

Assessment of the Knowledge of Midwives Regarding Prevention of Low Apgar Score

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Abstract: Health professionals and midwives in particular, are responsible for the management of a pregnant woman during antenatal clinic, labour, puerperium and including neonatal care. They have to acquire knowledge of obstetric practice. Lack of knowledge may lead to mismanagement of labour, poor delivery technique which leads to babies born with low Apgar score of 7 or less at 5 minutes. The objective of the study was to assess the knowledge of midwives regarding the prevention of low Apgar scores among neonates. The study was designed as a quantitative and descriptive research. A representative sample of 100 midwives working in the maternity units of three district hospitals was selected. A self-administered questionnaire with closed questions was used to collect data. A purposive sampling method was used to select participants. The findings revealed that midwives perceived themselves to be having knowledge related to midwifery practice; however they were lacking knowledge of some skills related to midwifery care such as gestational period for engagement of the fetal head in primigravida. Protocols on the management of conditions contributing to low Apgar scores among neonates should be developed. The protocols should be in line with the Guideline for Maternity Care in South Africa. All midwives need to be trained in the implementation of these protocols.

[Mulondo SA, Khoza LB. **Assessment of the Knowledge of Midwives Regarding Prevention of Low Apgar Score.** *Life Sci J* 2012;9(4):1537-1545] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 234

Keywords: Midwives; knowledge; prevention; low Apgar score; neonates

1. Introduction and Background

Health professionals and midwives in particular, play an important role in rendering maternal and childcare services, including neonatology. Midwives are responsible for the management of a pregnant woman during antenatal clinic, labour, puerperium and including neonatal care. They have to acquire knowledge of obstetric practice because in the management process they are exposed to various challenges such as conditions affecting pregnancy, difficult labour and resuscitation of hypoxic neonates (MacDonald & Van Der Walt, 2003).

It is the responsibility of the midwife to ensure that a woman gives birth to a healthy newborn baby with an Apgar score of 10/10 at one minute after birth. The Apgar score is a method that was introduced by an American anaesthetist called Virginia Apgar in 1953. The scoring system was intended to evaluate and record the physical condition of the baby in numerical terms at one minute after birth and if necessary it may be repeated at five minutes (Myles, Fraser & Cooper, 2004).

According to the World Health Organization (2003), midwives are responsible for clinical practice in midwifery discipline where they provide supervision, care and advice to the woman before conception, during pregnancy, labour and puerperium. Midwives must give health education during antenatal

clinic on topics such as the dangers of alcohol intake during pregnancy which may lead to a newborn born with a low Apgar score due to fetal alcohol syndrome (Viljoen, 1999). Midwives must have the ability to estimate fetal weight through abdominal inspection and palpation to identify macrosomic infants. Macrosomic were found to be the significant risk factors of low Apgar score (Essel & Opai-Tett, 1995).

Squire and Frances (2004) indicate that intrapartum asphyxia and chronic asphyxia were found to be contributory factors to low Apgar scores. Monitoring of the fetal condition by a midwife during labour is essential to ensure that delivery of the baby takes place before the occurrence of lack of oxygen supply to the fetal brain. experienced midwives with knowledge detects signs of fetal distress, identifies and grades meconium-stained liquor and seeks medical assistance for immediate management in order to prevent a low Apgar score (Myles *et al.*, 2004).

The knowledge and experience of midwives in the manipulation and interpretation of a cardiotocograph is very important in the identification of fetal distress which may result in a low Apgar score (Sellers, 2001a; Zapta-Vazquez, Rodríguez-Carvajal, Sierra-Basta, Alonzo-Vázquez and Echeverrilluz-Equiluz, 2003). Bunchman, Pattison and Nyathikazi (2002) reports from the study that 25% of fetal distress was due to incorrect interpretation of cardiotocograph

by midwives, 185 were due to inadequate fetal monitoring by midwives and in 7% there was no response to poor progress in labour by midwives. The role of a midwife is to evaluate carefully the progress of labour through the monitoring of maternal and fetal condition. The primary outcome is initiation of labour and delivery within 24 hours (Moodley, Venkatachalam & Songca, 2003).

Midwives keep clear and accurate records of the progress of pregnancy; labour and puerperium period. Apply the basic skills and techniques such as internal examination and pelvic assessment, cutting and suturing for an episiotomy in the second stage of labour (Searle, 1987a).

