zone, North-West of Ethiopia: A Cross-sectional Survey

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Research Article

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Posted Date: April 26th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-418760/v1>

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Version of Record: A version of this preprint was published at BMC Pediatrics on April 13th, 2022. See the published version at <https://doi.org/10.1186/s12887-022-03272-8>.

The quality of service provision to newborns in the primary healthcare, West Gojjam Zone, North-West of Ethiopia: A cross-sectional survey

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Abstract

Background: During 2019, neonatal conditions in Ethiopia accounted for 56% of under-5 deaths, with 33 neonatal deaths occurring for every 1,000 live births. More than 80% of all newborns deaths are caused by preventable and treatable conditions with available interventions. In Ethiopia, mortality rates for newborn babies have remained stubbornly high over the decades.

Methods: A cross-sectional survey design was employed. Interviewer-administered questionnaires were administered to 221 health workers and health extension workers in 142 health facilities from April to July 2017. Data was entered in the EpiData 3.1, exported to SPSS and STATA for analysis.

Results: Out of the ten quality of newborn care variables, 8.7 [95%CI: 6.03-11.303], the highest mean was achieved by primary hospitals, followed by urban health centres with a 6.4 mean [95%CI:5.168-7.601]. However, nearly half of the rural health centres were providing quality of newborn care at the mean of 5.7 [95%CI: 5.152-6.18], and below half was provided by health posts, 4.5 [95%CI: 3.867-5.116]. From the seven emergency newborn care signal functions, primary hospitals had a higher mean score, 6.3 [95%CI: 6.007-7.325] and rural health centres had a lowest mean score, 2.3 [95%CI: 2.043-2.623]. The availability of essential equipment is also significantly associated with the quality of neonatal care provision in the health facilities ($p < 0.05$). Overall, the effectiveness of the neonatal healthcare services has a significant association with the health facilitates readiness score [95%CI: 0.134-0.768].

Conclusion: The quality of newborn care was high at the higher-level health facilities and lower in the lower level health facilities such as rural health centres and health posts; where these facilities are designed to provide the newborn care services to the majority of the rural communities. In addition, the provision of emergency newborn care signal functions were critically low in rural health centres where these are a referral receiving health facilities from health posts. Thus, the rural health centres and health posts should be targeted to improve their readiness to provide the quality of services for newborns as per their expected level of care.

Keywords: Quality of service, Factors, Neonate/Newborn, Primary healthcare units, West Gojjam, Ethiopia

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Background

The first 28 days of life - the neonatal period - is the most vulnerable time for children under age 5. At the global level, under-five years of children, face the highest risk of dying in their first month of life at, 17 deaths per 1,000 live births (LBs) in 2019 and the neonatal deaths accounted for 47% of global under-five deaths. About a third of all neonatal deaths occurring within the first day after birth, and close to three-quarters occurring within the first week of life[1]. In 2019, Neonatal conditions in Ethiopia account for 56% of under-5 deaths, with 33 neonatal deaths occurring for every 1,000 LBs. Mortality rates for newborn babies have remained stubbornly high and about 99,000-100,000 newborns die every year in Ethiopia [1, 2]. More than 80% of all newborns deaths are caused by preventable and treatable conditions with available interventions [3, 4]. In Ethiopia, in 2017, the most common causes of newborn death are intrapartum related events (birth asphyxia & birth trauma) (30%), preterm birth complications (26%), sepsis & tetanus (18%), pneumonia (8%), diarrhoea (1%), congenital abnormalities (11%) and other conditions (7%)[5].

In addition, quality of care is not offered for the newborns and mothers who are already visiting the health system. Too many mothers and newborns miss out key interventions that can save their lives [6]. The assessment done on newborn care in four countries [7] reported that within primary healthcare and referral level health facilities, the newborn care services provision is found to be in poor quality; and this poor quality is exacerbated by deficient competency by health professionals. In the first level healthcare service provision and referral level, the quality of newborn care is generally substandard; and the limited knowledge and skills among providers contributed for poor quality of newborn care [7].

In Ethiopia, in 2019, 48% of births occurred in the health facilities and only 35% newborns received postnatal care (PNC) check-up within 48 hours after birth[2]. In this country, there is a wide regional difference in neonatal mortality; where neonatal mortality rates range from a low level of 21 per 1,000 live births in Addis Ababa (the capital city of Ethiopia) to high rate of 54 per 1,000 live births in Amhara region. Before reaching the age of one month, 17% more newborn infants die in Amhara region than in the nation[8]. To fast-track the reduction of deaths in under-five years, prioritizing the newborns conditions is very crucial for Ethiopia. Therefore, this research aimed to assess the quality of service provision to newborns in the primary healthcare units in the North-West of Ethiopia.

Methods

Study design and setting

A cross-sectional survey design [9, 10] was employed to assess the quality of newborn care in the primary health care units (PHCUs) of West Gojjam zone, North-West of Ethiopia. West Gojjam is one of the 11 administration zones in the Amhara regional state, with 2,463,004 estimated total population for 2015 consisting fifteen districts (*woredas*). In 2017 the zone had three primary hospitals (PHs), 91 health centres (HCs) and 373 health posts (HPs). Since there were only three primary hospitals, all were included in the study.

Study population

The targeted population was all health workers in PHs and HCs who were working in maternity ward (delivery and early post-natal) and under-five clinic and all health extension workers (HEWs) who were working in the HPs in selected health facilities in all the fifteen *woredas* (District) of the administrative zone.

Inclusion and exclusion criteria

All functional PHCUs and all health workers (HWs) and HEWs working maternity & early postnatal care ward and under-five clinic/outpatient department were included in the selected *woredas*. However, PHCUs which were not functional with various reasons and professional who didn't work in maternal and newborn health services were excluded.

Sample size determination and sampling procedure

StatCalcEpi info version 7 statistical software was used to calculate the sample size. The PHCUs/HCs were the study units and the following assumptions were considered to calculate the sample size: ninety-one PHCUs as a total population size; prevalence is considered as 50% the reason that no similar study was done so far; confidence limits is 5%; confidence level is 95%; design effect is 1 and clusters is considered as 1 to obtain the final sample of 71 PHCUs (71 HCs and 71 HPs). Having all the list of PHCUs from the *zone* and confirmed by the respective *woredas*, the PHCUs were selected by simple random sampling technique. In addition, one HP was selected by same methods with the available HPs from each selected PHCU catchment's. From the selected PHCU, two health workers in PH and HC who were working in maternity ward (delivery and early post-natal) and under-five clinic and one HEW who was working in the HP was selected.

