Original Article

To teach is to learn twice" Effectiveness of OB/GYN Residents as Teachers of Their Peers and Juniors Regarding Partogram Application and Promotion of Awareness of Vaginal Deliveries

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ABSTRACT

Objectives: The primary objective of this study is to assess the effectiveness of obstetrics and gynecology (OB/GYN) residents as educators for their peers and juniors, focusing specifically on their ability to teach partogram application and promote awareness of vaginal deliveries.

Study Design: A quasi-experimental design.

Subjects and Methods: This study included 20 OB/GYN residents, divided equally into teachers and listeners, and 50 interns, also divided into two groups of 25 each, based on their attachment to either the teaching or listening residents. The effectiveness of resident teachers was evaluated through pre and post-intervention assessments of knowledge and attitudes regarding partogram use and the promotion of vaginal deliveries.

Results: The knowledge and attitude assessment scores for the group of interns attached to resident teachers (Group A) saw a significant increase, with scores rising from a baseline average of 3.2 ± 1.1 to 6.3 ± 1.4 after the intervention ($p < 0.001$). In contrast, interns attached to resident listeners (Group B) showed no significant change, with scores marginally increasing from 3 ± 0.9 to 3.1 ± 1.2 ($p = 0.782$). Resident teachers themselves also demonstrated significant improvements in their teaching and clinical skills, as evidenced by an increase in their knowledge assessment scores from an average of 3 ± 1.6 to 8.5 ± 1.1 post-intervention ($p < 0.001$).

Conclusion: OB/GYN residents serving as educators can effectively enhance the understanding and skills of their peers and juniors in partogram application and vaginal delivery practices.

Key Words: Medical education; obstetrics and gynecology residents; partogram; residents as teachers; vaginal deliveries.

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INTRODUCTION

In the ever-evolving landscape of medical education, the role of residents as educators has garnered increasing attention. The Latin root of the word "doctor," docere, meaning "to teach," encapsulates the intrinsic teaching responsibilities inherent to the medical profession. Historically, medical education has been characterized by a hierarchical transfer of knowledge, with attending physicians at the pinnacle, imparting wisdom to their juniors[1]. However, the dynamic nature of healthcare and the complexities of clinical practice necessitate a more nuanced approach to learning. This perspective underscores the multifaceted roles that residents occupy, bridging the gap between the theoretical underpinnings of medicine and its practical application[2].

The educational synergy between residents and medical students or junior colleagues is underpinned by the concept of near-peer teaching. This model of instruction is distinguished by its ability to foster a learning environment that is both relatable and accessible, owing to the proximal experience levels between the teacher and the learner[3]. Residents, by virtue of their recent passage through the stages of medical education, possess a unique insight into the learning needs and challenges faced by their juniors. This positions them as pivotal figures in the educational ecosystem, capable of delivering tailored, contextually relevant instruction that resonates with the experiential learning pathways of medical students and interns[4].

Beyond the immediate benefits of knowledge transfer and skill acquisition, the act of teaching confers upon residents a host of professional and personal growth opportunities. Engaging in educational activities allows residents to refine their communication skills, deepen their understanding of medical concepts, and cultivate a sense of professional identity. Moreover, the reciprocal nature

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of teaching and learning fosters a culture of continual improvement and inquiry, essential qualities in the practice of medicine. This environment not only enhances the educational experience for learners but also contributes to a more cohesive, collaborative, and reflective medical community[5,6].

However, the impact of resident-led teaching extends beyond the confines of personal and professional development. It holds the potential to influence clinical outcomes positively, through the promotion of best practices and the fostering of a learning-oriented clinical environment. In fields such as obstetrics and gynecology (OB/GYN), where the stakes of clinical decision-making and patient management are particularly high, the role of resident educators could be pivotal[7,8]. Given the intricate balance between theoretical knowledge and clinical acumen required in OB/GYN, exploring the effectiveness of resident-led teaching in this specialty could provide valuable insights[9].

Against this backdrop, the aim of this study is to investigate the effectiveness of OB/GYN residents as teachers of their peers and juniors, with a specific focus on the application and promotion of awareness of vaginal deliveries and the use of the partogram. By examining the educational dynamics within this context, the study seeks to contribute to a deeper understanding of the role and impact of residents as educators in the medical field, particularly within the specialized domain of obstetrics and gynecology.

SUBJECTS AND METHODS

Participants and Procedures

This exploratory study was carried out involving OB/GYN residents and interns at the Banha University Hospital. Additionally, it encompassed all individuals seeking care in the OB/GYN emergency room for vaginal delivery trials. The Faculty of Medicine's Ethics Committee at Banha University sanctioned the study, and all participants gave their written consent to partake.

The participant pool comprised 20 OB/GYN residents, segmented into two factions: the first group of 10 serving as educators and the second group of 10 as audience members. Furthermore, 50 interns were split into two equally sized groups: one aligned with the educator residents and the other with the audience resident group.

Exclusions applied to OB/GYN doctors with advanced degrees and undergraduate students, as well as patients with specific medical conditions such as multiple cesarean sections, antepartum hemorrhage, severe preeclampsia, or fetal distress.

