ORIGINAL RESEARCH ARTICLE

The primary health care environment and the performance of advanced antenatal care trained nurse-midwives in South Africa

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Abstract

Transfer of learning in the workplace depends on various factors, one of which is the work environment. The aim of this study was to describe the interplay between the primary healthcare work environment, the performance of advanced antenatal care trained nurse-midwives, and birth outcomes. A cross-sectional, quantitative study was conducted in two purposely selected districts in South Africa. Document analyses were also completed. Statistical Analysis Software version 9.4 was used for descriptive statistical data analysis. The participating clinics, in the TM and LJ districts, both achieved ideal clinic status. The scores for the management of low- and high-risk pregnancies ranged between 86-89% and 87%, respectively. Babies born had Apgar scores of between 7-9 and 8-10 in 1 minute and 5 minutes after birth, respectively. Nurse-midwives scored low on interpreting assessment findings. Contrary to the Transfer of Learning Theory, nurse-midwives performed better in poorer work environments. The study suggests that the performance of advanced antenatal care trained nurse-midwives may not solely depend on a well-equipped work environment. Further studies should highlight the broader determinants of advanced antenatal care nurse-midwives services output. *(Afr J Reprod Health 2024; 28 [7]: 102-113).*

Keywords: Midwives, workplace environment, birth outcomes, primary healthcare, transfer of learning

Résumé

Le transfert des apprentissages en milieu de travail dépend de divers facteurs, dont l'environnement de travail. Le but de cette étude était de décrire l'interaction entre l'environnement de travail des soins de santé primaires, la performance des infirmières sages-femmes formées en soins prénatals avancés et les résultats de l'accouchement. Une étude transversale et quantitative a été menée dans deux districts délibérément sélectionnés en Afrique du Sud. Des analyses de documents ont également été réalisées. Le logiciel d'analyse statistique version 9.4 a été utilisé pour l'analyse de données statistiques descriptives. Les cliniques participantes, dans les districts de TM et LJ, ont toutes deux atteint le statut de clinique idéale. Les scores pour la gestion des grossesses à faible et à haut risque variaient respectivement entre 86 et 89 % et 87 %. Les bébés nés avaient des scores d'Apgar compris entre 7-9 et 8-10 respectivement 1 minute et 5 minutes après la naissance. Les infirmières sages-femmes ont obtenu de faibles résultats dans l'interprétation des résultats de l'évaluation. Contrairement à la théorie du transfert de l'apprentissage, les infirmières sages-femmes ont de meilleurs résultats dans des environnements de travail plus pauvres. L'étude suggère que la performance des infirmières sages-femmes formées en soins prénatals avancés ne dépend peut-être pas uniquement d'un environnement de travail bien équipé. D'autres études devraient mettre en évidence les déterminants plus larges de la production des services avancés d'infirmières et de sages-femmes en soins prénatals. *(Afr J Reprod Health 2024; 28 [7]: 102-113).*

Mots-clés: Sages-femmes, environnement de travail, issue de l'accouchement, soins de santé primaires, transfert d'apprentissage

Introduction

The United Nations and its member states have committed to attaining Sustainable Development Goals by 2030.[1] According to WHO[2] and Women Deliver[3], middle- and low-income countries ought to remove the barriers to quality healthcare services, particularly for the most marginalised people in communities, such as women and children. To enhance quality healthcare, the Ideal Clinic Realisation and Maintenance (ICRM) initiative was established to strengthen primary healthcare (PHC)

facilities.[4] To achieve an "ideal" primary healthcare status, it was established that a one-stop approach, with a set of prescribed, integrated services, including free antenatal care (ANC) services, is needed. In the South African PHC context, nurses have dual registration as a nurse and midwife. Women with low-risk pregnancies are managed at PHC clinics by nurse-midwives with an additional qualification in primary healthcare.[5] According to the system of the National Committee for Confidential Enquiry into Maternal Deaths, the common cause of maternal deaths during the ANC period at the PHC level is related to quality-of-care issues.[6]

In an attempt to address the quality-of-care issues, the WHO[7] released a joint statement defining who skilled birth attendants are and what their role in improving maternal and child health is. Midwives are categorised as skilled birth attendants. Evidence shows that well-educated and properly regulated midwives are crucial in reducing maternal and neonatal mortalities.[8] Training is thus an important element in terms of quality care.

