Assessing South African medical interns’ experience and confidence in managing obstetric emergencies

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Background. Medical doctors in South Africa (SA) are required to complete a 2-year internship at training hospitals, including a 4-month rotation in obstetrics and gynaecology. Following this, doctors are allocated to community service posts, many of which are at district- and primary-level facilities where supervision is limited. Recent triennial Saving Mothers reports identify district hospitals (DHs) as the second leading site for maternal deaths of all causes, the leading site for maternal deaths secondary to obstetric haemorrhage, and the most likely site for the lack of a skilled doctor to be identified as a factor in deaths associated with caesarean delivery.

Objectives. To describe the self-perceived readiness of medical interns completing their training to manage obstetric emergencies, based on the Essential Steps in the Management of Obstetric Emergencies modules in the Health Professions Council of South Africa’s internship logbook.

Methods. This cross-sectional descriptive study assessed medical interns in the last 3 months of their training, using a self-administered online questionnaire. Data collection took place between October and December 2019.

Results. Cluster sampling of interns at training facilities throughout SA resulted in a total of 182 respondents from 17 hospitals in seven provinces in the country, with an overall response rate of 34.1%. Most interns had experience with and confidence in the management of miscarriage and hypertension in pregnancy. However, gaps in labour ward management, pregnancy-related sepsis and surgical skills were identified. Only 42.3% of respondents were confident in their ability to diagnose obstructed labour, 26.3% had performed an assisted delivery, 39.0% were confident in their knowledge of the indications for and contraindications to assisted deliveries, and 35.7% had been involved in the delivery of a baby with shoulder dystocia. Regarding pregnancy-related sepsis, 54.4% had experience with managing a wound abscess and 29.7% were confident managing puerperal endometritis. While 78.0% felt confident to perform a caesarean section (CS), only 28.6% had performed uterine compression suture for uterine atony at CS. Additionally, there was a statistically significant variation in scores between training hospitals.

Conclusions. An incongruity exists between the shortcomings in DH obstetric services, the prioritisation of placement of community service doctors at primary healthcare facilities and DHs, and the self-perceived readiness of medical interns completing their training to manage obstetric emergencies safely. This situation highlights the importance of clinical support for junior doctors at DHs and standardisation of intern training at accredited facilities across SA.
detail and quantify the readiness of community service doctors to provide safe obstetric care at DHs and PHC facilities. Research into the readiness of medical interns completing their training to independently manage obstetric emergencies is lacking, despite policy that prioritises community service doctor placement in district- and primary-level facilities.

**Objectives**
To describe the experience level medical interns completing their internship have had in managing obstetric emergencies during their internship, and their confidence in managing these emergencies. We also compared the experience level and confidence of medical interns with the university where they studied, the current hospital at which they were completing internship, and the hospital level for internship training.

**Methods**
The study took the form of a cross-sectional descriptive study, using a self-administered online questionnaire. Data collection took place from October to December 2019. The study took place in SA, among medical interns in accredited training hospitals throughout the country where participants were completing their 2-year internship training programme.²²

**Participants**
Approximately 1 800 medical doctors complete their internship each year,¹⁰ the group doing so in 2019 forming the study population for this research. The majority of these medical interns subsequently enter community service posts for 1-year mandatory contracts as medical officers before registration for independent practice.²¹ For the purposes of the research, the population was second-year internship candidates only, who were in the final 3 months of their internship training.

A cluster sampling technique was used, randomly selecting internship accredited training sites, alternating the levels of the hospitals to ensure a fair representation of interns from the variety of levels of care where interns are trained. Using the results of the study by Peters et al.,³⁴ where 73% of medical interns assessed themselves as competent in performing a CS, a target sample size of 260 participants was calculated. A response rate of 51% was expected, based on the results of previous research with similar data collection methods in community service doctors.³⁴ Sampling of facilities continued until a sample frame of a total number of >510 potential participants was obtained. With an expected response rate of 51%, a total of 260 participants was anticipated.

**Procedure**
The participants were recruited via an intern representative for each facility, who distributed the link to the online questionnaire and assisted with follow-up messages to ensure an adequate response rate. For each facility, response rates were monitored according to the number of reported second-year interns employed at the hospital.

The data collection consisted of an online questionnaire, Data collection took place from October to December 2019. The study took place in SA, among medical interns in accredited training hospitals throughout the country where participants were completing their 2-year internship training programme.²²

The questionnaire could be completed within 5 minutes and was accessible on a standard smartphone, as well as on a tablet or computer. Informed consent for the questionnaire was obtained electronically at the start of the questionnaire.

