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"*If you don't have enough equipment, you're not going to provide quality services*": Healthcare workers' perceptions on improving the quality of antenatal care in rural Tanzania

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ABSTRACT

Introduction: To reduce maternal mortality in rural Tanzania, improving antenatal care remains an urgent priority. Therefore, the availability of qualified and motivated staff providing antenatal care is an essential precondition for high-quality maternal healthcare. However, it is still unclear which factors affect the performance of healthcare workers in this setting, and what they perceive is necessary to improve the quality of antenatal care. The aim of this research was to identify factors that could, according to healthcare workers, improve their performance and thereby improve the quality of antenatal care in rural Tanzania.

Methods: Semi-structured in-depth interviews were conducted with sixteen healthcare workers of different education levels and from different health facilities in Magu District, Tanzania. Questions were asked about their experiences, opinions, and motivations related to the provision and quality of antenatal care, as well as their perceptions of the value of using an e-health application during consultations.

Results: Healthcare workers possess a positive attitude towards antenatal care and acknowledge its importance. Despite the existing social pressure from both colleagues and clients to perform well, this study identified differences in the quality of antenatal care provision and the level of motivation between healthcare workers. In addition, participants felt capable of providing antenatal care but complained about the poor working conditions (e.g. lack of electricity, equipment or medication), and indicated a need for more training and better supervision. Furthermore, when asked whether an electronic clinical decision and support system could improve the quality of antenatal care and their working conditions, healthcare workers expressed a positive attitude towards such a system.

Discussion: In order to change the status quo in antenatal care provision in Tanzania, attention should be paid to reducing the work challenges experienced by healthcare workers. This could be achieved through providing training opportunities, supportive leadership, and the improvement of physical working conditions, for example by the implementation of an electronic clinical decision and support system.

1. Introduction

Maternal mortality remains a major issue globally; 830 women die from pregnancy- or childbirth-related complications every day (World Health Organization, 2018). Of these deaths, 66% occur in sub-Saharan Africa (Alkema et al., 2016) and one of the countries with the highest maternal mortality ratio is Tanzania with 410 maternal deaths (i.e., the death of a woman while pregnant or within 42 days of termination of pregnancy) per 100,000 live births (WHO, UNICEF, UNFPA, The World Bank, & United Nations Population Division, 2014). For nearly two decades, the United Nations have been focusing on the reduction of maternal mortality. In their Sustainable Development Goals (United Nation, 2019), the United Nations set the target to reduce the global maternal mortality ratio to less than 70 per 100 000 live births by 2030

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(Alkema et al., 2016; World Health Organization, 2015). To achieve such a reduction in maternal and infant death rates, one key intervention is universal access to high-quality maternal healthcare services (Koblinsky et al., 2016; Miller et al., 2016; World Health Organization, 2018).

Antenatal care is a key component of maternal healthcare, as these services identify high-risk pregnancies, and provide an opportunity to prevent and manage (pregnancy-related) diseases, as well as to provide health education to women and their partners (Kerber et al., 2007; Lawn et al., 2010; World Health Organization, 2016) which contribute to maternal and child health. Antenatal care involves the provision of essential interventions such as tetanus toxoid immunisation, iron supplements, malaria prophylaxis, and deworming, as well as screening and treatment for complications, such as sexually transmitted infections (Lassi et al., 2014; Ministry of Health, 2016; Mrisho et al., 2009; World Health Organization, 2006). In Tanzania, attendance at antenatal care at least once is 96% and therefore offers an important entry point to other maternal healthcare services for a large proportion of women (Conrad et al., 2012). Receiving antenatal care has been also associated with uptake of facility-based childbirth which is still considered as the key intervention to reduce maternal mortality (Afnan-Holmes et al., 2015; Campbell & Graham, 2006; Conrad et al., 2012; Lassi et al., 2014; Ministry of Health, 2016; Mrisho et al., 2009).

Despite the importance of antenatal care for maternal and child health, research has shown that the quality of antenatal care in Tanzania is low (Miltenburg et al., 2017; Nyamtema et al., 2012). In general, healthcare workers show poor adherence to antenatal care guidelines and low provision of essential interventions (Boller et al., 2003; Conrad et al., 2012; Gross et al., 2011; Miltenburg et al., 2017; Mubyazi et al., 2012; Nyamtema et al., 2012; Pembe et al., 2010; Sarker et al., 2010). For example, fewer than 50% of health facilities that provide antenatal care offer a urine check, syphilis screening, or haemoglobin testing (Ministry of Health, 2016), and only 67% of women visiting antenatal care received information on danger signs (Conrad et al., 2012). Reasons for not performing these tasks include staff and equipment shortages, as well as a lack of knowledge on guidelines and procedures among healthcare workers (Conrad et al., 2012; Gross et al., 2011; Mrisho et al., 2009; Nyamtema et al., 2012; Sarker et al., 2010). Some studies have found, however, that even when necessary equipment to perform antenatal care-related tasks is available, some interventions were not provided (Miltenburg et al., 2017; Nyamtema et al., 2012). Researchers have posited that challenging work conditions for healthcare workers in Tanzania, such as a high workload, poor infrastructure and low incentives (Conrad et al., 2012; Gross et al., 2011; Lugina et al., 2001; Miltenburg et al., 2017; Mrisho et al., 2009) might be underlying these findings. Since inadequate working conditions may influence work motivation (Gross et al., 2011; Mrisho et al., 2009; Mubyazi et al., 2012; Nyamtema et al., 2012; Pembe et al., 2010), and less motivated healthcare workers may not provide the highest quality care (Ntoburi et al., 2008), there is a need to investigate healthcare workers' perceptions of antenatal care provision, and in particular to understand their working conditions and motivation to provide antenatal care.