In line with the international and national priority to address the quality-of-care issue, the Free State introduced the Advanced Antenatal Care (AANC) programme to strengthen ANC services at the PHC level and to improve birth outcomes. Calculations were made to determine the service demand, the ratio of AANC midwives to clinics, and the populations served in the region. Service demands were calculated based on four factors: fertility rates, population growth rate, the number of trained midwives, and the assumption that 20–30% of pregnancies will be high-risk.[9]

Meetings were held prior to the programme implementation by the programme pioneers, the Provincial Maternal and Child Health Specialists Unit, and the identified relevant stakeholders, including the district managers, the hospital CEOs, and the PHC and clinic managers. The purpose of involving the listed managers as stakeholders and gatekeepers was to ensure their acceptance of the programme to be implemented in their respective areas. The aim of their involvement was also to explain the aim and objectives of the AANC programme, to outline the manager's expected roles,

and to outline the resources needed to run the programme successfully. Furthermore, the Provincial Maternal and Child Health Specialists Unit compiled selection criteria to be followed by the district management in nominating participants, who subsequently took part in the four structured training sessions over three months. The content covered during these training sessions included ANC-related health problems, the background information on the proposed strategy focusing on strengthening risk identification for proper management, and the medico-legal implications of ANC failures. Training methods used were lectures, group discussions, practical work, and videos. Multiple-choice questions were used to test participants' knowledge. The district PHC managers assigned AANC nurse-midwives to do outreach in clinics after their training had been completed; the outreach was completed with due consideration of the availability of resources. Outreach areas were specified per AANC nurse-midwife according to the service demand calculations.

Despite literature showing that training programmes alone do not change practice[10], many organisations still focus on training programmes to improve quality-of-care. Similar to most training programmes, this training programme was content- and lecture-based, which are known not to promote critical thinking and clinical reasoning.[11] Yet, vast amounts of money are still invested in training and quality improvement programmes, especially in low-income countries.[12–14] Although many of these training programmes are successful in increasing knowledge, few consider a nurse-midwife's clinical performance after completion of the programme.[5,6] A systemic approach is thus needed to strengthen an individual's transfer of learning (as evidenced by performance) after completion of the programme.[15,16]

The Transfer of Learning systemic model by Donovan and Darcy[17] postulates that student characteristics, training design, transfer climate, and work environment influence a student's motivation to learn and, subsequently, their motivation to transfer their knowledge to the workplace. This lack of transfer can impede individual and organisational performance. Additionally, the work environment

has a direct influence on a person's performance. Thus, the overall programme expectation was for each AANC-trained nurse-midwife to perform optimally (individual performance) at the specified PHC clinics (work environment) with the view to improving birth outcomes (organisational performance). Individual performance entailed assessment, noticing deviations from the norm, interpreting findings, and acting in the best interest of the pregnant woman.[11]

Various authors support Donovan and Darcy's[17] argument that resources are required to function maximally in the workplace.[18,19]. The non-availability of good infrastructure negatively affects the physio-psychosocial well-being of healthcare providers.[20] The WHO's[7] conceptual framework supports the work of Luxon[18], Manyisa, and Van Aswegen[20] in stating that ideal infrastructures are a prerequisite for midwives to perform their duties. Organisations depend on their workers to achieve their targets and uphold their promise of quality care[21], which may be a reason they invest in training programmes. However, few organisations evaluate the return on investment of these training programmes by looking at individual performance and organisational outcomes.[12–14] Therefore, this article reports on the quality of the environment and the performance of nurse-midwives after completing the AANC training programme.