No appropriate and validated data collection tool was available for this research. To ensure standardisation, topics for the questions were based on the list of ESMOE modules to be completed during internship, according to the Health Professions Council of South Africa (HPCSA)’s internship logbook. There are 12 modules in the logbook, one of which is neonatal resuscitation. The latter was excluded to keep the questionnaire focused on maternal factors. The remaining 11 modules were: (i) maternal resuscitation; (ii) sepsis; (iii) obstetric haemorrhage; (iv) pre-eclampsia/eclampsia; (v) miscarriage; (vi) partograms and obstructed labour; (vii) cardiotocographs (CTGs); (viii) assisted deliveries; (ix) obstetric emergencies; (x) surgical skills; and (xi) HIV in pregnancy.

Two questions were formulated per the ESMOE module, based on a core skill or knowledge component in the drill and accompanying lecture material associated with each module. Each question focused on assessing either the participants’ confidence or their experience relating to a particular core skill or knowledge component in each module. The questions were not aimed at testing the participants’ knowledge of that topic or skill.

A conventional level of significance of alpha = 0.05 (5%) was used, and confidence intervals were therefore set at 95%. All data were analysed using Excel 2019 (Microsoft, USA) and Stata 15 (StataCorp, USA). Ethics approval was obtained from the Walter Sisulu University Faculty of Health Sciences Post Graduate Education, Training, Research and Ethics Unit on 16 September 2019 (ref. no. 063/2019).

**Results**
A total of 17 hospitals in 7 provinces were randomly selected in the sample, with the hospitals reporting a total of 534 second-year interns employed and therefore potential respondents. Of these, 212 interns answered the online questionnaire. After applying exclusion criteria to remove respondents who had completed the questionnaire despite being in their first year of training, 182 respondents remained for analysis. The final overall response rate was 34.1%. Response rates varied between facilities, ranging from 11.4% to 83.3% (Table 1).

Data on the university at which undergraduate training had been completed were collected to assist with analysis. Candidates from all eight SA medical schools were represented.

Respondents were asked 11 questions regarding their experience with or exposure to certain obstetric conditions or procedures, as related to the ESMOE modules to be completed according to the HPCSA internship logbook. These questions and responses are detailed in Table 2.

Respondents were asked 11 questions regarding their confidence to manage certain obstetric conditions or procedures, as related to the ESMOE modules to be completed according to the HPCSA internship logbook. They were asked to rate their confidence on a Likert scale (strongly agree, agree, neutral, disagree and strongly disagree) in response to a statement regarding their confidence to manage a certain scenario. These questions are detailed in Table 3.

In describing these data, Likert scales were binarised to be represented as either confident or not confident. Confidence was interpreted when the respondent agreed or strongly agreed with the statement.

A summary of the results arranged by ESMOE topic is presented in Fig. 1, including scores for both experience and confidence questions.

In keeping with the objectives of the study, the experience level and the confidence of respondents were compared with the current hospital for internship training, the level of the hospital, and the university at which they had studied. In these comparisons, Likert scales for confidence scores were kept at the original scale of 1 - 5 (strongly disagree to strongly agree). This was done to avoid loss of detail in the data, with the Likert scale converted to numerical values (1 - 5) when analysing. For each comparison, a one-way analysis of variance test was performed to look for significance in the variation.
of the means between groups. If a significant difference was found, further analysis using a Bonferroni test was done to compare facilities individually.

The hospital level did not significantly affect results, with scores similar between hospital levels for both experience questions \( (p = 0.36) \) and confidence questions \( (p = 0.71) \). Similarly, there was no significant difference in the scores between different universities for both experience questions \( (p = 0.32) \) and confidence questions \( (p = 0.11) \).

When comparing the current hospital for internship training with those hospitals’ scores in the experience and confidence questions, greater variation was seen. Statistically significant variation was seen between hospitals for both experience scores \( (p = 0.00) \) and confidence scores \( (p = 0.001) \). While there was variation in the scores for both experience and confidence between hospitals, the total numbers of respondents for most hospitals were too low for those differences to be statistically significant. However, one hospital scored significantly lower than six other hospitals for experience scores and significantly lower than three others for confidence scores.

### Discussion

Strengths were noted in the management of hypertension in pregnancy, miscarriages and HIV in pregnancy. Areas with lower scores included OH, surgical skills and pregnancy-related sepsis. Regarding OH, 56.0% of respondents had experience with manually removing a retained placenta and 69.8% were confident with managing a patient presenting with abruptio placentae. The 2014 - 2016 Saving Mothers report identified OH as the third leading cause of maternal mortality, with DHs the most likely site of deaths due to OH.