In Tanzania, several solutions have been implemented in an effort to increase the work motivation of healthcare workers. Among these are higher (financial) incentives, improved working conditions, better training opportunities, and supervision (Manzi, Kida, Mbuyita, Palmer, & Gilson, 2004; Mrisho et al., 2009; Mselle, Moland, Mvungi, Evjen-Olsen, & Kohi, 2013; Oka, Horiuchi, Shimpuku, Madeni, & Leshabari, 2018). Unfortunately, these strategies have not yet resulted in high-quality antenatal care. One innovative solution might be the implementation of an electronic clinical decision and support system (hereafter: electronic decision aid) in health facilities. Research has shown that this can improve healthcare workers' performance and adherence to guidelines (Adepoju et al., 2017; Agarwal et al., 2015; Horner et al., 2013; Oluoch et al., 2012) which results in better services for pregnant women. For example, a systematic review on electronic decision aids in sub-Saharan Africa showed, despite several health system barriers, that the implementation of an electronic decision aid led to increased healthcare worker motivation, better adherence to evidence-based guidelines, and improved training opportunities (Adepoju et al., 2017). Moreover, a pilot study in Tanzania and Ghana implementing an electronic decision aid revealed high uptake during antenatal care consultations and positive attitudes of healthcare workers towards the use of an electronic decision aid (Sukums et al., 2014).

Although an electronic decision aid may be one promising tool to enhance the motivation of the health workforce providing antenatal care, for such a tool to enable outcomes there remains a need to first understand the determinants that influence health care workers' performance of essential antenatal care interventions as well as their usage of electronic decision aids. Changing the work motivation of healthcare workers – and thereby, ultimately the quality of the services they provide - requires understanding what influences it, i.e. the determinants (Kok et al., 2016). In this study, the Theory of Planned Behaviour is used as a framework to understand the behaviour of healthcare workers providing antenatal care services in Tanzania. The Theory of Planned Behaviour has been successfully applied to understand many types of health behaviour and provide insight into the determinants of behaviour (Ajzen, 1991, 2011). The theory predicts that behaviour is influenced primarily by the motivation or intention to perform the behaviour, which in turn is influenced by three determinants: attitude, subjective norms, and perceived behaviour control. Attitude refers to the positive or negative evaluation of performing the behaviour. Subjective norm means the perceived social pressure to perform (or not perform) the behaviour. Finally, perceived behaviour control is the perceived capability to perform the behaviour (Ajzen, 1991, 2011). The aim of this research was to identify perceptions of healthcare workers about antenatal care in rural Tanzania, and the factors that influence their performance. Specifically, sixteen semi-structured in-depth interviews were conducted with healthcare workers responsible for antenatal care about the quality of their provided services and focused on their attitudes, subjective norms, and perceived behavioural control; further, healthcare workers' motivation and their opinions on the utility of an electronic decision aid were explored.

2. Methods

2.1. Study design

Data for this research were collected utilizing a qualitative study design, specifically, individual semi-structured in-depth interviews. The aim was to gain insights into the experiences, opinions, and motivation of healthcare workers providing antenatal care.

2.2. Study site

This study took place in Magu District, Mwanza Region, which is part of the Lake Zone of Tanzania, one of the regions in Tanzania where maternal mortality is highest (Shoo, Mboera, Ndeki, & Munishi, 2017). The Tanzania Demographic and Health Survey report of 2016, shows that the Lake Zone has the lowest percentage of assistance at birth by a skilled birth provider (Ministry of Health, 2016; Ministry of Health et al., 2016) as well as the lowest coverage of quality antenatal care in the country (Ministry of Health et al., 2016).