Methods

A cross-sectional, quantitative study was conducted in two purposely selected districts of the Free State (LJ and TM), a province in South Africa. LJ had 69% penetration, whereas TM, a National Health Insurance (NHI) pilot site, had 12% penetration, which is indicative of its functionality. Penetration was calculated using the actual number of women seen and the expected headcount (demand) using Census 2011 data, adjusted for the uninsured population.[22] Based on their respective penetration levels, LJ was deemed functional, and TM was deemed dysfunctional. The first cohort of twenty-four (n=24) nurse-midwives were trained over a period of three months between October and December 2014. As per programme mandates, each

AANC-trained midwife was allocated to do monthly outreach within her catchment area, ranging from four to six clinics in TM and two to nine in LJ. An outreach assignment to specific clinics was determined by managers at the district's local level; the assignments depended on the size of the area, the number of clinics within the local catchment area, the service demand calculations, and the availability of resources. Full implementation of the programme across the province was reached in 2016. The researcher obtained permission from the managers to access the files of the pregnant women managed by all fourteen (n=14) operational midwives included in the study.

A list of the AANC midwives who submitted the statistics of pregnant women to the provincial official was also requested from the managers. The midwives' booking and management registers were collected and checked against the clinics' ANC registers to corroborate the information. Table 1 shows the number of AANC-trained midwives and those operating at the time of the study, the number of clinics that should have been supported, those that were actually supported by the AANC-trained midwives, and the number of files of pregnant women who attended the PHC facility during a predetermined month.

A list of files to be audited was compiled and sent to the facility managers via email, requesting that the files be retrieved from their respective facilities. Telephonic follow-ups were done due to the poor response in the number of files retrieved. The researcher went to the different sites with the printed list to engage face-to-face with the managers facilitate the file retrieval. With subsequent telephonic follow-ups, the response was still poor. Once more, the researcher returned to the facilities and requested permission to physically retrieve the files. Despite various efforts, fewer files (n=284, 27%) were retrieved than the anticipated total number of n=1035 (100%) files. The reasons for the low retrieval rate varied from a filing backlog to a shortage of personnel at records and time constraints on the part of the facility personnel managing records.

Data was collected in December 2019. Two sets of documents, the Ideal Clinic Realisation and

Table 2: Population and sample in the two selected districts

Districts	Number of midwives	AANC-trained	Number of clinics			Number of files (Maternity Case Records)	
	Trained	Operational	Per district	Supported by AANC midwives (planned)	Supported by AANC midwives (actual)	Headcount (peak period)	Files retrieved
LJ	n = 12 (100%)	n = 9 (75%)	n = 44 (100%)	n = 42 (63%)	n = 28 (53%)	n = 779 (75%)	n = 187 (66%)
TM	n = 12 (100%)	n = 6 (50%)	n = 72 (100%)	n = 25 (37%)	n = 25 (47%)	n = 256 (25%)	n = 97 (34%)
TOTAL	**n = 24 (100%)**	**n = 14 (58%)**	**n = 116 (100%)**	**n = 67 (100%)**	**n = 53 (79%)**	**n = 1035 (100%)**	**n = 284 (27%)**

Maintenance (ICRM) and the Maternity Case Record (MCR) adopted from the National Department of Health (NDoH), were collected from the Provincial Department of Health, the primary source and custodian of the documents. The ICRM set of documents was selected to describe the physical environment using the provincial ICRM dashboard, which aims to identify and address the gaps at the PHC clinics with the view of providing good quality health care services. The ICRM dashboard hosts work environment assessment results per healthcare service site with various components, subcomponents, and elements. Addressed in the ICRM dashboard are the aspects of physical space and conditions, human resources, medicines and supplies, administrative processes, communication, and health information management. Thirteen (13) elements relevant to the workplace environment for the provision of high-quality care for pregnant women were selected from the ideal clinical standards.[4,19] When a clinic meets certain elements with high but different thresholds, they are awarded a particular status based on four weighted categories: Silver (70 – 79%), Gold (80 – 89%), Platinum (90 -99%) and Diamond (100%). For a clinic to be regarded as 'ideal', it must attain an aggregated score of 80% or higher on all weighted categories upon inspection.[4,19,23,24] Using a data sheet, the researcher captured data on the elements required to provide safe maternal and newborn care.