The South African Nursing Council regulation which governs the practice of a midwife (R2488) states that in case of antepartum haemorrhage, a midwife shall not carry out internal examination to avoid aggravating the condition and refer the woman to the medical practitioner for emergency management (SANC, 1990). Maternity Guidelines of South Africa states that the partogram must be promoted as the only legitimate record of labour progress to the extent that failure to use a partogram would be seen as negligence or indefensible in a medico-legal context (Department of Health, 2007).

The incidences of high or low statistics of babies born with low Apgar scores depend upon the knowledge of midwives in the management process prior to conception, during pregnancy, labour and neonatal care (Sellers, 2001a). Babies who fail to respond to resuscitation at birth have low Apgar scores of 6 or less at one minute and are sometimes referred to as being "flat" or "depressed" (Squire & Frances, 2004). An Apgar score of 8/10 usually indicates that the neonate is in good condition and that few or no problems may be expected (Nolte, 1998).

2. The Problem Statement

The practice of obstetric nursing requires a midwife practitioner who is competent to practice independently in providing antenatal services during pregnancy, progress of labour and conducts delivery on her own for a normal healthy baby. Vhembe district statistics from three particular hospitals, that is Hospital A, Hospital B and Hospital C revealed that out of 1 218 deliveries in a month, 43 neonates were born with low Apgar scores. Contributory factors might be many and varied (MacDonald *et al.*, 2003). The researcher is concerned about constant statistic of low Apgar scores among neonates which is not coming down and focused on the knowledge of midwives regarding prevention of low Apgar scores among neonates.

3. Purpose of the Research

The purpose of the study was to assess the knowledge of midwives with regard to the prevention of low Apgar scores among neonates.

4. Objectives of the Study

To describe the knowledge of midwives regarding the prevention of low Apgar scores among neonates.

5. Materials and Methods

This study used a quantitative and descriptive research design (Polit & Hungler, 1995). A sample of 100 midwives working in maternity units at three district hospitals was selected. A self-administered questionnaire was used to collect data. A non-probability purposive sampling method was used to select participants.

The research study was conducted in a clinical setting at Government hospitals in the Vhembe district of Limpopo Province. The district has seven district hospitals and one regional hospital which serve as a referral hospital to which the six district hospitals refer patients for specialised services. The seventh hospital is for maximum security psychiatric patients. Three hospitals were chosen as sites for the study to be conducted. The choice appeared to be relevant because they were located less than 40 kilometres from one another.

The questionnaire was used as an instrument for collecting self-reported data from the midwives. A self-administered questionnaire with closed-ended questions was designed. Structured questions were formulated to assess and describe the competencies of midwives with regard to the prevention of low Apgar scores among neonates. Structured procedures and a formal instrument were used to collect numerical information under controlled conditions. Midwives in this study provided relevant data in relation to the study (Dempsey & Dempsey, 1992; Mouton, 1996). Questionnaires were distributed to all midwives practicing in the maternity units of three different hospitals and they were allowed to complete them in the presence of the researcher and bring them back.

The population in this study was all midwives practising in maternity units of three selected hospitals of the Vhembe district. Only midwives who were allocated and practicing in maternity units were included in the study. Midwives were required to have at least one year's experience of practising in maternity, and six months in the labour ward (Brink, 2003; Brink & Wood 1998). A sample size of 100 midwives was sufficient to achieve saturation of the theoretical categories.

For the purpose of this study a non-probability purposive sampling approach was used to select the hospital sample and participants. The researcher used

her own knowledge about the population and its elements to handpick cases to be included in the study. All available midwives practicing in the maternity departments who were judged to be typical of the population in question or particularly knowledgeable about the issue of the prevention of low Apgar scores among neonates from three hospitals were chosen (Brockopp & Hastings-Tolsma, 1995; Burns & Grove, 2003). This meant that not all midwives working at the three selected hospital had a chance to be part of the study.

Data obtained from the completed questionnaires were subjected to analysis by the Statistical Packages of social sciences (SPSS) programme to establish frequencies and percentages. The purpose of the data analysis was to impose some order on a large body of knowledge so that a general conclusion could be communicated in a research report. Statistical procedures enabled the researcher to reduce summaries, organize, evaluate, interpret and communicate numerical information (Polit & Hungler, 1999).