This study was part of the *Women Centered Care Project*, a project run by the African Woman Foundation from 2013 until 2016. The project aimed to improve maternal healthcare in Magu District through three main activities: community groups to raise awareness on maternal health issues and increase health-seeking behaviour (Solnes Miltenburg et al., 2019); upgrading health facilities and providing training to healthcare workers; and developing and implementing an electronic

decision aid (the Nurse Assistant App) to enhance antenatal care services in rural dispensaries. In Magu District, reproductive health services are provided at different levels of care ranging from the district-level dispensaries providing basic healthcare services (26 scattered over the district) to tertiary care offered at the district hospital (one in the district town). In rural areas, dispensaries are the main access points for reproductive health services, including antenatal care. They serve as first-level primary healthcare and provide services mainly on an outpatient basis. For this study, thirteen dispensaries were selected using purposive sampling based on different geographic factors to represent the district as adequately as possible. The current study was conducted among healthcare workers of six of these dispensaries that were allocated to be control facilities. (Further information on the *Women Centered Care Project* and an overview of its published papers, see supplemental material).

2.3. Sampling

Antenatal care is provided by healthcare workers of different disciplines and seniority levels, e.g., clinical officer, assistant clinical officer, nurse midwife, enrolled nurse, and medical attendant. Although medical attendants are not officially trained to provide antenatal care services, the circumstances in the dispensary require them to provide this care. Therefore, we decided to apply purposive sampling to include healthcare workers from all types of disciplines and seniority levels. All healthcare workers responsible for providing antenatal care in their health facility were eligible for inclusion and were approached at their health facility. In total, from the healthcare workers who offered to volunteer in the research, sixteen healthcare workers were selected, in which care was taken to include as many differences as possible. The healthcare workers were invited for the interview at their health facility. Among them were five clinical officers, four enrolled nurses, and seven medical attendants.

2.4. Data collection

An interview guide was developed, based on the determinants of the Theory of Planned Behaviour (Ajzen, 1991, 2011) and tailored to the local setting. To maximise content validity, the researchers discussed the guide with the team members of the Women Centered Care Project while taking the context of the data collection into account and made sure to base the phrasing of the Theory of Planned Behaviour questions on the original recommendations by Ajzen (1991, 2011). The interview guide (see Appendix 1) was further adapted during the data collection using an iterative approach to acknowledge healthcare workers' input (ensuring ecological validity).

Healthcare workers were asked about their attitudes towards antenatal care services, perceptions of social norms towards antenatal care in their social environment (e.g. by other healthcare workers), and opinions on the level of control they experienced in their jobs, as well as their job satisfaction. Moreover, to probe whether an electronic decision aid could contribute to improvements in both the quality of care as well as healthcare workers' motivation and performance, questions using an electronic decision aid during antenatal care were included. Example questions are: What do you think about providing antenatal care? Do you feel you had enough training to provide antenatal care? Do you like working at this facility?

The interviews were conducted in March and April 2016 in Kiswahili and the regional language Sukuma. English translations were provided by a translator who was present with the researcher conducting the interview. The translator and researcher are extensively trained and experienced in conducting qualitative research. Prior to the commencement of data collection, interview skills were practised and refreshed during training meetings with the principal researcher. Interviews took approximately 30 min and were conducted in a private, quiet area in or around the health facility. All interviews were tape-recorded with the consent of the participants and transcribed verbatim using *F5transcription v3 software*. Field notes taken by the researcher were informally discussed with the translator at the end of each data collection day and were used to supplement the transcripts. Any discrepancies or disagreements in the field notes or transcripts were discussed in a follow-up meeting with the principal researcher.

2.5. Data analysis

Analysis was performed by the principal researcher using MAXQDA 12 software, employing a directed content analysis approach (Hsieh & Shannon, 2005). After reading all interviews once, the text was coded and revealed prior defined categories of the Theory of Planned Behaviour, as well as newly formed categories that emerged from the text. After this, the categories were checked by reading the interviews for a second time and grouped into five themes whereby the categories consisting of variables from the Theory of Planned Behaviour (attitude towards antenatal care services; social norm; perceived behaviour control) were combined into one theme called psychosocial variables. To maximise inter-rater reliability, part of the analysis was repeated by one of the team members. Inter-rater reliability refers to the interpretation of data and the likelihood that the same themes emerge from similar data (Green & Thorogood, 2011). Therefore, any discrepancies in codes and categories were discussed until consensus was reached. The three final themes - psychosocial variables, inhibiting factors to provide antenatal care, and opinions on an electronic decision aid - will be discussed separately in the result section below.

2.6. Ethical considerations

Ethical clearance for this study was obtained from the National Institute of Medical Research in Tanzania (MR/53/100/103-244-245-349-399) and Maastricht University in the Netherlands (OZL_188_10_02_2018_S32). A research permit was granted by the Tanzanian Commission for Science and Technology (No. 2015-227-NA-2013-32). This study was discussed and approved by the local (medical) authorities and conducted in collaboration with the district coordinator for Reproductive and Child Health. Verbal information about the purpose of the study and the content of the interview was provided to the respondents before written informed consent was obtained from all healthcare workers. Healthcare workers were informed about their right to withdraw at any time. Data were only accessible to the research team.