Further investigating surgical skills, 78.0% of respondents felt confident to perform a CS, but only 28.6% had performed a uterine

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**Table 1. Number of respondents and facility response rates**

| Training hospital                                      | Level                     | Province         | Respondents, n | Response rate, % |
|---------------------------------------------------------|---------------------------|------------------|----------------|-----------------|
| Addington/Mahatma Gandhi Memorial Hospital Complex      | Regional                  | KwaZulu-Natal    | 13             | 43.3            |
| Charlotte Maxeke Johannesburg Academic Hospital        | Central                   | Gauteng          | 5              | 11.4            |
| Chris Hani Baragwanath Hospital                         | Central                   | Gauteng          | 22             | 24.4            |
| East London Hospital Complex                            | Provincial tertiary       | Eastern Cape     | 18             | 33.3            |
| General Justice Gizenga Mpanza Regional Hospital        | Regional                  | KwaZulu-Natal    | 2              | 20.0            |
| Karl Bremer Hospital                                    | District                  | Western Cape     | 5              | 83.3            |
| Khayelitsha District Hospital                           | District                  | Western Cape     | 5              | 83.3            |
| King Edward VIII Hospital                              | Central                   | KwaZulu-Natal    | 20             | 51.3            |
| Livingstone Hospital                                    | Provincial tertiary       | Eastern Cape     | 22             | 39.3            |
| Pelononimi Academic Hospital                           | Provincial tertiary       | Free State       | 7              | 17.5            |
| Photosong Hospital                                      | Regional                  | Gauteng          | 4              | 40.0            |
| Rob Ferreira Hospital                                   | Provincial tertiary       | Mpumalanga       | 6              | 60.0            |
| Robert Mangaliso Sobukwe Hospital                       | Provincial tertiary       | Northern Province| 8              | 30.8            |
| Steve Biko Academic Hospital                           | Central                   | Gauteng          | 10             | 22.7            |
| Tygerberg Hospital                                      | Central                   | Western Cape     | 15             | 42.9            |
| Uitenhage Provincial Hospital                          | Regional                  | Eastern Cape     | 10             | 62.5            |
| Victoria Hospital                                       | District                  | Western Cape     | 10             | 55.6            |
| **Total**                                               |                           |                  | **182**        | **34.1**        |

**Table 2. Exposure/experience of respondents to ESMOE scenarios**

| ESMOE topic                     | Experience/exposure question                                                                 | Yes, % |
|---------------------------------|---------------------------------------------------------------------------------------------|--------|
| Maternal resuscitation          | I have performed a maternal resuscitation drill during my internship                        | 75.8   |
| Pregnancy-related sepsis        | I have performed or assisted with drainage and debridement of a wound abscess post caesarean section during my internship | 54.4   |
| Obstetric haemorrhage           | I have manually removed a retained placenta during my internship                           | 56.0   |
| Hypertension                    | I have loaded a patient with magnesium sulphate during my internship                        | 91.8   |
| Miscarriage                     | I have performed a uterine evacuation of products of conception independently (manual vacuum aspiration or curettage) during my internship | 89.0   |
| Obstructed labour               | I have augmented patients in labour with oxytocin during my internship                      | 76.4   |
| Cardiotocographs                | I have been responsible for assessing cardiotocographs during my internship              | 85.2   |
| Assisted delivery               | I have performed an assisted delivery (vacuum extraction or forceps extraction) during my internship | 26.4   |
| Obstetric emergencies           | I have been involved in the delivery of a baby with shoulder dystocia during my internship | 35.7   |
| Surgical skills                 | I have performed a B-lynch procedure, or other uterine compression suture, during caesarean section for uterine atony during my internship | 28.6   |
| HIV in pregnancy                | I have been involved in decision-making regarding virological failure and antiretroviral regimen changes in pregnant and breastfeeding patients during my internship | 76.4   |
| **Overall mean (min.; max.)**   |                                                                                             | 63.2 (26.4; 91.8) |

ESMOE = Essential Steps in the Management of Obstetric Emergencies.
compression suture for uterine atony at CS. It is encouraging to see that interns felt comfortable to perform a CS, probably as a result of this procedure being prioritised in the HPCSA internship logbook. However, considerably fewer had performed a uterine compression suture, suggesting that interns are probably preferentially exposed to low-risk CSs in their training. With the possibility of even low-risk CSs becoming complicated, the importance of experience in managing these complications is apparent.