Mouton (1996) maintains that since scientific research is a type of human conduct, it follows that the research has to correspond with the generally accepted norms and values. Ethics is doing what is right and good during research and all ethical principles to be applied to the research process were observed. The researcher protected the rights of the midwives and those of the institutions in which the study was conducted. According to (Nieswiadomy, 1993; Seaman, 1998), midwives have several rights such as the right not to be harmed, the right to maintain self-respect, dignity and the right to privacy, informed voluntary consent, confidentiality and anonymity, and the right to refuse to participate or to withdraw from participation without any fear of discrimination.

Pilot study was conducted in order to double check the instrument before commencing the major study to ensure that it worked properly (Polit & Beck, 2004). A purposive sample of 10 midwives was drawn from three different hospitals and was informed about the purpose and outcome of the study. This is done to prevent frustrations and irritability if instrument is out of order as it may result into losing respondents, time, patience and motivation (Hicks, 1996; Mouton & Marais, 1991). The respondents involved in the pilot study were not included in the major study (Brink & Wood, 1998). The researcher was able to test the use of the questionnaire and assess whether the questions were understood (Streubert & Carpenter, 1995). This further determined the reliability of the questionnaire (Abdellah & Levine, 1986).

In ensuring reliability in this study, the same tool or instrument was used at three different hospitals and yielded the same results. This is supported by De Vos

and Fouche (1998) and Crookes and Davies (2004) who refer it as “the extent to which independent administration of the same instrument yields the same results under comparable conditions.” the same instrument was used several times in different situations the outcome or results were the same. Reliability and validity are related to each other (Polit & Hungler, 1999).

According to Myles *et al.* (2004) and Mashanzi (2000), midwives has been trained to assess and make a decision to a save life by the South African Interim Nursing Council (SANC). Fullerton and Ingle (2003) state that Knowledge is the pre-requisite for proper management of the woman during antenatal care and labour.

6. Results

Respondents were asked to rate their knowledge on the scale below. “Strongly agree” and “agree” were combined to denote “agree”; “disagree” and “strongly disagree” were combined to denote “disagree” and missing responses by “mis”.

Table 1. “Knowledge of Midwives in Prevention of Low Apgar Score”

Knowledge of the Midwives	Agree	Disagree	Mis	Total
1. During palpation the palmar surfaces of the fingers determine the soft consistency of the fetus	64.3	29.5	6.3	100.0
2. Walking the fingertips of both hands is an excellent method of locating fetal position	68.4	26.3	5.3	100.0
3. Recurrent pregnancies lead to poor fetal growth	55.4	40.0	4.2	100.0
4. Thick and tight cervix facilitates good progress of labour	11.6	88.4	-	100.0
5. The hands grasp the fetal mass in the centre to assess the fetal weight and size	49.4	44.3	6.3	100.0
6. Meconium-stained liquor is an indication of amniotitis	32.7	64.1	3.2	100.0
7. In primigravida the head should have engaged at 38-39 weeks of pregnancy	63.2	35.7	2.1	100.0
8. Posterior position of the fetus leads to prolonged labour	77.9	22.1	-	100.0
9. Resuscitation of a newborn requires extra skills and experience	86.3	13.7	-	100.0
10. Presence of moulding 3+ is a good indication of descent of the head during labour	19.0	81.0	-	100.0
11. Continuous strong	84.2	15.8	-	100.0

contractions may lead to rupture of the uterus				
12. In multiparous women duration of second stage of labour should not exceed 30 minutes	69.5	30.5	-	100.0
13. Fetal heart rate is monitored ¼- hourly during the active phase of labour	60.0	40.0	-	
14. Pelvic assessment is done at 34- weeks of pregnancy in primigravida	69.5	30.6	-	100.0
15. Full urinary bladder facilitates descent of the fetal head during labour	16.8	81.1	2.1	100.0
16. Diabetes mellitus during pregnancy may cause obese babies leading to difficult delivery	90.5	8.4	1.1	100.0
17. A rise in blood pressure of 160/100 during the second trimester is considered pathological and needs advice for rest	65.2	33.7	1.1	100.0
18. Maternal condition is recorded on the partogram	84.2	13.7	2.1	100.0
19. PIH causes decrease in uterine blood flow and placental dysfunction if not treated properly	73.7	22.1	4.2	100.0
20. Descent of the fetal head takes place in deflexed head	33.6	58.9	7.4	100.0
21. Antepartum haemorrhage, prolonged labour and premature labour are conditions that compromise the fetus	71.6	27.4	1.1	100.0
22. Vacuum extraction is the best in the case of delayed second stage of labour	44.2	54.7	1.1	100.0
23. Bishop score of "6" is a good indication of induction at 42 weeks pregnancy	52.6	42.1	5.3	100.0