Data collection

From April to June 2017, questionnaires were administered by the researcher in 221 HWs and HEWs in 142 health facilities including 3 PHs, 76 HCs and 63 HPs; two health workers per PH and HC and one HEW per HP. All the 15 *woredas* in the West Gojjam zone were represented by the selected health facilities.

Data quality control

The survey questionnaire adapted from newborn services rapid health facility assessment tool [11], to evaluate the quality & access at primary health care level[12], service availability readiness assessment manual[13], rapid health facility assessment for core maternal, neonatal, and child health services at the primary level[14] and a health facility assessment tool for a quality of newborn care in rural Ghana[15]. Ten experienced health professionals on neonatal and child health services, at least first degree in nursing or health officers and who speak Amharic (the local language) were selected, trained and deployed in the field. Two days training was provided for field workers and the questionnaire was pre-tested in two PHCUs which were not included in the study results.

Operational definitions

Neonate/Newborn: An infant between 0 and 28 days old [16, 17].

Quality of service: The provision of services to the newborns as per the standard to improve desired health outcomes [18].

Primary health care unit: The lower level health care delivery functions in the primary health care that comprises five satellite health posts, one health centre and primary hospital [19].

Factors: Variables that cause, influence or determine to offer quality of service provision to newborns [16].

Ethics approval and consent to participate

This study was conducted under the ethical principles of the Declaration of Helsinki. The study was approved by the Research and Ethics Committee from the Department of Health Studies, University of South Africa (UNISA) (Ref no: HSHDC/489/2015). The Amhara regional health bureau and West Gojjam Zone provided permission to conduct the study. Furthermore, the directors of PHs and HCs, and heads of the HPs also offered permission to conduct the study. Written informed consent was obtained from the study participants before the interview. Information on the study's purpose, procedures, risks, burdens and benefits, as well as confidentiality and voluntariness of participation was provided to all potential participants as part of the informed consent process. Privacy and confidentiality of information provided by each participants were maintained throughout the study, and which were used exclusively for statistical purposes, were assured at all times. In addition, names and other specific addresses were not recorded and reported.

Data analysis

Data was entered in the EpiData 3.1, exported to Statistical Package for Social Science (SPSS windows version 23) and STATA version 15 for analysis. Descriptive and regression multivariate analysis were applied to have a comprehensive description of the quantitative data and statistical relationship or association of variables. The analysis was presented in table format with number, percentage, frequencies, means, p-value and confidence interval. A p-value less than 0.05, was considered as major test value. In most of the variables, a mean was used to report the findings with 95% confidence interval (CI).

Results

Socio-demographic characteristics

Out of the total 142 surveyed health facilities in the West Gojjam zone, 63 (44.4%) were rural health centres (RHCs) and 63 (44.4%) health posts (HPs Table 1)).

Table 1 Distribution of surveyed facilities in the West Gojjam Zone

Health facility type	Frequency (N=142)	Percent
PHs	3	2
UHCs	13	9.2
RHCs	63	44.4
HPs	63	44.4
Total health facilities	142	

Table 2 Profile of interviewed health providers in the maternity units and under-five clinics in 142 PHs and HCs, and HPs by type of qualification and percent distribution

Background characteristics	Maternity units		Under-five clinics	
	Frequency (N=138)	Percent	Frequency (N=142)	Percent
Nurse all types (degree & diploma)	12	8.7	51	35.9
Midwife all types (degree & diploma)	56	40.6	5	3.5
Health Officer	7	5	22	15.5
HEWs	63	45.7	63	44.4

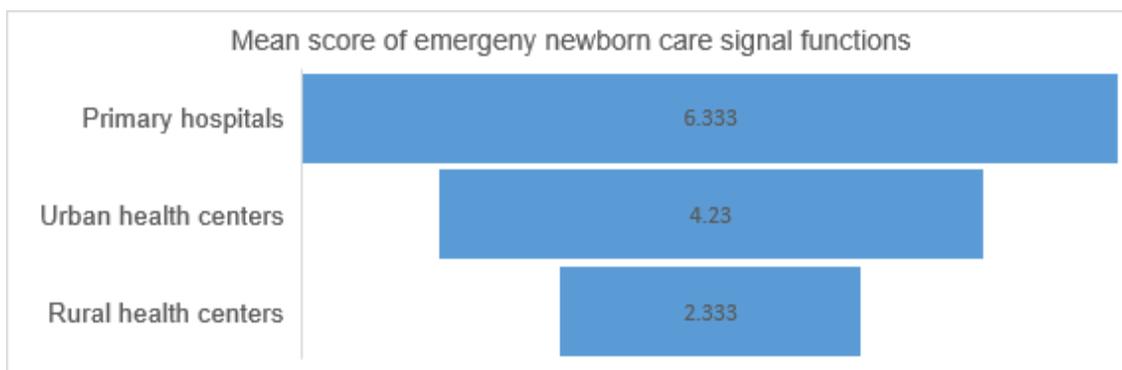
Medical doctor			1	0.7
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Fifty-six (40.6%) of interviewed health providers in the maternity units had midwife diplomas or degree and, while HEWs accounted 63 (45.7%). Similarly, from the total health providers interviewed in under-five clinics, 63 (44.4%) were HEWs, followed by nurses 51 (35.9%) (Table 2).

Emergency newborn care (EmNeC)

Emergency newborn care (EmNeC) was assessed by asking the seven signal functions including the neonatal resuscitation with bag and mask, kangaroo mother care (KMC) for premature or very low birth weight, injectable antibiotics for neonatal sepsis, corticosteroids in preterm labour, intravenous fluids for newborns, and newborn resuscitation with oxygen. PHs had a higher mean score, 6.3 [95%CI: 6.007-7.325] and RHCs had a lowest mean score, 2.3 [95%CI: 2.043-2.623] in the provision of EmNeC signal functions in the last six months before the survey (Figure 1).

Figure 1 Provision of emergency newborn care signal functions in the last six months



Essential immediate newborn care practices

The application of chlorohexidine in the umbilical cord and putting the baby on the breast within one hour of delivery were reported by 28 (35.4%) and 34 (43%) of health facilities respectively (Table 3).