3. Results

3.1. Theme 1: psychosocial factors

3.1.1. Attitude towards delivering antenatal care services

All healthcare workers expressed a positive attitude toward providing antenatal care. They stated that they like helping pregnant women and their unborn child by checking their health status and providing them with the required services. In general, healthcare workers indicated that the provision of antenatal care services is important, explaining that antenatal care reduces pregnancy-related problems and that the provided services reduce maternal and child mortality rates.

Some participants pointed out that the health education provided during antenatal care is important because they felt it increases women's awareness of the possible danger signs during pregnancy. Others also stated that health education helps pregnant women understand the advantages of a facility birth:

> *"First you have a health education on how to manage your pregnancy and preparations during pregnancy […] The importance for antenatal care visits, it helps the mother to understand the advantage of attending*

to the health facility (for delivery) and counselling provided by the medical personnel which is very necessary." (Clinical Officer, Male, 32)

Besides providing health education, most healthcare workers mentioned other important components of antenatal care, such as HIV testing, foetal heart rate monitoring, blood pressure measurement, abdominal examination, urine testing, and medication provision. Although a few participants viewed certain components as more important than others, all healthcare workers indicated they felt that all aspects of antenatal care are important.

3.2. Social norms

All healthcare workers interviewed expressed that they care about the opinions of their co-workers and supervisors about their performance. However, the majority of the participants had difficulties in providing reasons why they felt this was important. The few who were able to do so explained that the quality of their work reflects on their colleagues and the whole facility. One clinical officer stated that it is important to reduce the number of complaints from pregnant women and to satisfy colleagues with his performance. He further stated that his co-workers come to him for help when they face challenges, which gave him the confirmation that they must be content with his manner of providing antenatal care services.

In addition, all healthcare workers expressed that it is important that their clients are satisfied with the care provided but struggled to cite reasons for this. Instead, they mentioned things that contribute to client satisfaction, for example receiving the service they expect, receiving the service for free, providing weight measurement of the newborn, and being provided with a *clean delivery pack* (in Tanzania, women are expected to bring their equipment to the health facility when they deliver). The *clean delivery pack* contains the basic equipment required to conduct a safe delivery and is provided to women attending antenatal care as part of a campaign supported by the Ministry of Health to reduce the financial burden for women. One healthcare worker explained that it is important that pregnant women are satisfied with antenatal care services because without clients she would not have a job. Another one stated that the satisfaction of his clients encourages him to do his work well, and he stated that he believes that women would not come back to the facility if poor quality care was provided. One clinical officer gauged the quality of antenatal care services by her clients' satisfaction:

"And I see that they are happy because if you do something good to somebody, and somebody says thank you for your services, means that they have appreciated your services." (Clinical Officer, Male, 28)

Interestingly, although they all indicated their own work should be of good quality, the healthcare workers were not unanimously positive about the quality of antenatal care provided by their co-workers. About half of them expressed that the service of their colleagues was the same, or just as good as the service they provide themselves. Several explained that this is because they all use the same guidelines and two participants indicated that they work as a team and assist each other. However, some healthcare workers commented on differences in the quality of antenatal care provided by their colleagues. Most of them expressed that these differences were due to the level of education these colleagues received, which often results in lack of skills, knowledge, and experience. For example, one clinical officer asserted that medical attendants do not receive enough antenatal care skills training:

"Eh they are working but these healthcare workers who are available here they don't have much experience and knowledge on antenatal care […] so they are not trained in antenatal care." (Clinical Officer, Male, 58)

In addition to lack of experience and knowledge, shortage of healthcare workers as well as the heavy workload was cited as another factor influencing provider behaviour.

"If you don't have enough equipment, you're not going to provide the quality service to the pregnant mama […] So the shortage of healthcare workers and also lack of working equipment are the main barriers […] Because she won't have enough training, it affects the quality of antenatal care to the pregnant mama, because she can do something wrong because she doesn't know maybe." (Medical Attendant, Female, 52)

Furthermore, one healthcare worker stated that another potential reason for poorer quality of antenatal care services is that specialised healthcare workers are not motivated to work in a department other than that of their specialisation, and that they refuse to provide certain services. She gave an example of seeing incomplete antenatal care records when clients came to give birth at the health facility. It was noted that co-workers failed to record important medical information, despite her instructions to do so, sometimes leading to complications that could have been prevented:

"shaking her head (laughing) *It is out of my control. Other healthcare workers they are not working good […] Personal behaviour so cannot be able to changing that (sic) because I may ask that why don't you do this one, and again they don't fill this one, and again then I repeat it - so it's hard […]. They are not motivated to provide such services."* (Enrolled Nurse, Female, 29)

3.3. Perceived behaviour control

The majority of participants expressed the need for additional training, supervision, and leadership; most felt that they had not received enough education to provide good quality antenatal care:

"I don't have (enough education). Eh I don't have because this information they change day after day so they need to visit seminar to up to date (sic) to get new things. Yes, that's why the quality is decreased." (Clinical Officer, Male, 51)

In general, healthcare workers were positive about the possibility of receiving more leadership and supervision; importantly, some of them thought that it would have a positive effect on the quality of care they provide. One participant noted they would feel more capable of doing the job if more experienced colleagues shared their experience and knowledge with them. Conversely, several healthcare workers expressed that they already receive enough guidance. The participants furthermore revealed different experiences about the level of supervision they received. For example, one medical attendant explained that the books at the facility provided her with guidance, whereas others indicated that they received sufficient leadership and supervision from the District Medical Office, and the clinical officers in charge. Some participants mentioned that supervision and guidance are particularly needed when doing rotations to other departments within a health dispensary. Rotation between departments of one dispensary is recommended by the District Medical Office to upgrade the different competencies needed to provide all healthcare services the dispensary offers. Some dispensaries rotate weekly while others rotate monthly and some infrequently do rotations. This healthcare worker explained that she and her colleagues rotate regularly and that this rotation system teaches her how to manage all departments, and that she learns from experience:

"Yes, it helps me because I learn to work in every place and to manage all the departments maybe in the ward taking measurements (sic). No one is there to guide me or to show me because I just do due to the experience (sic) […]." (Medical Attendant, Female, 44)

3.4. Theme 2: inhibiting factors to provide antenatal care

During the interviews, healthcare workers were asked to rate the

Table 1
Mentioned barriers in providing antenatal care.

Barrier	Explanations of healthcare workers	Improvements suggested by healthcare workers
Lack of equipment	• Required items: an ultrasound machine; diagnostics (urine dipsticks, malaria, HIV and syphilis rapid tests); medication (folic acid, antimalarial, deworming) and the antenatal care card • Caused by a malfunctioning ordering system: missing items and the period during which these items were out of stock varied from one health facility to another and varied per item.	• Equipment, materials and medication should be available at all times. • Look for donors to receive equipment to increase healthcare workers' confidence in their ability to provide antenatal care services. • Government has to pay its debt to the Medical Stores Department (the department of the Ministry of Health responsible for the distribution of medicines and supplies) • District authorities need to make a plan to supply the facilities with antenatal care equipment.
High workload	• Caused by insufficient medical staff and high patient load (up to 70 a day).	• More staff • Rotation and feedback sessions to increase knowledge • More training
Infrastructure	• Facilities are in a poor condition and too small to accommodate all clients: no toilets, floods due to heavy rains, strong scent of bats, lack of (running) water, lack of power.	• Water tank • Ambulance

quality of antenatal care they provide at the health facility on a scale from 0 to 100, with 0 being the lowest and 100 the highest. In general, the service was rated as being of high quality. The majority of the participants rated their performance as 70 or higher, and two outliers scored themselves as below 50 and over 90. Although they rated their performance as adequate, the majority of the healthcare workers elaborated further by pointing out barriers to high-quality antenatal care. First, all participants mentioned the lack of medical materials and equipment as an apparent barrier; second, half of them expressed a high workload as a result of insufficient medical staff; and last, three respondents commented on the infrastructure of the buildings which they deemed inadequate. Some participants came up with solutions to these barriers. As an example, pregnant women are informed when HIV tests are available again after being out of stock for some time and are invited for an extra antenatal care visit to get tested. To provide additional information, Table 1 describes these barriers in more detail, complemented with improvements suggested by the healthcare workers.

3.5. Theme 3: opinions on an electronic decision aid

During the interviews, an explanation was provided to participants about what an electronic decision aid is and how it could be used during antenatal service delivery. In this project an electronic decision aid was developed that runs on a tablet which was shown and shortly demonstrated to the participants in order to assist them to building their opinions. All but one of the healthcare workers expressed a positive attitude towards the use of an electronic decision aid, stating: "It's nice", "It's a good system" or "I really like it, I like it". The healthcare worker who did not express a positive attitude felt unable to use the program due to her eye problems. The majority thought it would be a good tool to use during antenatal care, and some of them added that it is better than their current paper-based documentation system. One clinical officer made an appeal to receive an electronic decision aid and expressed the wish to provide all health facilities in Tanzania with it in order to level the health situation in Tanzania with other countries. All of them expressed that they would use an electronic decision aid if available, and were open to learning how to use it:

> *"Yea it is a good system […] I am capable to learn and even the others also they're capable to learn."* (Enrolled Nurse, Age: 40, Woman)

Most healthcare workers mentioned that the ability to store patient information on a computer/tablet is the biggest advantage. In Tanzania, pregnant women are responsible for keeping their paper-based antenatal care card, which is used for documentation and contains the information relevant to their pregnancy. The women bring this card to their antenatal care visit in the clinic. Participants explained that antenatal care cards sometimes get lost and therefore liked the possibility of the electronic decision aid to store all patient information digitally. This would allow them to quickly retrieve information about specific clients during antenatal care visits and reduce the risk of losing information:

> *"Yea so I like to using that (sic) […] if a pregnant woman has lost the antenatal care card it means it's going to be very difficult for them to found out previous information or previous records so if they're having another kind of or another means of keeping records rather than antenatal care card it's going to be very good."* (Clinical Officer, Age: 28, Man)

A few participants also indicated that an electronic decision aid could improve their performance and the quality of care, as the aid prompts healthcare workers to ask additional questions to the patient, conduct examinations, and gives guidance on complication management or referrals. One healthcare worker mentioned the benefit of saving time with the registration of clients.