The other set of documents, the maternity case records (MCR), were used to describe the performance of midwives and birth outcomes as a reflection of individual and organisational performance. The MCR is a comprehensive record meant to ensure continuity of care from pregnancy to discharge after giving birth. It is a card that a woman keeps during pregnancy, and it is left at the facility where she gave birth. The maternity case records were audited using a standardised Quality Check for Antenatal Records audit tool. The tool was validated during the Perinatal Saving Babies workshop in 2001, where midwives, obstetricians, administrators from the national and provincial departments of health, and researchers were part of the process.[25]

The audit tool is a checklist to assess the quality of antenatal care rendered to women with low- and high-risk pregnancies. The checklist has elements that need to be complied with and addresses the quality of information obtained (history), assessment done (examination), the interpretation of the clinical findings (interpretation) and the management and care rendered (decisions)[25]. For data analysis, the researcher captured data from both districts on an Excel spreadsheet in preparation for analysis by a biostatistician. The descriptive statistical analysis was done using the Statistical Analysis Software (SAS) version 9.4. Continuous variables were summarised by medians, minimums, maximums, or percentiles, with results presented in

medians and percentages. The Health Sciences Research Ethics Committee at the local university granted ethical approval (UFS-HSD2018/1328/2603), and the provincial Department of Health allowed the study to be conducted using the ICRM dashboard. The district managers, hospital CEOs, PHC, and clinic managers were approached and presented with a copy of the permission granted by the DoH prior to accessing the documents. Confidentiality was maintained throughout the study.

Results

The results are reported based on the quality of the clinical work environment, midwife performance, and birth outcomes. Results of the ICRM clinical work environment per district are presented in Table 2.

The majority (15; 60%) of the clinics in TM achieved Silver status, while two (8%) clinics achieved Gold status as a minimum standard setting. Only seven clinics (25%) in LJ met the minimum standards. Fewer clinics (6; 21%) in LJ achieved Silver status compared to TM. Only one clinic in LJ reached Gold status. No clinic in any of the two districts attained Platinum status. Amongst the ideal elements assessed, clinics in both districts had an electronic network system for monitoring the availability of medicines. The midwives' performance in relation to the work environment is reflected in Table 3.

Despite the work environment being less than ideal, the midwives met the standard score of 80% for managing women with low-risk pregnancies. From the audited files, the number of PHC clinics supported by the midwives did not seem to have any effect on their performance.

Midwives performed well in managing women with low-risk and high-risk pregnancies, with all but one midwife in LJ falling short of the set standard of 80% in low-risk pregnancies. LJ scored slightly higher than TM in the management of low-risk pregnancies. The average scores for both districts in managing high-risk women were almost similar.

The tool used to audit the files of pregnant women with low-risk pregnancies comprised three segments. Of the three segments, midwives performed well in taking the history in both districts. The midwives' performance in examination was good and relatively better (90%) in TM compared to LJ (86%). However, the score obtained for the interpretation segment was poor, particularly in TM. Women with high-risk pregnancies proved to be more difficult to manage in LJ than women with low-risk pregnancies.

A total of 67 women (out of 86) with high-risk pregnancies were admitted to hospital, as depicted in Table 5. Most mothers were admitted with live babies except two in LJ, who were admitted with intra-uterine deaths. Consequently, most babies were born alive. All the women seen by the AANC midwives in both districts were discharged alive with no near misses.

One set of twins was born in LJ and two sets were born in TM, adding three infants to the total number of pregnant persons (n=89). Four babies in LJ and two in TM were born with Apgar scores of less than 7 within one minute of birth, an additional two were stillborn, and the remaining 82 had good Apgar scores.

Discussion

For optimal individual and organisational performance resulting in positive health outcomes, an enabling work environment is needed. Among the ICRM elements assessed, clinics in both districts had an effective electronic network system for monitoring the availability of medicines, which improved the oversight and timely ordering of stock. The findings align with the evaluation report by the National Department of Health that ICRM improvements were noted in the availability of medicines and equipment.[26] Various authors assert that a continuous and adequate supply of medicines is critical in managing and treating pregnancy-related conditions and complications.[27,28] Guidelines provide a practical approach for clinicians to manage various pregnancy-related conditions and complications[29] and these were available to a greater