Table 3 Availability of the immediate essential newborn care services in health facilities

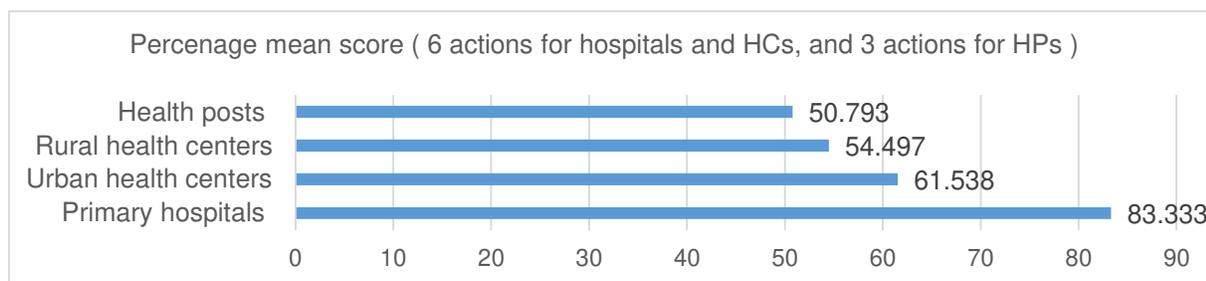
Variable	Frequency	Percent
The baby put in the mother abdomen once the baby is delivered		
PHs (N=3)	3	100
UHCs (N=13)	13	100
RHCs (N=63)	63	100
All health facilities (N=79)	79	100
First put the baby in the breast immediately after delivery		
PHs (N=3)	1	33.3
UHCs (N=13)	7	53.8
RHCs (N=63)	35	55.6
All health facilities (N=79)	43	54.4

First put the baby on the breast within one hour of delivery		
PHs (N=3)	2	66.7
UHCs (N=13)	6	46.2
RHCs (N=63)	26	41.3
All health facilities (N=79)	34	43
Apply antibiotics in the infant's eye		
PHs (N=3)	3	100
UHCs (N=13)	13	100
RHCs (N=63)	63	100
All health facilities (N=79)	79	100
Bath after 24 hours		
PHs (N=3)	3	100
UHCs (N=13)	13	100
RHCs (N=63)	57	90.4
All health facilities (N=79)	73	92.4
Nothing applied in the cord/dry cord care		
PHs (N=3)	1	33
UHCs (N=13)	9	69
RHCs (N=63)	37	58.7
All health facilities (N=79)	47	59.5
Apply chlorhexidine (CHX jell) the umbilical cord of the baby		
PHs (N=3)	2	66.7
UHCs (N=13)	4	30.7
RHCs (N=63)	22	34.9
All health facilities (N=79)	28	35.4
The weight of the baby is always monitored		
PHs (N=3)	3	100
UHCs (N=13)	12	92.3
RHCs (N=63)	61	96.8
All health facilities N=79)	76	96.2

Care for very small/low birth weight babies

Figure 2 shows that, 83.3 [95%CI: 50.384-116.28] of the PHs practiced the recommend actions for the care of low birth weight babies; on the contrary, only half of the HPs practiced actions for the care of low birth weight babies (50.8 [95%CI: 43.510-58.076] (Figure 2).

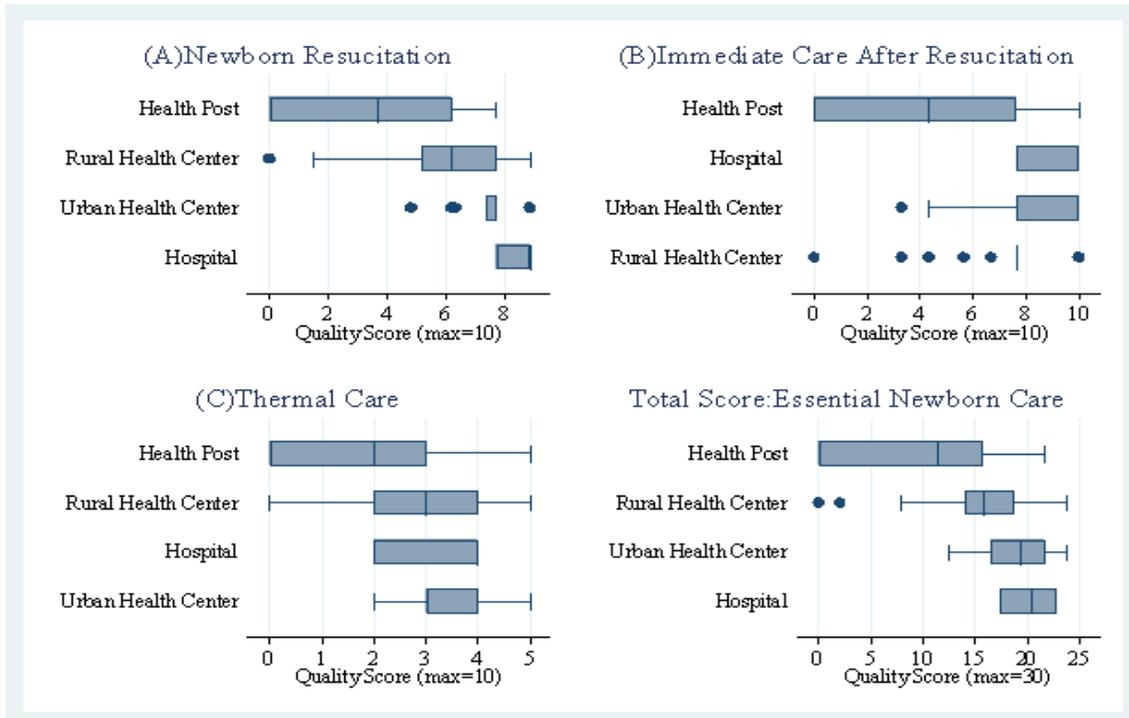
Figure 2 Percentage mean score for carrying of low birth weights babies



Quality of essential newborn care: Actions for resuscitation, follow-up and thermal care for newborns

The questions and the score given for each action was used from the research done in Ghana [15]. Among total score, PHs had the highest mean score, 20.2 [95%CI: 17.076-23.377] and HPs had the lowest mean score, 9.9 [95%CI: 8.164-11.629] (Figure 3 - Total score).