This discrepancy between the confidence of interns to perform an uncomplicated CS and their potential lack of exposure to complicated CSs illuminates a concerning shortcoming in the current training programme.

Regarding pregnancy-related sepsis, while 54.4% of respondents had experience with managing a wound abscess post CS, only 29.7% were confident regarding the management of puerperal endometritis. The 2014 - 2016 Saving Mothers report noted with concern the high proportion of avoidable deaths that occurred due to pregnancy-related sepsis.

Responses to questions related to ESMOE modules pertaining to labour ward management and CSs were important to note. The 2014 - 2016 Saving Mothers report states that 26% of maternal deaths associated with caesarean delivery occurred at DHs, with an institutional maternal mortality ratio three times higher for caesarean delivery than vaginal birth in these facilities. Reducing unnecessary CSs, and specifically avoiding unnecessary high-risk CSs, is essential. The experience and confidence of interns to manage labour and make decisions around delivery is therefore of interest.

Of note here, only 42.3% of respondents were confident in their ability to diagnose obstructed labour, 26.3% had performed an assisted delivery, 39.0% were confident in their knowledge of the indications for and contraindications to assisted deliveries, and 35.7% had been involved in delivery of a

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### Table 3. Confidence of respondents to manage ESMOE scenarios (using binarised Likert scales)

| ESMOE topic                  | Confidence statement                                                                 | Proportion assessed confident, % |
|------------------------------|--------------------------------------------------------------------------------------|----------------------------------|
| Maternal resuscitation       | I am confident in my ability to lead a maternal resuscitation                        | 50.6                             |
| Sepsis                       | I am confident in my ability to definitively manage patients with puerperal endometritis | 29.7                             |
| Haemorrhage                  | I am confident in my ability to initially manage and stabilise a patient presenting with abruptio placentae | 69.8                             |
| Hypertension                 | I am confident in my ability to manage a fitting eclamptic patient                   | 61.5                             |
| Miscarriage                  | I am confident in my ability to definitively manage an unstable patient presenting with a miscarriage | 85.7                             |
| Obstructed labour            | I am confident in my ability to diagnose and safely manage obstructed labour         | 42.3                             |
| Cardiotocographs             | I am confident in my ability to interpret cardiotocographs                            | 67.6                             |
| Assisted delivery            | I am confident in my knowledge of the indications for and contraindications to assisted deliveries | 39.0                             |
| Obstetric emergencies        | I am confident in my ability to safely manage cord prolapse                           | 51.7                             |
| Surgical skills              | I am confident in my ability to safely perform a caesarean section in a patient who has not had any prior caesarean sections (virgin abdomen) | 78.0                             |
| HIV in pregnancy             | I am confident in my knowledge of HIV guidelines as they relate to pregnant and breastfeeding patients | 65.9                             |
| Overall mean (min.; max.)    |                                                                                      | 58.3 (29.7; 85.7)                |

ESMOE = Essential Steps in the Management of Obstetric Emergencies.

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Fig. 1. Summary of results.
With the increased prioritisation of community service doctor placement at DHs and PHC facilities, this research strengthens the findings of previous literature in showing the relative lack of skills available in these settings. Clinical support in the form of senior medical officers, family physicians and district clinical specialist teams is therefore essential.

Conclusions

This research aimed to describe the self-perceived readiness of medical interns completing their training to independently manage obstetric emergencies, based on the ESMOE modules in the HPCSA internship logbook. A significant variation between internship-accredited hospitals in the self-perceived readiness of medical interns to practise safe obstetrics was found. Specific experience and confidence gaps in labour ward management, pregnancy-related sepsis and compression sutures for uterine atony were identified. Strengths were identified in the management of miscarriage, performing an uncomplicated CS and the management of hypertension in pregnancy.

An incongruity exists between the shortcomings in DH obstetric services as identified in the Saving Mothers reports, the prioritisation of placement of community service doctors at PHC facilities and DHs, and the self-perceived readiness of medical interns completing their training to safely manage obstetrics and reduce preventable maternal mortality. It is therefore important that internship training hospitals and the HPCSA adjust their programmes accordingly. Interns in their obstetrics and gynaecology rotations need prioritisation given to developing life-saving skills while these can be learnt in an environment with specialist support. Additionally, considering the lack of experience and confidence identified in this research, it becomes essential that senior medical doctors and on-site family physicians are attracted to and retained in PHC facilities and DHs where they will be able to support junior doctors, together with district clinical specialist obstetricians.

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