Table 2: ICRM clinical work environment

Elements	LJ - clinics supported (actual) N=28			TM - clinics supported (actual) N=25		
	Achieved Green (%)	Partially achieved Orange (%)	Not achieved Red (%)	Achieved Green (%)	Partially achieved Orange (%)	Not achieved Red (%)
Availability of priority stationery	19 (67.86)	4 (14.29)	5 (17.86)	22 (88.00)	3 (12.00)	0
Adolescent and youth-friendly health services are provided	0	3 (10.71)	25 (89.28)	3 (12.00)	7 (28.00)	15 (60.00)
ICSM compliant package of clinical guidelines is available in all consulting rooms	27 (96.43)	1 (3.57)	0	19 (76.00)	6 (24.00)	0
National guidelines on priority health conditions are available in the facility	28 (100)	0	0	19 (76.00)	5 (20.00)	1 (4.00)
Patient safety incident records comply with the National Guideline for Patient Safety Incident Reporting	12 (42.86)	3 (10.71)	13 (46.43)	11 (44.00)	3 (12.00)	11 (44.00)
The complaints/compliments/suggestion records comply with the National Guideline to manage complaints	18 (64.29)	6 (21.43)	4 (14.29)	13 (52.00)	7 (28.00)	5 (20.00)
Electronic networked system for monitoring the availability of medicines is used effectively	27 (96.43)	1 (3.57)	0	25 (100)	0	0
Required functional diagnostic equipment and concurrent consumables for point-of-care testing are available	16 (57.14)	12 (42.86)	0	17 (68.00)	8 (32)	0
Laboratory results are received from the laboratory within the specified turnaround times	19 (67.86)	5 (17.86)	4 (14.29)	17 (68.00)	5 (20.00)	3 (12.00)
Clinic space accommodates all services and staff	2 (7.14)	23 (82.14)	3 (10.71)	8 (32.00)	17 (68.00)	0
Essential equipment is available and functional in consulting areas	3 (10.71)	23 (82.14)	2 (7.14)	13 (52.00)	12 (48.00)	0
Resuscitation room is equipped with functional, basic resuscitation equipment	8 (28.57)	18 (64.29)	2 (7.14)	16 (64.00)	9 (36.00)	0
There is an emergency sterile obstetric delivery pack	16 (57.14)	8 (28.57)	4 (14.29)	21 (84.00)	4 (16.00)	0
Results - Ideal Clinic status	**LJ count**			**TM count**		
	n	**%**		**N**		**%**
Not achieved	**21**	**75**		**8**		**32**
Achieved Silver	**6**	**21**		**15**		**60**
Achieved Gold	**1**	**4**		**2**		**8**
Achieved Platinum	**0**	**0**		**0**		**0**

extent in LJ than in TM. This element is deemed vital as it has immediate and long-term adverse effects on the health of the population.[30] However, from this study, the challenges identified included poor clinic conditions, shortage of equipment, inadequate basic life support training for patients' resuscitation and operation of Automated External Defibrillators, and a flawed system of reporting patient safety incidents. These challenges are similar to those reported by Muthelo *et al.*[31]

The initial premise of this study was that well-functioning work environments lead to high individual and organisational performance.[16,32] However, this study evidenced the better

Table 3: Midwives' performance*

LJ Trained midwives (n)	Files assessed per practitioner (n)	Clinics Status Not achieved (n)	Silver (n)	Gold (n)	Performance low-risk pregnancies Total mark (%)	Performance High-risk Pregnancies Total mark(%)	No. of clinics supported by midwives (n)	TM Trained midwives (n)	Files assessed per practitioner (n)	Clinics Status Not achieved (n)	Silver (n)	Gold (n)	Performance low-risk pregnancies Total mark (%)	Performance High-risk Pregnancies Total mark (%)	No. of clinics supported by Midwives (n)
P1	24	5	0	0	90	90	5	P10	8	0	1	2	89	91	1
P2	37	2	0	0	90	86	2	P11	16	8	7	0	94	85	17
P3	14	5	0	0	90	81	5	P12	3	0	3	0	81	No high-risk cases seen	3
P4	9	0	1	1	93	92	2	P13	19	0	3	0	84	83	3
P5	23	1	1	0	87	84	2	P14	51	0	1	0	84	87	1
P6	18	5	1	0	87	88	6								
P7	10	1	1	0	77	86	2								
P8	38	0	2	0	89	87	2								
P9	14	2	0	0	95	86	2								
TOTAL	**187**	**21**	**6**	**0**	**89**	**87**	**28**	**TOTAL**	**97**	**8**	**15**	**2**	**86**	**87**	**25**
Average score %					**89**	**87**		**Average score %**					**86**	**87**	