7. Discussion

Results revealed that midwives have knowledge related to most midwifery skills that would prevent low Apgar score among the neonates. But not necessarily to all skills outlined in the questionnaire. All midwives are expected to have acquired knowledge to achieve competency level of 100% in midwifery practice. The birth of the baby is more than the start of new life (Drake, 2010). However, they were lacking knowledge in performing some of the midwifery skills which are considered to be critical for the best possible outcome of the neonates as follows:

- During palpation the palmar surfaces of the fingers determine the soft consistency of the fetus (64.3%)

- The hands grasp the fetal mass at the centre to assess fetal weight and size (49.4%)
- Recurrent pregnancy leads to poor fetal growth (40.0%)
- In primigravida the head should have engaged at 38-39 weeks of pregnancy (63.2%)
- Meconium-stained liquor is an indication of amnionitis (64.1%)
- Descent of the fetal head takes place in a deflexed head (58.9%)
- A Bishop score of 6 is a good indication of induction at 42 weeks of pregnancy (52.6%)
- Fetal heart rate is monitored ¼-hourly during the active phase of labour (60.0%)

Identified Lack of Knowledge as Perceived by Midwives

The Australian Nursing and Midwifery Council (2009) indicate that midwives acquire theoretical knowledge during their period of training which is applied in practical situations when performing midwifery clinical skills. According to the findings, midwives perceived themselves to be lacking knowledge in performing some skills related to midwifery care. A discussion of key areas in relation to lack of knowledge when performing midwifery skills follows.

During palpation the palmar surfaces of the fingers determine the soft consistency of the fetus and the hands grasp the fetal mass in the centre to assess the fetal weight and size.

The findings reveal that 64% and 49% of the midwives are lacking knowledge related to that: "during palpation the palmar surfaces of the fingers determine the soft consistency of the fetus and the hands grasp the fetal mass in the centre to assess the fetal weight respectively". Lack of knowledge in performing the above skills predisposes poor location of fetal position, inability to estimate fetal weight and size, and possible undetected big baby (macrosomia). If labour is progressed and the baby allowed to be delivered normally, baby will be born with a low Apgar score due to difficult delivery of a big baby (Chiarella *et al.*, 2008). Mocanu *et al.* (2000) reports similarly from the study conducted at the American College of Obstetrics and Gynaecologists in America involving 175 000 deliveries with the aim of evaluating the impact of macrosomic babies and neonatal outcome. The results indicated that 2 345 caesarean sections which were done were due to macrosomic babies (exceeding 4500g) in order to prevent low Apgar scores among the neonates. Caesarean section was recommended for all suspected fetal weight exceeding 4500g. Contrary to the stud Askham and Barbour

(1996); Barbour (1990) reports that women preferred to tell midwives their problems rather than the doctor during antenatal clinic where abdominal palpation takes place. They consider midwives to have more knowledge about childbearing than men (doctor or accoucher). Midwives had considerable midwifery knowledge and skills which needed to be put into practice in midwifery units.

Robinson (1990) also reported similar findings, that midwives had considerable knowledge and experience of providing midwifery care and women felt more comfortable when they were cared for by midwives. Hodnett, Gates, Hofmeyr and Sakala (2007); The Royal College of Obstetricians and Gynaecologists (2001) reported that there is relationship between the fetal size and shoulder dystocia. Similar findings were reported by Sokol and Blackwell (2003) and Langer, Berkus, Huff and Samueloff (1991), that a big baby is associated with a difficult delivery and a low Apgar score. All midwives should be able to perform abdominal palpation to estimate fetal weight and identify macrosomia.

Recurrent pregnancy leads to poor fetal growth

The findings reveal that 55% of the midwives are lacking knowledge related to that "Recurrent pregnancies lead to poor fetal growth." According to Sellers (2001b), recurrent pregnancy is a predisposing factor for a big baby leading to difficult delivery and low Apgar score if allowed to deliver vaginally. Lack of knowledge prevents midwives from anticipating the outcome of recurrent pregnancies, which may result in babies born with low Apgar scores. The findings might conclude that midwives are lacking in knowledge related to the impact of recurrent pregnancies on the unborn baby.