Figure 3 Essential newborn care scores by type of health facility

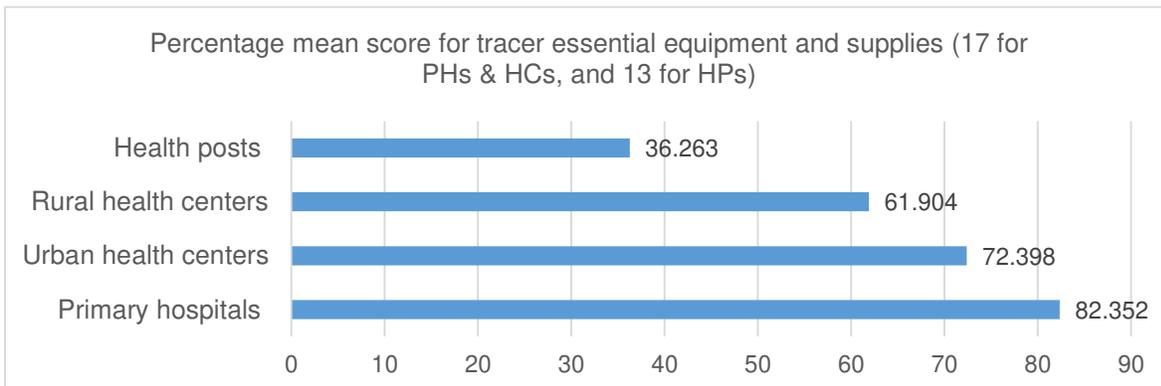


Remark: The lines in the box plots show the range of score, while the box captures the range of the middle 50%

Availability of essential equipment for post-delivery newborn care

As shown in the Figure 4, the highest, 82.3 [95%CI: 80.076-93.256] mean percentage score of functional essential equipment and supplies were available in PHs; on the other hand, the lowest mean percentage score was documented for HPs at 36.3 [95%CI: 32.099-40.427].

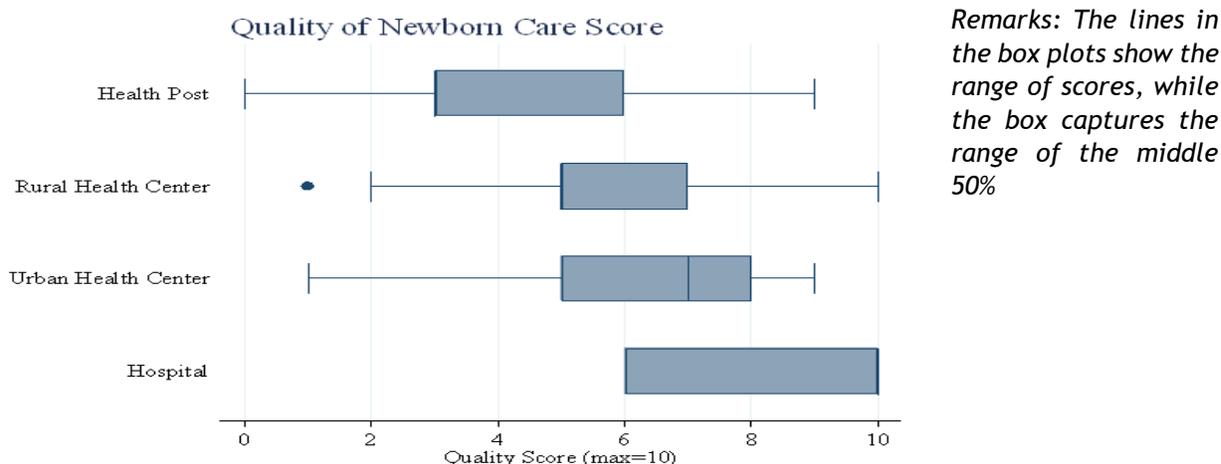
Figure 4 Percentage mean score for tracer essential equipment and supplies in health facilities



Quality of newborn care service provision

The quality of newborn care (QNC) service as one of the outcome variable was constructed from the five variables index including the essential newborn care, care provided for low birth weight babies, monitoring postnatal care, signal functions for EmNeC, and newborn death audit. All five variables index included in QNC are not in the same scale, and it was given equal weights and recalibrated to the range between zero and 10, with the highest score indicating better QNC service at different level of health facilities. Consequently, 8.7 [95%CI: 6.03-11.303], the highest mean QNC score was achieved by PHs followed by UHCs with a 6.4 mean [95%CI:5.168-7.601]. However, nearly half of the RHCs were providing QNC (5.7 [95%CI: 5.152-6.18]), and below half of QNC was provided by HPs (4.5 [95%CI: 3.867-5.116]). This shows that the QNC given was high at the higher-level health facilities and lower in the lower level of health facilities (Figure 5).

Figure 5 Quality of Newborn Care Score



As shown in Table 4, the multiple regression analysis shows that, from the below 11 listed and computed facility readiness indicators (independent variables), only availability of essential equipment is significantly associated with the QNC provision in the health facilities ($p < 0.05$).

Table 4 Association between facility readiness indicators and quality of newborn care provision

Independent variable	Coefficient	p-value	95% LCI	95% UCI
Total number of skilled birth attendants available in the health facilities	0.025	0.097	-0.005	0.055
Percent of health workers received newborn health training in the last one year	-0.003	0.659	-0.015	0.010
Percent availability of basic amenities in the health facilities	0.017	0.087	-0.003	0.036
Percent of essential equipment available in health facilities	0.037	0.047*	0.000	0.074
Percent of essential drugs available in health facilities	-0.007	0.571	-0.033	0.018
Number of Laboratory tests available in the health facilities	0.272	0.124	-0.077	0.620
Essential newborn care clinical scenario score	0.100	0.062	-0.005	0.205