*Scores obtained (figures) were rounded off to a single digit

performance of midwives working in less-than-ideal \PHC clinics than those working in clinics with a higher Ideal Clinic Status. This study's findings support those from the literature.[33–36] In this study, midwives performed well in the history-taking and physical examination criteria used to audit the nurse-midwives, but they failed to interpret the assessment findings; this result confirms the conclusions of the National Department of Health[37] and the 'Saving Mothers 2014 -2016' report.[38] Consequently, pregnancy-related conditions may be misdiagnosed and mismanaged with disastrous effects on the lives of the mother and her unborn baby.[29]

The provision of quality ANC, the continuous monitoring of the well-being of both mother and baby during labour, and the availability of competent midwives trained in programmes such as the Helping Babies Breathe programme immediately after birth, have been reported to reduce the risk of early neonatal mortalities.[39] According to this study, most babies were born with good Apgar scores, ranging between 7 and 10, which is indicative of a lower risk of cerebral palsy and epilepsy.

Reducing maternal and neonatal deaths is one of the Sustainable Development Goals to be achieved by 2030.[2] Countries should thus develop innovative strategies and programmes to accelerate their efforts to meet Sustainable Development Goals 3.1 and 3.2 and the related targets.

Table 4: Average performance score of the AANC practitioners in percentage*

LJ

AANC practitioners	Files assessed per practitioner (n)	History taking Low risk (mean)	High risk (%)	Examination 1st visit Low risk (mean)	High risk (%)	Examination Follow up High risk (%)	Interpretation Low risk (mean)	High risk (%)	Special investigations 1st visit High risk (%)	Total mark Low risk (mean)	High risk (%)
P1	24	92.4	97	86.6	92	89	89.6	79	93	89.5	90
P2	37	93.6	97	81.9	87	82	93.1	80	96	89.6	86
P3	14	93.0	87	90.0	94	75	85.7	68	92	89.5	82
P4	9	100	100	96.2	88	89	82.9	85	92	93.0	92
P5	23	93.3	85	93.7	85	74	74.4	81	91	87.1	84
P6	18	91.6	90	86.1	94	93	83.4	83	88	87.0	88
P7	10	100	96	75	77	93	57.1	81	85	77.3	86
P8	38	97.5	91	79.5	89	82	91.0	82	91	89.3	87
P9	14	95.8	95	87.9	78	85	100	76	91	94.5	86
TOTAL (n)	**187**										
Average score (%)		**95**	**93**	**86**	**87**	**85**	**84**	**79**	**91**	**89**	**87**

TM

AANC practitioners	Files assessed per practitioner (n)	History taking Low risk (mean)	High risk (%)	Examination 1st visit Low risk (mean)	High risk (%)	Examination Follow up High risk (%)	Interpretation Low risk (mean)	High risk (%)	Special investigations 1st visit High risk (%)	Total mark Low risk (mean)	High risk (%)
P10	8	94.4	100	91.6	98	92	80.9	74	94	89.0	91
P11	16	100	97	97.2	82	79	85.7	72	83	94.3	85
P12	3	87.5	No high-risk cases seen	81.1	No high-risk cases seen	No high-risk cases seen	73.2	No high-risk cases seen	No high-risk cases seen	80.6	No high-risk cases seen
P13	19	87.6	96	89.6	91	91	73.4	65	65	83.5	83
P14	51	89.6	97	90.5	79	100	71.5	70	70	83.8	87
TOTAL (n)	**97**										
Average score (%)		**92**	**98**	**90**	**88**	**91**	**77**	**70**	**78**	**86**	**87**