In primigravida the head should have engaged at 38-39 weeks of gestation

The findings of the study reveals that 63% of the midwives are lacking knowledge related to that: "In primigravida the head should have engaged at 38-39 weeks of pregnancy." According to Sellers (2001a), the fetal head should have engaged into the pelvic brim two weeks before commencement of labour. Failure of engagement is a sign of inadequate pelvis or the presence of some abnormality in the lower pole of the uterus. That will lead to prolonged labour causing fetal distress and a baby born with a low Apgar score. Midwives should apply theoretical knowledge during pelvic palpation and assessment to identify engagement of the fetal head in primigravida. The findings of this study concluded that midwives lacked the knowledge related to engagement of the fetal head in primigravida during pregnancy. Failure of the fetal head to engage at 38-39 weeks of pregnancy requires prompt attention

and referral to the hospital for hospital delivery to prevent a low Apgar score.

Meconium-stained liquor is an indication of amnionitis

The findings of this study reveal that 64% of the midwives are lacking knowledge of differentiating meconium-stained liquor and amnionitis. Myles & Strassner (2005) report that meconium-stained liquor is detected in three grades and it is an indication of fetal distress which causes a low Apgar score. Amnionitis usually occurs if membranes have been ruptured for more than 24 hours. It is a sign of infection. It may have an offensive smell and is very dangerous to the baby. Midwives should report the woman to the doctor for prophylactic treatment including antibiotics to be administered to prevent a low Apgar score.

Davis and Henderson-Smart (2001) report that a dexamethasone injection is given to infants who are exposed to amnionitis to extubate the lungs after delivery. Zapata-Vazquez et al. (2003) report similar from the study conducted at Carlos Urziaz Jiménez hospital in Merida, Mexico involving 387 neonates with the aim of evaluating the impact of amnionitis on newborn babies. The outcome of the study indicated that 83 neonates had low Apgar scores of less than 7 at five minutes. Among the 83 neonates with low Apgar scores, 26 were due to amnionitis which was not detected and treated properly before delivery due to lack of knowledge of midwives. It was also associated with prolonged rupture of membranes for more than 24 hours or the woman had undergone multiple vaginal examinations during labour by midwives.

Similarly, lack of knowledge of the midwives had resultant into 46% of neonates with low Apgar scores and 6% died within 24 hours of delivery from 102 neonates who had amnionitis at Francisco maternity hospital in France. It was also indicated that amnionitis was associated with placental insufficiency with subsequent fetal hypoxia, fetal distress and low Apgar score if not treated properly (Wiswell, 2001). Ghidini and Spong (2001) and Davis and Henderson-Smart (2001) share similar views, that amnionitis is an infection of the amniotic fluid and prophylactic treatment should be given prior to delivery to prevent a low Apgar score. Lack of knowledge by midwives leads to poor management of women with amnionitis and causes low Apgar scores among the neonates. Richardson, Tarnow-Mordi and Escobar (1998); Ward and Sinn (2003) shared similar views that prolonged rupture of membranes is associated with amnionitis. If midwives lack the knowledge concerning it, it may result in babies born with low Apgar scores.

The perinatal care survey in South Africa in 2001 analysed the causes of perinatal deaths from 78 343 births. The outcome showed that 3 045 neonates died

and the most common primary causes were spontaneous premature labour associated with amniotitis (Pattison, 2001).

Descent of fetal head takes place in a deflexed head

The findings of this study reveal that 58% of the midwives are lacking knowledge about the situations or conditions which facilitated descent of the fetal head. Descent of the fetal head takes place in situations where the fetus is in a complete attitude (flexion) while still in the uterus. In deflexed head, there is no flexion of the head. During labour, it will lead to poor progress which may result in deep transverse arrest. Caesarean section may be performed or rotation and flexion of the head with application of a forceps delivery resulting in poor neonatal outcome. The baby may be born with a low Apgar score (Myles *et al.*, 2004).

A Bishop score of 6 is a good indication of induction at 42 weeks of pregnancy

The findings of this study reveal that 52% of the midwives are lacking knowledge regarding the favourable features of a Bishop score for induction of labour. According to Bishop (1994); Buchanan, Macer and Yonekura (2005), induction of labour is commenced following full assessment of the woman by the doctor. Midwives should have knowledge of the fact that the favourable induction feature is a score of 6-13. Levis (2007) reports that a score of 5 or less is unfavourable for induction of labour. A score of 6 and above indicate that the cervix is ripe. Induction of labour can therefore be initiated and may have a high probability of being successful.

