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Assessment of Practical Training in Cesarean Delivery and Obstetric Hemostatic Procedures among Physicians Enrolled in the Diploma of Specialized Studies in Obstetrics and Gynecology in Dakar, Senegal

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Abstract

Objective: To describe self-reported operative exposure, self-assessed technical competence, and perceptions of practical training in cesarean delivery and obstetric haemostatic procedures among physicians enrolled in the Diploma of Specialized Studies (DES) in Obstetrics and Gynecology at Cheikh Anta Diop University in Dakar. **Methods:** A descriptive cross-sectional survey was conducted from 1 April to 30 June 2025 across DES-affiliated training sites. A self-administered KoboToolbox questionnaire collected participant characteristics, self-reported operative exposure, operating-room role, self-assessed technical competence, and views on training. Analyses were descriptive. **Results:** Eighty-four valid questionnaires were analysed from a target population of 112 enrolled trainees (75.0% coverage). The mean age was 30.38 years and 61.9% were women. Before entering the DES, 84.5% had never performed a cesarean section. The self-reported weekly average was 5.57 ± 3.53 procedures (median 5; range 1 - 20). Means were 4.5 in year 1 and 7.2 in year 4; because the design was cross-sectional, this difference does not represent individual longitudinal progression. Overall, 89.3% had served as primary operators, without measurement of case numbers or degree of supervision. Self-assessed competence was reported by 77.4% for an unscarred uterus, 72.6% for a scarred uterus, and 75.0% for a multiply scarred uterus with adhesions. Reported mastery was 73.8% for vascular ligation, 53.6% for uterine compression sutures, and 38.1% for haemostatic hysterectomy. Among 75 respondents to the numerical-threshold item, 54.7% considered 1 - 10 cesarean sections

sufficient for mastery. **Conclusion:** Respondents reported regular but highly variable exposure and lower perceived competence in some advanced haemostatic procedures. These reports are not objective measures of technical competence. A prospective study combining operative logbooks, supervision levels, and structured observation is required to evaluate actual skill acquisition.

Keywords

Cesarean Delivery, Surgical Education, Self-Assessed Competence, Obstetrics and Gynecology, Postgraduate Medical Education, Senegal

1. Introduction

Cesarean delivery is one of the most frequently performed obstetric operations. When medically indicated, it can prevent substantial maternal and perinatal morbidity and mortality. Its safety nevertheless depends on appropriate indication, sound operative technique, and the ability to recognise and rapidly manage complications, particularly haemorrhage [1] [2]. Operative education traditionally relies on progressively increasing participation under supervision. Procedure volume contributes to experience but, by itself, does not establish competence. Case complexity, quality of supervision and feedback, and direct observation of performance must also be considered [3]-[5]. Structured instruments such as the Objective Structured Assessment of Technical Skills (OSATS) have been applied to cesarean delivery, although adaptation to different levels of complexity and assessor training remains necessary [6]. Simulation may complement clinical learning by allowing trainees to practise rare situations without risk to patients [7]-[10]. In Senegal, the Obstetrics and Gynecology DES at Cheikh Anta Diop University (UCAD) trains hospital interns and other physicians across several hospitals and health centres in Dakar, with an additional rotation outside the region. Operative opportunities may vary according to clinical activity, rotation, training year, and supervision. However, little information is available on trainees' operative exposure and their perceptions of their ability to perform cesarean delivery and associated haemostatic procedures. This study aimed to describe self-reported operative exposure, self-assessed technical competence, and perceptions of practical cesarean training among physicians enrolled in the UCAD Obstetrics and Gynecology DES.

2. Methods

2.1. Study Design, Period, and Setting

This descriptive cross-sectional survey was conducted from 1 April to 30 June 2025 among trainees enrolled in the UCAD Obstetrics and Gynecology DES. Affiliated sites included Principal Hospital of Dakar, Pikine National Hospital, Dalal Jamm Hospital, the Social Hygiene Institute, and the Philippe Maguilen Senghor, Gaspard Camara, and Nabil Choucair health centres.

2.2. Study Population and Recruitment

Eligible participants were hospital interns and other physicians regularly enrolled in years 1 - 4 of the DES, clinically active at an affiliated site, and willing to participate. Incomplete or invalid questionnaires were excluded. The survey targeted the entire eligible population, and the link was circulated through institutional WhatsApp groups.

Enrolment lists comprised 112 trainees: 23 in year 1, 33 in year 2, 33 in year 3, and 23 in year 4. Individual receipt of the link and the number of questionnaires opened but not submitted were not traceable. The proportion of valid questionnaires relative to enrolment is therefore reported as target-population coverage rather than a strict response rate. The form did not record participant category (hospital intern versus other DES physician).

2.3. Questionnaire, Variables, and Definitions

The self-administered questionnaire was developed specifically for this study and programmed in KoboToolbox. It covered age, sex, year of training, experience before entering the DES, self-reported weekly cesarean exposure, operating-room position, self-assessed technical competence, and views on training. No formal content-validation process or documented pretest could be established from the available records. The exact instrument is provided as Supplementary Material S1.