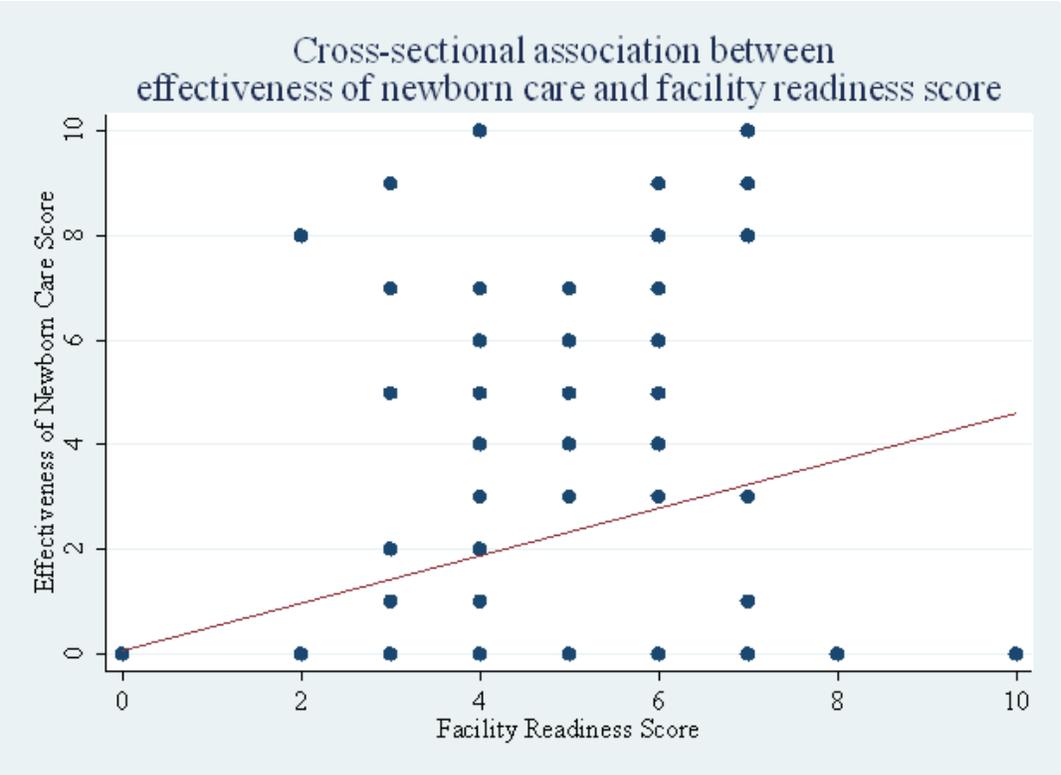
Quality of care for very low birth weight babies' clinical scenario score	0.055	0.369	-0.067	0.177
Overall newborn care knowledge of health providers managing sick children and newborns (with score range zero to 10)	0.122	0.422	-0.179	0.423
Percent of referral communication	0.014	0.195	-0.007	0.035
Percent of health facilities received supportive supervision in the last 3 months	0.132	0.762	-0.736	1.000
cons	-2.646	0.111	-5.916	0.624

*P value <0.05

Effectiveness of the neonatal healthcare services

The effectiveness of the neonatal health care services in the primary health care units' composite index score was defined and measured by a composite index of quality of newborn care service provision, quality of sick young infants' case management, and service utilization of sick young infants in the health facilities.

Figure 6 The cross-sectional association between effectiveness of newborn care and facility readiness score



All variables were given equal weights and recalibrated into a range between zero and 10 [20] with a higher score showing a better effectiveness of neonatal health care services. Cronbach's alphas were also calculated to assess the internal reliability of the 11-health facility readiness items in measuring the underlying construct of the effectiveness of the neonatal health care services. It is expressed as a number between 0 and 1; and internal consistency The Cronbach's

alpha for the 11 facility readiness items was 0.5 which less than 0.7 from the acceptable value of alpha value [21]. Over all, the effectiveness of the newborn care services in the primary health care which ranged between zero and ten, for every unit increase of the facility readiness score, there was a corresponding average of 0.45 percentage points [95%CI: 0.134-0.768] increase in the effectiveness of the newborn care services (Figure 6).

Discussion

Overall, the likelihood of getting EmNeC signal functions to save the lives of the sick young infants in the RHCs in the West Gojjam Zone were critically low and were better provided in PHs. This is supported by the existing evidences, only 3 percent of health facilities in Amhara region, Ethiopia were providing fully EmNeC signal functions, and there was no fully EmNeC facilities in rural areas and no health centres were providing fully EmNeC at national level[22] and the mean availability of EmNeC signal functions was 30% of health facilities in Amhara region[23]). This is also supported by the assessment done in health facility capacity to provide newborn care in the five countries [24], hospitals and facilities in urban areas were in the better position in both service availability and readiness; however, the readiness and availability of essential newborn care services in the rural areas facilities were reported as a substantial equity gaps for people accessing lower-level health.

The study results by Vesel et al on quality of newborn care in rural Ghana [15] highlights that health facilities that were categorized as a lower level achieved scores ranged from low to moderate for newborn resuscitation, immediate care after resuscitation and thermal care for the newborns provided overall low quality of essential newborn care. In consistent with the evidence, in this study, the quality of essential newborn care was assessed by considering the five and three key resuscitations actions and follow-up care to save the lives of the newborns, and the five key actions to improve the quality of thermal care of the newborns. The mean score from the total 30 was computed for each health facility type, and the mean ranged below 10 for HPs and about 20 for PHs. However, UHCs had a mean of 18.7 and RHC had 15.9. This implies that the lower level health facilities including HPs and RHCs had had a lower essential quality of care score.

The service availability and readiness assessment in Amhara region, Ethiopia showed that, neonatal bag and mask, and infant weighing scale were found in 46% and 90% of health facilities [23]. In consistent with the existing evidence, 82.3 mean percentage score of functional essential equipment and supplies were available in PHs; followed by 72.4 in UHCs. Only 61.9 percentage score of essential equipment and supplies were available in the RHCs. Overall, HPs and RHCs were facing a shortage of essential equipment and supplies to provide key intended services for mothers and newborns.

The study done in Uganda demonstrated that nurses, midwives, and nursing assistants were considered to have adequate knowledge in newborn care (46.5%), management of neonatal infections (7.1%) and identifying/stabilizing low birth weight babies (56.3%)[25]. This study also measured the newborn care knowledge of the health providers, the ten domains of questions were rescaled to range from a 0 to 10 scale. Health workers who were working in PHs were found to be at scale of 5; HWs in UHCs were at 5.4; followed by RHCs with a knowledge scale of 5.3. Relatively below half of the knowledge scale were HEWs in HPs level, with the scale point of 4.2.

Conclusion

In this study, the RHCs and HPs provide sub-optimal or low quality of neonatal healthcare service. Thus, these facilities, should be targeted to improve their readiness to provide the

quality of newborn services as per their level of care. In addition, the availability of essential equipment and the health facilities readiness are significantly associated with the quality of neonatal care provision and the effectiveness of the neonatal healthcare services respectively. Therefore, the primary healthcare units, should be assessed regularly for their readiness and fulfil the missing component to ensure the quality of newborn care services.