Midwives must have knowledge of the Bishop Score so that they can be able to advocate for their patients. According to the SANC (R2598, 1984; R2488, 1990), a midwife acts as an advocate for the patient. She speaks on behalf of the woman in labour in order to protect her from possible abuse, neglect or harm. Augustine and Orhue (2005) report the findings of the study conducted at the University Hospital, Benin City in Nigeria involving 90 primigravida with a low Bishop Score of less than 6. The outcome indicates that methods used for induction failed due to unripe cervix. Ezimokhai and Nwabineli (1998) report similar findings that a Bishop score of less than 6 had poor induction outcome as the cervix was not yet ripe and ready for dilatation.

Fetal heart rate is monitored ¼-hourly during the active phase of labour

The findings of this study revealed that 60% of the midwives are lacking knowledge related to monitoring fetal heart ¼ hourly during active phase of labour. This is one of the critical skills which 100% knowledge is expected from all midwives responsible for

management of labour. This may help with the detection of any sign of early or late deceleration and indicate urgent action to be taken to prevent a low Apgar score. Various methods can be used for monitoring the fetal heart during labour. Bunchman *et al.*, (2002) report findings from study conducted in metropolitan and rural hospitals in South Africa involving 102 perinatal deaths due to asphyxia neonatorum. Out of these babies, in 80 cases fetal monitoring was done ¼-hourly, 55% with cardiotocograph, 32% using the fetal scope and 13% using the hand-held Doppler. Early and late decelerations of the fetal heart were detected which resulted in poor neonatal outcome. However, findings not reported in numerical terms.

According to Maternity Guidelines in South Africa (Godi, Mhlanga, Saloojee, Steinberg and Tlebere, 2007), all findings of maternal and fetal condition, including progress of labour, are recorded on the partogram by midwives who are monitoring and progressing labour. Failure to use a partogram during labour or incorrect recording with misinterpretation of the findings constitutes substandard care. Poor progress with complications such as fetal distress will result in babies born with low Apgar scores. The WHO (1994) also reported similar views that the partogram was an important tool for monitoring labour and identifying women in need of obstetric intervention.

Orji (2008) conducted a study of 463 women with normal labour with the aim of evaluating the progress of labour using the modified WHO partogram. Labour was monitored and plotted on the partogram by midwives. The results indicated that 102 women who had crossed the action line had delayed first stage of labour which further resulted in poor neonatal outcome. Low Apgar scores were reported in 36 babies at one-minute and five-minute intervals, 25 babies had asphyxia neonatorum and there were 5 stillbirths (Orji, 2008). Bosse, Massawe and Jahn (2002) reported similar findings from their studies, that the partogram was analysed to evaluate neonatal outcome. The results yielded low Apgar scores of less than 7 at five minutes.

8. Conclusion

The study included 100 midwives who agreed to participate in the study and a self-administered questionnaire was used to collect data. Data were analysed by using a computer programme for statistical analysis, Statistic Package for Social Sciences (SPSS). The knowledge of midwives was assessed by addressing the objectives and the purpose of the study, which were achieved. The findings of the study reveal aspects where midwives have acquired the knowledge needed in managing pregnancy and labour as well as the areas where they are lacking knowledge. Maternity care forms an integral component of primary health

care, and is one of the priority reproductive issues that require urgent attention. For this reason all midwives need to be equipped with knowledge to provide quality midwifery care as they are dealing with two lives, that of the mother and the baby, and to curb maternal and neonatal complications.

Recommendations Related to Improving the Knowledge of Midwives on Aspects of the Prevention of Low Apgar Scores

Standardised clinical guidelines should be included in the structured learning curriculum for undergraduate nurses.

Protocols on the management of conditions contributing to low Apgar scores among neonates should be developed. The protocols should be in line with the Guideline for Maternity Care in South Africa. All midwives need to be trained in the implementation of these protocols.

Midwives should meet monthly to discuss problems experienced and update each other on the latest developments in midwifery care.

Acknowledgements:

I wish to acknowledge the following for their respective contributions enabled me to complete this study. I would like to express my sincerest gratitude to:

Limpopo Province Department of Health for granting permission to pursue this study at the three selected hospitals in Vhembe district.

Directors/CEOs/Deputy managers of the three selected hospitals for willingly giving me their final permission and support to continue with the study.

The Ethical Clearance Committee of the University of Venda for giving me permission to carry on with this study.

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