Critical remarks on the implementation of electronic decision aid were also discussed. The most commonly mentioned barrier was the lack of electricity, which hinders the feasibility of using an electronic decision aid when it needs to be charged. In addition, some of the participants were concerned with theft or damaging of the electronic device. One healthcare worker was concerned about the risk of running out of battery while providing antenatal care which would result in asking clients to come back the next day. Some participants mentioned that they do not know how to operate the tool and that not understanding it properly could cause problems. Nevertheless, several participants expressed that these doubts about the skills for and knowledge about using an electronic decision aid would be removed if proper training would be provided. Other participants either stated that they could not see any disadvantages, or that they were unable to assess disadvantages because they had never really used an electronic decision aid.

4. Discussion

The aim of this study was to investigate healthcare workers' perceptions of the quality of antenatal care services and barriers to providing high-quality antenatal care in rural Tanzania. In this light, the initial feasibility of implementing an electronic decision aid during antenatal care was also explored. From the semi-structured in-depth interviews conducted with healthcare workers from different education levels and with different positions, it was found that the performance of healthcare workers is influenced by several determinants.

Results indicate that the positive attitude of healthcare workers towards performing antenatal care, as well as their beliefs of its

importance, seemingly contradicts their actual behaviour during antenatal care provision. Consistent with previous studies, healthcare workers acknowledge that avoiding important components of antenatal care occurs due to various factors, such as lack of materials and shortages of skilled healthcare workers (Conrad et al., 2012; Miltenburg et al., 2017; Nyamtema et al., 2012; Sarker et al., 2010). Having a positive attitude towards certain behaviours positively influences the likelihood of performing that behaviour (Ajzen, 1991). However, these findings illustrate that knowledge and a positive attitude alone may not be sufficient to enable behaviour change, despite being important determinants in delivering high-quality antenatal care. (Bartholomew Eldredge et al., 2016).

Healthcare workers expressed the importance of being helpful to colleagues and performing well on the job, supporting overall performance of the healthcare team. Participants often stated that some of the differences in quality of care provided can be attributed to discrepancies in levels of knowledge, skills, experience, and motivation of different healthcare workers. To a certain extent, healthcare workers felt obliged to perform well because their actions might be evaluated by co-workers, indicating that their motivation was externally driven. However, not all motivation was externally driven, since several healthcare workers also expressed varying levels of perceived responsibility for service provision and accountability for pregnant women's health outcomes.

Although some participants in this study attributed differences in the quality of provided care primarily to differences in healthcare workers' level of education and experience, this might not be the full explanation. For example, one Tanzanian study among healthcare worker performance found that medical attendants, the lowest cadre of health professionals, were providing more antenatal care services than their highly educated colleagues (Pembe et al., 2010). Therefore, it is more likely that this perceived variety in the quality of care is related to healthcare workers' motivation. Some of the participants in the current research explained that they were obliged to provide antenatal care services despite their deficiency in required knowledge and skills (e.g., they were specialised in a different medical field), which led to a lack of motivation to provide these unfamiliar services. Consistent with other studies, this indicates a critical shortage of qualified staff trained specifically to provide maternal health services in rural health facilities in Tanzania (Gross et al., 2011; Mselle et al., 2013; Nyamtema et al., 2012; Plotkin et al., 2012). Providing services without the required knowledge and skills can lead to frustration or even less motivation to perform (Feringa, De Swardt, & Havenga, 2018; Mathauer & Imhoff, 2006), which in turn may negatively affect the quality of care and ultimately increase pregnant women's and new-borns' health risks.

Moreover, previous studies have shown that there is a relationship between poor quality of care and the poor infrastructure of health facilities (Conrad et al., 2012; Gross et al., 2011; Miltenburg et al., 2017; Mrisho et al., 2009; Nyamtema et al., 2012; Sarker et al., 2010) in rural Sub-Saharan Africa, which influence healthcare workers' motivation (Gross et al., 2011; Mosadeghrad, 2014; Mrisho et al., 2009). Being faced on a daily basis with challenges such as missing equipment and supplies, a high workload, the lack of reliable water, housing facilities, and electricity, can lead to a decrease in motivation and morale (Gross et al., 2011; Mosadeghrad, 2014; Mrisho et al., 2009; Penfold et al., 2013). In the current research, healthcare workers also mentioned these challenges as barriers to performing adequate antenatal care and their perception that these conditions may increase health risks for both themselves as well as their clients.