The form asked whether participants believed that they had the skills to perform cesarean delivery in three uterine contexts and three haemostatic procedures. No predefined competence criterion, experience threshold, autonomy instruction, or validated rating scale was provided. Responses are therefore interpreted as self-assessed competence rather than objective performance.

Operative exposure was measured with the item: "How many cesarean sections do you perform per week (on average)?" The form specified neither a recall period nor a definition of "perform." The variable is consequently reported as a self-reported weekly average, according to each respondent's interpretation. Primary operator and assistant were separate, non-exclusive positions. Counts by role, level of supervision, complete versus partial performance, and procedure-specific exposure to haemostatic surgery were not collected.

2.4. Statistical Analysis

Data were exported and analysed in Microsoft Excel 2021. Categorical variables are presented as counts and percentages. Continuous variables are summarised using the mean, standard deviation, median, and range, as available. Item-specific denominators are reported for missing data. No inferential analysis was performed.

2.5. Ethical Considerations

The Chair of Obstetrics and Gynecology was informed of the study and raised no objection to its conduct. The study was not submitted to an ethics committee or any other formal review authority; consequently, no formal ethical approval or

exemption was issued. Participation was voluntary, and respondents provided informed consent before completing the questionnaire. No directly identifying information was collected, and anonymity was maintained throughout data collection and analysis.

3. Results

3.1. Participants and Self-Reported Operative Exposure

Eighty-four valid questionnaires were analysed among 112 enrolled trainees, corresponding to 75.0% target-population coverage. Respondents numbered 17/23 (73.9%) in year 1, 26/33 (78.8%) in year 2, 22/33 (66.7%) in year 3, and 19/23 (82.6%) in year 4. Because individual receipt of the invitation could not be verified, no strict response rate was calculated.

Mean age was 30.38 years (range 25 - 47), and 52 participants (61.9%) were women. Thirteen participants (15.5%) had performed at least one cesarean section before entering the DES; 71 (84.5%) had not.

The mean self-reported number of cesarean sections per week was 5.57 ± 3.53 (median 5; range 1 - 20). Group means were 4.5, 4.8, 6.0, and 7.2 in years 1 - 4, respectively. These figures compare distinct groups at one time point and do not describe longitudinal change within individual trainees. Seventy-five participants (89.3%) had served as primary operator and 31 (36.9%) as assistant; responses were not mutually exclusive and did not indicate the level of supervision. Participant characteristics and self-reported operative exposure are presented in Table 1.

Table 1. (a) Participant characteristics and self-reported operative exposure; (b) Coverage of the enrolled target population by training year.

(a)

Indicator	Result
Participants analysed	84
Age, mean (range), years	30.38 (25 - 47)
Women, n (%)	52 (61.9)
Men, n (%)	32 (38.1)
Enrolled/respondents, years 1/2/3/4	23/17; 33/26; 33/22; 23/19
Cesarean before DES, n (%)	13 (15.5)
No cesarean before DES, n (%)	71 (84.5)
Cesareans/week, mean ± SD	5.57 ± 3.53
Cesareans/week, median (range)	5 (1 - 20)
Year-group means, years 1/2/3/4	4.5/4.8/6.0/7.2
Ever primary operator, n (%)	75 (89.3)
Ever assistant, n (%)	31 (36.9)

Continued

(b)

Training year	Enrolled	Respondents	Coverage (%)
Year 1	23	17	73.9
Year 2	33	26	78.8
Year 3	33	22	66.7
Year 4	23	19	82.6
Total	112	84	75.0

3.2. Self-Assessed Technical Competence

As shown in Table 2, self-assessed competence in cesarean delivery was reported by 65/84 participants (77.4%) for an unscarred uterus, 61/84 (72.6%) for a scarred uterus, and 63/84 (75.0%) for a multiply scarred uterus with adhesions. Thus, the ordering of these proportions was not strictly parallel to the assumed case complexity. Reported mastery of haemostatic procedures was 73.8% for vascular ligation, 53.6% for uterine compression sutures, and 38.1% for haemostatic hysterectomy. These responses were not accompanied by counts of procedures performed or assisted.

Table 2. Self-assessed technical competence.

Procedure	n/N	%
Cesarean delivery, unscarred uterus	65/84	77.4
Cesarean delivery, scarred uterus	61/84	72.6
Cesarean delivery, multiply scarred uterus with adhesions	63/84	75.0
Vascular ligation	62/84	73.8
Uterine compression sutures	45/84	53.6
Haemostatic hysterectomy	32/84	38.1

Seventy-five participants answered the item on the number of cesarean sections considered necessary to achieve technical mastery. Among them, 41/75 (54.7%) selected 1 - 10 procedures, 18/75 (24.0%) selected 11 - 20, 12/75 (16.0%) selected 21 - 50, and 4/75 (5.3%) selected more than 50. Nine responses were missing.