Abbreviations

CI: Confidence Interval; EmNeC: Emergency Newborn Care; HCs: Health Centres; HEWs: Health Extension Workers; HWs: Health Workers; KMC: Kangaroo Mother Care; LBs: Live Births; PHCUs: Primary Health Care Units; PHs: Primary Hospitals; PNC: Postnatal Care; QNC: Quality of Newborn Care; RHCs: Rural Health Centres; UHCs: Urban Health Centres

Ethics approval and consent to participate

This study was conducted under the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from the study participants before the interview. The study was approved by the Research and Ethics Committee from the Department of Health Studies, University of South Africa (UNISA) (Ref no: HSHDC/489/2015). The Amhara regional health bureau and West Gojjam Zone provided permission to conduct the study. Furthermore, the directors of PHs and HCs, and heads of the HPs also offered permission to conduct the study. Information about the purpose, procedures, risks, burdens and benefits, as well as confidentiality and voluntariness of participation was provided to all potential participants as part of the informed consent process. Privacy and confidentiality of information provided by each participants were maintained throughout the study, and which were used exclusively for statistical purposes, were assured at all times. In addition, names and other specific addresses were not recorded and reported.

Consent for publication

Not applicable.

Availability of data and materials

Full data set and materials pertaining to this study can be obtained from the correspondent author on a reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

The authors declare that there is no funding source.

Acknowledgements

The authors would like to thank UNISA for approving the ethical clearance. In addition, we would like to thank data collectors and study participants.

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Authors' contributions

The authors declare their responsibility for the following tasks (according to their initials). Bizuhan Gelaw Birhanu (BGB), Johanna Mmabojalwa Mathibe-Neke (JMM): BGB has designed the study and involved in the data collection, supervision, data processing & analyzing; and drafting the manuscript. JMM has reviewed the research design & data collection tools and supported the interpretation and analysis, as well reviewing the manuscript. All the authors have critically reviewed and approved the manuscript. The research was previously formed part of a PhD at the University of South Africa.

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Figures

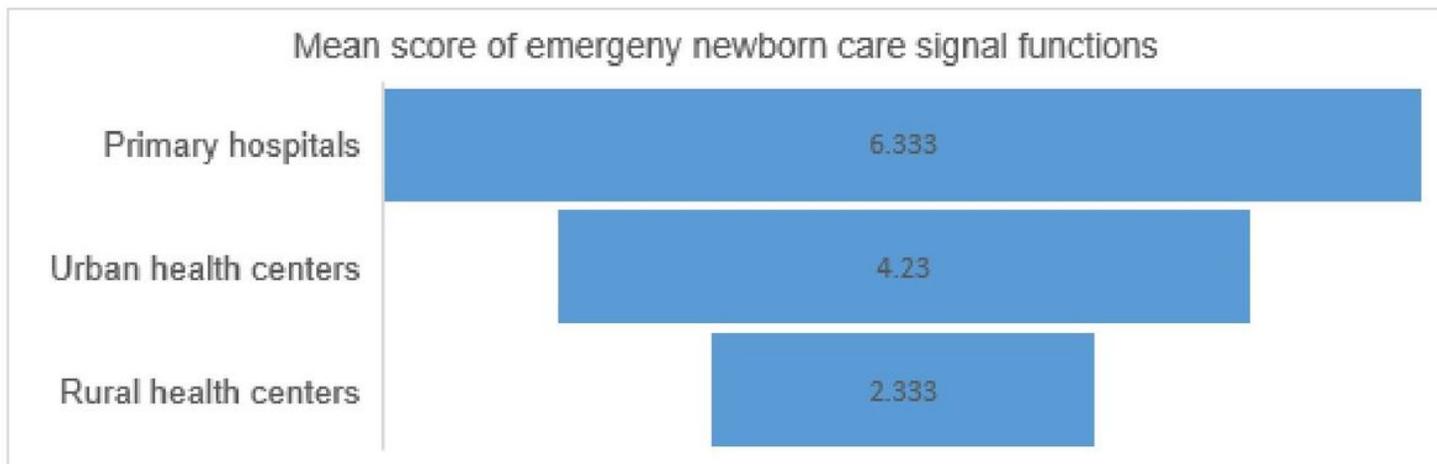


Figure 1

Provision of emergency newborn care signal functions in the last six months

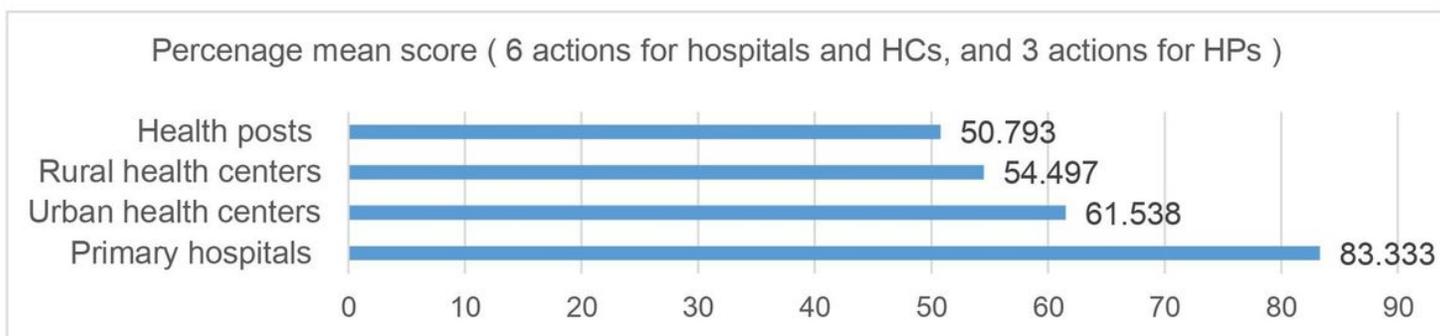


Figure 2

Percentage mean score for carrying of low birth weights babies Quality of essential newborn care:
Actions for resuscitation, follow-up and thermal care for newborns