Interestingly, in the current study, participants reported that they valued their clients' satisfaction with the services they provided. This finding contradicts previous studies on (pregnant) women's experiences with maternal healthcare in Tanzania, which have reported negative encounters of clients with healthcare workers, including experiencing humiliation, sanctions, and abusive treatment (Kruk et al., 2018; Mrisho et al., 2009; Mselle et al., 2013; Solnes Miltenburg et al., 2018). Although the participants in the current study indicated they answered truthfully, one explanation of this contrast between the current findings and the existing literature could be that the healthcare workers in the current study under-reported their negative attitudes and behaviours toward their clients, and responded in a socially desirable manner when asked about the pregnant women's satisfaction with their work. Given that some of the participants also mentioned they experienced pressure from their colleagues to perform well, this hesitation to report their true opinion might have been shaped by fear for criticism about their performance.

Despite barriers, it is interesting that most healthcare workers felt able to provide good quality antenatal care and rated their service as being of high quality. The majority of the participants attributed the challenges they faced to external factors, which they did not feel capable of solving, and reported waiting for governmental funds to resolve the problems. The findings also indicate that on the one hand, healthcare workers seem to have been able to adjust to the challenging working conditions. On the other hand, they expressed the need for change: healthcare workers asked for additional training opportunities, especially for medical attendants (the lowest cadre of health professionals), and additional supervision from the District Medical Office. Lack of training opportunities has been identified as a barrier in other studies on antenatal care practices in Tanzania (Gross et al., 2011; Manongi et al., 2006) in which healthcare workers expressed feelings of frustration because of the challenging working conditions and a lack of feedback, promotion opportunities, training, and supportive supervision – which according to them resulted in low quality of care (Manongi et al., 2006). In three other studies conducted in Tanzania, healthcare workers acknowledged their performance sometimes suffered and proposed to receive more education and better supervision to solve this problem of the low quality of care (Bremnes et al., 2018; Mkoka et al., 2015; Mubyazi et al., 2012). Overall, the interviews in this study show that healthcare workers may have requested education and supervision, did not receive it, and may not have felt in position of power to change this situation. Previous research has demonstrated that the lack of control and lack of supportive management reduces work motivation or performance of healthcare workers (Manzi et al., 2004; Mosadeghrad, 2014; Tibandebage, Kida, Mackintosh, & Ikingura, 2016). This lack of empowerment, which relates to healthcare workers' motivation and feeling of autonomy, may result in staff who perceive themselves as not capable of providing safe and good quality care (Harrowing & Mill, 2010; Lugina et al., 2002; Tibandebage et al., 2016).

In this respect, the positive attitude of the healthcare workers towards electronic decision aid is promising, given prior research suggesting that use of a decision aid increases the motivation of staff to work under difficult conditions and provides opportunities for self-improvement (Agarwal et al., 2015; Thondoo et al., 2015). Furthermore, research demonstrates that the use of an electronic decision aid may help with providing correct guidelines, monitoring progress and condition of clients, as well as assisting inadequately skilled staff to comply with treatment guidelines (Agarwal et al., 2015).

In this study, healthcare workers identified more advantages than disadvantages of working with an electronic decision aid. It seems that an electronic decision aid enables in particular the less experienced healthcare workers to provide good quality care because of its structured guidance during the provision of antenatal care. An electronic decision aid has the capacity to guide healthcare workers in detecting high-risk pregnancies and assist in decision making during complications. Another perceived advantage is the ability to safely store clients' information, which participants indicated would be a large improvement compared to the current situation. These findings suggest that healthcare workers' attitude towards an electronic decision aid and the recognised advantages of its utilisation in antenatal care provision, may positively influence their decision to use it if it would be available to them. In addition, the healthcare workers' perceived ease to learn how to use an electronic decision aid may facilitate its implementation

during antenatal care visits.

This study has some limitations that need to be taken into consideration. First, as healthcare workers providing antenatal care in rural Tanzania were interviewed, the findings may not be generalizable to urban settings or more well-resourced settings. Although the findings are likely to be similar in other rural areas, generalisation to all of Tanzania or low-income countries must be made with caution due to the narrow geographical scope of the study. Second, this study is part of the *Women Centered Care Project,* which has made donations of equipment and materials to the health facilities of the participants. This might have increased the chance of socially desirable answers. Third, although the neutrality of the research was emphasised, it is likely participants were biased to self-rating their performance of antenatal care. Furthermore, the pilot implementation of an electronic decision aid at neighbouring health facilities might have influenced participants' opinions regarding such tools. Despite these limitations, this study reveals valuable insights into several determinants that influence the behaviour of healthcare workers during antenatal care provision, which help in understanding what healthcare workers might need to provide antenatal care in a different way, and what solutions might be feasible in the rural Tanzanian context.