Median Score (n=9)		94	95	87	88	85	86	81	91	90	86	**Median Score (n=5)**		90	97	81	87	91	73	71	87	84	86

*The mean is rounded to one more decimal place than occurs in raw data

Table 5: Comparison of birth outcomes – high-risk pregnancies

Selected outcomes	1. Mother admitted before labour		2. Foetus alive on admission		3. Date of delivery	4. Correlation with the EDD		5. Mode of delivery		6. Baby born alive		9. Birth weight			10. Resuscitation required		11. Maternal complications		12 Alive at discharge		13 Maternal near miss		14. Maternal death		Median scores
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	Yes (%)	No (%)	C/s (%)	Normal (%)	Yes (%)	No (%)	Normal (%)	Prt (%)	S-G (%)	Yes (%)	No (%)	Yes (%)	No (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	
LJ	46 (77)	14 (23)	58 (97)	2 (3)	60 (100)	47 (78)	13 (22)	37 (62)	23 (38)	58 (97)	2 (3)	49 (82)	6 (10)	5 (8)	2 (3)	58 (97)	5 (8)	55 (92)	2 (3)	58 (97)	60 (100)	0	60 (100)	0	86
TM	21 (81)	5 (19)	26 (100)	0	26 (100)	13 (50)	13 (50)	13 (50)	13 (50)	26 (100)	0	24 (92)	1 (4)	1 (4)	1 (4)	25 (96)	1 (4)	25 (96)	0	26 (100)	26 (100)	0	26 (100)	0	88

C/s = Caesarean section; EDD = expected date of delivery; Prt = Preterm; S-G = small for gestation

AANC is a programme aiming to improve ANC services at the PHC level. Midwives are trained to identify risks and ensure that pregnant women in the PHC system are managed and referred on time. The findings indicate that midwives could overcome the environmental workplace challenges as depicted by the ICRM results. However, despite various interventions being put in place, the nurse-midwives in this study still struggled to interpret their assessment findings. Interventions include additional training focusing on the problems encountered and gaps identified with antenatal care service delivery, the facilitation of content to enhance the competency of the nurse-midwives in assessment, interpretation, early identification of complications, the management and care of women with both low- and high-risk pregnancies, and the medico-legal impact of failures at an antenatal care level. Yet, despite these interventions, problems still exist. As a result, future training should emphasise the development of thinking and reasoning skills for effective clinical decision-making in line with the suggestion in the study by Hong.[40].

Strengths and limitations

The contribution of this study is embedded in the description of the interplay between the clinical workplace, the performance of the AANC midwives within a particular clinical environment, birth outcomes, and an AANC training initiative to increase midwives' competency.

A limitation of the study is its small sample size. The study also did not test the association between elements of the work environment and AANC performance outcomes. Thus, further studies are needed in this area. Logistical and local factors such as shortages of personnel at the facilities' records sections, filing backlogs, and time constraints on the part of the facility personnel managing the records resulted in fewer retrieved files than had been anticipated. Additionally, the researcher had to travel to all the clinics and hospitals to retrieve the files personally. As a result of fewer files being retrieved, the sampling might have been skewed, and an unintended bias introduced into the results.

Therefore, the results cannot be generalised to the larger population. The national ANC audit tool used to audit the files of women with low-risk pregnancies lacks a component for assessing birth outcomes. Consequently, the maternal and neonatal birth outcomes for low-risk pregnancies could not be captured. Furthermore, because low-risk pregnancies could still have adverse birth outcomes, the data presented might not have reflected the birth outcomes accurately.[41]

Conclusion

The maternal surveillance system in South Africa has consistently linked the most common causes of maternal deaths during ANC at the PHC level to quality care issues. In the two districts included in this study, midwives performed well in assessing women with low- and high-risk pregnancies but had difficulty interpreting clinical findings. Apgar scores for newborns were good. There were no maternal deaths or near misses. Although this study focussed on the influence of the work environment on individual performance and birth outcomes, further studies are needed to investigate other determinants of AANC work performance and their potential effects on birth outcomes.

Conflict of interest

The authors have no conflicts of interest to disclose.

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