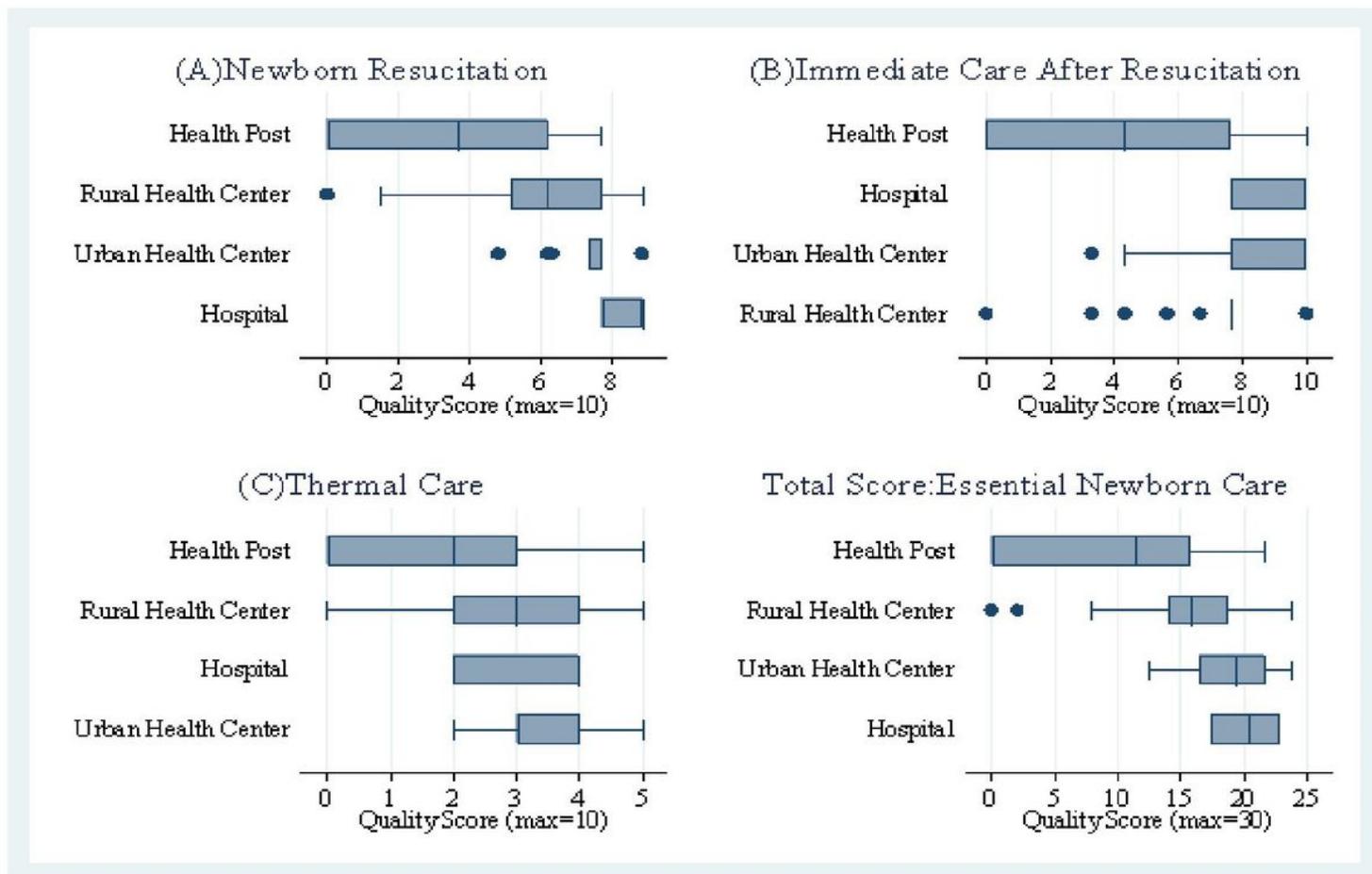


Figure 3

Essential newborn care scores by type of health facility Remark: The lines in the box plots show the range of score, while the box captures the range of the middle 50%

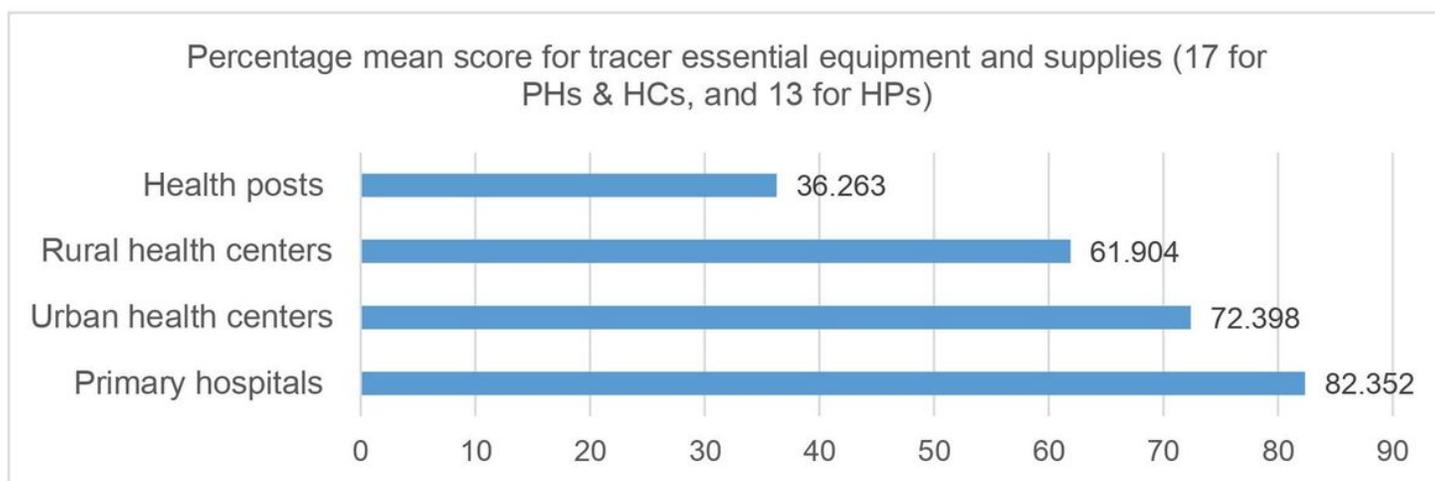


Figure 4

Percentage mean score for tracer essential equipment and supplies in health facilities