The current findings suggest that the focus for improving antenatal care services in Magu District, Tanzania should be on resolving the work challenges experienced by healthcare workers. This could be attained through training opportunities, supportive leadership, improvement of the physical work environment, and the implementation of an electronic decision aid. As a result, this might also lead to increased work motivation and empowerment of healthcare workers. Training opportunities do not only have the potential to enhance the skills of healthcare workers (Nyamtema et al., 2012) but will also increase feelings of control and responsibility (Manzi et al., 2004; Mkoka et al., 2015; Prytherch et al., 2012). Working conditions have to be improved in order to reduce feelings of frustration and to trigger feelings of recognition and confidence (Manzi et al., 2004; Mubyazi et al., 2012). Practicing antenatal care with an electronic decision aid improves healthcare workers' performance and adherence to guidelines (Adepoju et al., 2017; Agarwal et al., 2015; Horner et al., 2013; Oluoch et al., 2012) which have the potential to enhance their motivation. Moreover, through the use of an electronic decision aid, healthcare workers may be able to assess and reflect on their knowledge and performance. These actions, combined with supportive leadership, could empower healthcare workers to improve antenatal care (Tibandebage et al., 2016).

5. Conclusion

The results of the current research indicate that healthcare workers in rural Tanzania are willing to provide good quality antenatal care, but that several inhibiting factors prevent them from providing all essential antenatal care interventions. Therefore, attention should be paid to reducing the work challenges experienced by healthcare workers by providing training opportunities, supportive leadership, and improving physical working conditions, for example by the implementation of an electronic clinical decision and support system.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Table A1

Table A1
Interview guide semi-structured in-depth interviews.

Used in the health facilities which provided antenatal care (ANC) without the electronic decision aid	
Introduction	The translator introduces him/herself, the research and the researcher The participant signs the informed consent form
Themes	**Questions**
Attitude ANC	How many years have you been providing ANC? What do think about providing ANC?
	• What are some of the reasons for why you like providing ANC?
	• What don't you like about providing ANC?
	How important do you think is ANC?
	• Why?
Importance of ANC	• What is in your opinion the most important part of ANC and why?
	• Is there any part of ANC that is less/not really important?
	How does ANC improve the health of pregnant women?
	• What do you think improves the health of pregnant women when she is provided with ANC?
	What are the reasons for the pregnant women to come for ANC?

(*continued on next page*)

Table A1 (*continued*)

Quality ANC	On a scale from 0 to 100, 0 being the lowest and 100 being the highest, how would you rate the ANC you provide? • What is it that you do that makes you provide this quality of ANC?
Barriers (perceived behavioural control)	What do you think are the main barriers to provide better ANC? • What makes you think that? • What kind of supplies are you missing the most? • Where do you get your water from? • Why do you think women come late in their pregnancy? • How could these barriers be minimized? • What do you think about male involvement? • What do you think of your workload at this facility? (# of
Improvements	pregnant mamas and other medical services)How can this be improved?What do you think about the quality of ANC the other HWs at your facility provide? • Is there a difference between the quality of ANC you and your colleagues provide? • How do your colleagues feel about that?
Social norm Quality of others	Do you discuss ANC with each other? • Is it important to you that other HCWs at your facility are satisfied with the ANC you provide? Why? Is there a difference between the ANC provided at this facility and the hospital? • Why do you refer someone for ANC to the hospital?
Co-worker satisfaction	What do the pregnant mamas think of the ANC in your facility? • What do they like? • Is it important to you that they are satisfied with the ANC at this facility? • What would they want to see improved?
Client satisfaction	
Knowledge, skills, leadership, supervision	Do you feel you had enough training to provide ANC?Do you feel like you have enough leadership?Do you feel like you have supervision? • Does that affect the quality of ANC that you are providing? How?
Job satisfaction	Do you like working at this facility? • What do you like about it? • What don't you like about it? • Have you chosen to work at this facility or have you been assigned to it?
Experience with ANC card	How does the ANC card help you in providing ANC? • How does it help you in decision making? • Do you think it is important to document ANC visits? • What do you think about the availability of the ANC cards? • What do the pregnant mamas think about the ANC cards? • Is there something missing? • Would you like to change something about it? And what? Are there any other guidelines available? • Do you have them at work? • Do you use them?
Attitude digital Health	• Do you find them helpful? What would you think of having the guidelines on your phone or a tablet?In some clinics, healthcare workers providing ANC use mHealth tools such as a phone, tablet or laptop to assist and document the visits. • Would you like to use such a tool? • What do you like about it? • What are the disadvantages of using such a tool? • How difficult would be to use such a tool in this facility?
End Questions	• What do you think is the most important change that can be done to help you to make the quality of ANC better? • How would you change this? Would you like to say or add anything that we have not talked about?

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijans.2020.100232.

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