3.3. Perceptions of Training

Fifty-five participants (65.5%) considered that a medical student could not correctly perform a cesarean section after a two-month clinical placement. In addition, 53 (63.1%) opposed integrating technical cesarean training into the undergraduate medical curriculum.

Statement	Yes, n (%)	No, n (%)
Correct performance after a two-month placement	29 (34.5)	55 (65.5)
Integrate technical cesarean training into undergraduate education	31 (36.9)	53 (63.1)

4. Discussion

This survey yielded three main findings. First, respondents reported regular but highly variable exposure, with higher group means in later training years. Second, most reported competence in common cesarean contexts, whereas reported mastery was lower for compression sutures and haemostatic hysterectomy. Third, most respondents opposed autonomous technical training in cesarean delivery during undergraduate medical education.

Differences between training years must be interpreted cautiously. Because this was a cross-sectional survey of different groups, the data cannot demonstrate within-trainee progression. The observed range may reflect training site, workload, rotation, year of training, individual characteristics, or other unmeasured factors; the present data cannot distinguish these explanations.

Primary-operator status indicates active participation but not autonomy. A primary operator may be directly supervised and may perform only part of the procedure. Procedure volume describes experience rather than quality of performance. Contemporary competency-based education therefore emphasises repeated observation, explicit criteria, feedback, and progressive entrustment [3]-[6].

The relatively high proportions of self-assessed competence should also be interpreted cautiously. Self-assessment may correlate imperfectly with observed performance, especially in the absence of explicit standards [11]. Moreover, the proportion for a multiply scarred uterus with adhesions was slightly higher than that for a scarred uterus. This pattern may relate to item interpretation, clinical exposure, individual confidence, or sampling variability; the study cannot determine which explanation is correct.

Reported mastery was lower for uterine compression sutures and haemostatic hysterectomy. However, exposure to each procedure was not measured, and the survey cannot determine whether the finding reflects rarity, complexity, supervision, or another cause. Literature on cesarean training supports the potential value of simulation for repeated practice of operative steps and haemorrhage management [7]-[10], but improvement in simulated performance does not automatically establish better clinical outcomes.

Most respondents opposed technical cesarean training during undergraduate medical education. Undergraduate curricula may nevertheless address non-operative competencies, including recognition of indications and urgency [12], preoperative preparation, asepsis, assistance, postoperative surveillance, and communication. Autonomous performance should remain a postgraduate specialist-training objective.

4.1. Strengths and Limitations

The survey included all four training years in a multisite programme and covered 75.0% of enrolled trainees. Important limitations remain. Individual receipt of the link was not traceable, preventing calculation of a strict response rate, and participant category was not collected. Data were self-reported and susceptible to recall, interpretation, and social-desirability biases. Competence was neither defined us-

ing standardised criteria nor directly observed. The weekly-average item specified neither a recall period nor what counted as performing a procedure. Training site, current rotation, case complexity, role-specific counts, complete versus partial performance, degree of supervision, and procedure-specific exposure to haemostatic surgery were not recorded. No formal questionnaire validation or documented pretest could be reported. Finally, the cross-sectional design compared distinct cohorts and cannot establish individual educational progression; generalisability is limited to a single university programme, albeit a multisite one.

4.2. Educational Implications and Proposed Directions

This study did not evaluate operative logbooks, OSATS, or simulation. Based on the literature, these approaches warrant prospective evaluation: progressive objectives and explicit supervision levels; documentation of role, case complexity, and supervisor feedback in an operative logbook; repeated direct observation using a cesarean-specific instrument; and simulation as an adjunct for rare or critical procedures [6]-[10]. A prospective study should follow the same trainees and examine relationships among exposure, supervision, objective scores, and autonomy.

5. Conclusion

In this cross-sectional survey, physicians enrolled in the Obstetrics and Gynecology DES in Dakar reported regular but highly variable weekly exposure to cesarean delivery. Most reported competence in the cesarean contexts presented, whereas reported mastery was lower for some advanced haemostatic procedures. These findings reflect perceptions rather than objectively demonstrated competence. Prospective follow-up combining operative logbooks, supervision data, and structured performance assessment is required before conclusions can be drawn about skill acquisition or the effectiveness of specific educational interventions.

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Author Contributions

Mouhamet Sene contributed to study conception, supervision, interpretation, drafting, and critical revision.

Khalifa Ababacar Gueye, Abdoul Aziz Diouf, Moussa Yagouba Sow, Moussa Diallo, Hamza Dane Moussa, Anna Dia, Youssou Toure, and Alassane Diouf contributed to data acquisition and/or interpretation and critically revised the manuscript. All authors read and approved the final version and accept responsibility for the integrity of the work.

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Conflicts of Interest

The authors declare no conflicts of interest related to this work.

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