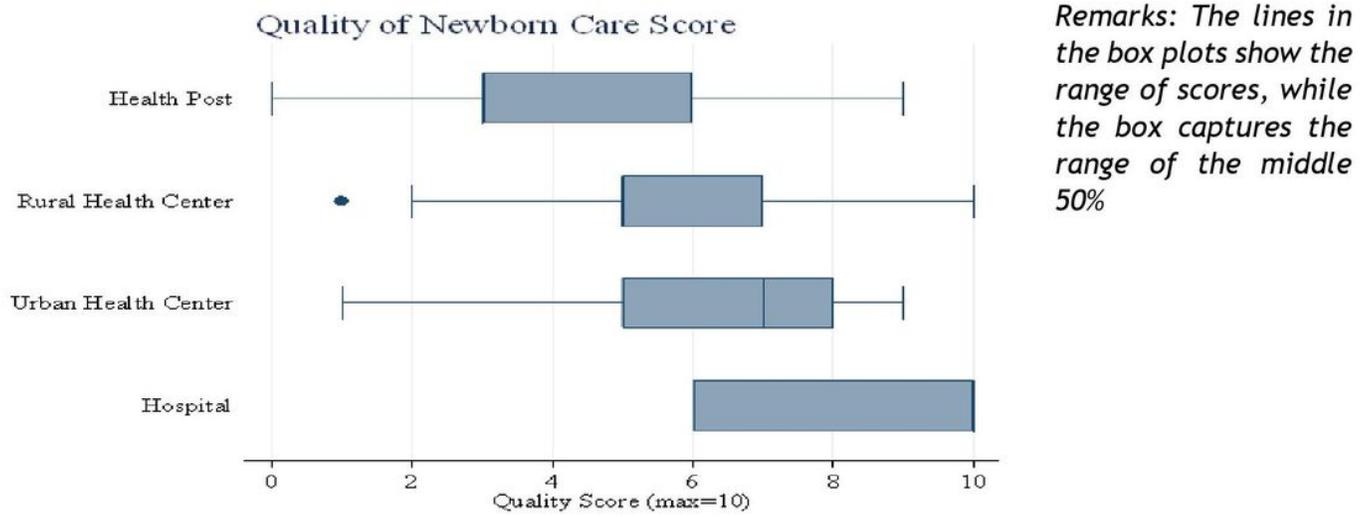


Figure 5

Quality of Newborn Care Score

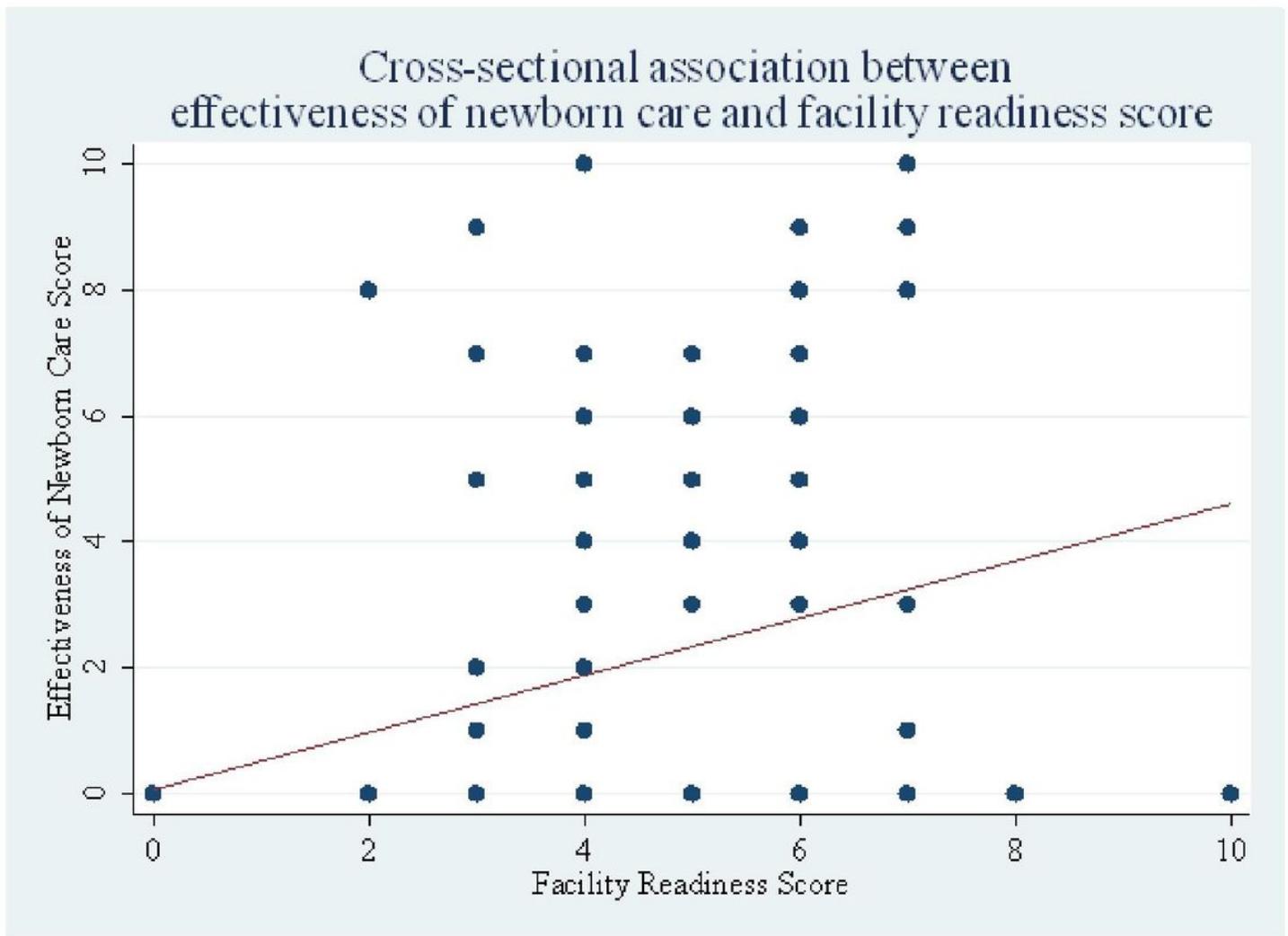


Figure 6

The cross-sectional association between effectiveness of newborn care and facility readiness score