Approach

The methodology involved surveying all candidates on their educational engagements and administering a pre-assessment on a preselected subject matter (the partogram). Subsequently, participants were randomly designated to either instruct (n = 10) or attend a 30-minute educational session on the same topic. In the ensuing six months, the educator group led instructional sessions for their assigned interns (10 per subgroup), focusing on the practical use of the partogram and monitoring of standard labor progression. Conversely, the remaining interns were assigned to the audience group without active teaching involvement. Post-study, both resident and intern groups underwent a final assessment. To objectively measure partograph understanding, a scoring system was developed, tallying correct responses to specific survey questions. The variation in scores from the initial to the final test served as a measure for evaluating knowledge gained by both residents and interns.

Survey instrument

All the included OB/GYN resident were subjected to the following questions to assess baseline knowledge: To what extent do you have knowledge about labour? - What is the LCG? - What are the differences between who modified partogram & LCG? - Active 1st stage of labor? - Duration of active 1st stage in PG usually doesn't exceed - In active 1st stage, Digital vaginal examination is recommended at interval? - During labor, oral fluid and food intake is? - Active management of labor for prevention of delay is? - Delayed cord clamping is? - PG, cervical dilation is 6 cm, for how many it can be considered normal according to LCG?

While all the included OB/GYN interns were subjected to the following questions to assess baseline knowledge: (Active phase of labour starts from? - During labour, oral fluid and food intake is? - What is the partogram? - What is the normal FHR? - Can we give analgesics as: pethidine to female during labour? - IV oxytocin is recommended for all cases to prevent PPH? - Late deceleration is? - TF the BPD is at the level of ischial spine, then station equal?

All the included OB/GYN resident were subjected to the following questions to assess baseline attitude: How often do you use partogram for labour monitoring? - How did your learning curve go throughout your residency? - Have you seen any of your seniors use PG for assessing labor progress? - During your residency, roughly estimate number of cases faced morbidities or mortalities due to the non-use of PG? - How much time do you spend teaching interns passively or actively? - Do you think teaching juniors or interns will have a benefit in you or any of them regarding knowledge acquisition? - During your residency, the ratio between CS vs normal deliveries can be roughly

estimated by? - How do you monitor labor in your labor ward?

All the included OB/GYN interns were subjected to the following questions to assess baseline attitude: During your internship, how much do you get benefit from the residents? - Have you ever changed your point of view or interest regarding a specialty based on the resident attitude towards you? - Have you ever performed a PV? - During labor monitoring, have you ever learned from a resident partogram or CTG participants? - Have your communication skills with the patient improved during your attachment to residents?

Statistical Analysis

The data analysis was conducted using SPSS version 27, provided by IBM, located in Chicago, Illinois. To assess whether data distribution followed a normal curve, we employed the Shapiro-Wilk test alongside histogram evaluations. For data that followed a normal distribution, we reported means and standard deviations (SDs), and these sets of data underwent analysis through the ANOVA test, supplemented by the Tukey post hoc test for detailed comparisons. Non-normally distributed quantitative data were described using medians and interquartile ranges (IQRs), and comparisons between groups were made using the Kruskal-Wallis test, followed by the Mann-Whitney test for pairwise comparisons. For categorical data, frequencies and percentages were calculated and analyzed using the Chi-square test. Significance was determined at a *P value* of less than 0.05, employing a two-tailed test.

RESULTS

(Table 1) indicates that there were no significant differences in baseline characteristics (age, sex, level of work, years of experience, and place of work) between the resident study groups.

Table 1: Baseline characteristics of the residents studied groups.

		Group 1 (n =10)	Group 2 (n =10)	*P value*
Age (year)	≤30	10 (100.0%)	10 (100.0%)	-
	>30	0 (0.0%)	0 (0.0%)	
Sex	Male	8 (80.0%)	7 (70.0%)	0.606
	Female	2 (20.0%)	3 (30.0%)	
Level of work	Junior	5 (50.0%)	2 (20.0%)	0.309
	Sub senior	3 (30.0%)	6 (60.0%)	
	Senior	2 (20.0%)	2 (20.0%)	
Years of experience	1 year	5 (50.0%)	2 (20.0%)	0.309
	2 years	3 (30.0%)	6 (60.0%)	
	≥3 years	2 (20.0%)	2 (20.0%)	
Place of work	Banha University	10 (100.0%)	10 (100.0%)	-
	Another hospital	0 (0.0%)	0 (0.0%)	

(Table 2) reveals that there was no significant difference in baseline knowledge and attitude assessment scores between the residents' study groups. After follow-up, knowledge and attitude assessment scores were significantly higher in Group 1 compared to Group 2. The knowledge and attitude assessment scores significantly increased in Group 1 after follow-up compared to the baseline level, but there was no significant change in Group 2.

Table 2: Change of knowledge and attitude assessment scores before and after intervention in the residents studied groups

		Group 1 (n =10)	Group 2 (n =10)	*P value*
Baseline knowledge assessment score	Mean ± SD	3 ± 1.6	3.2 ± 2.3	0.820
	Range	1 – 5	0 – 6	
Knowledge assessment score after follow-up	Mean ± SD	8.5 ± 1.1	3 ± 2.3	<0.001*
	Range	7 – 10	0 – 7	
P value		<0.001*	0.808	
Baseline attitude assessment score	Mean ± SD	1.9 ± 0.3	2 ± 0	0.331
	Range	1 – 2	2 – 2	
Attitude assessment score after follow-up	Mean ± SD	3.6 ± 0.7	2.2 ± 0.4	<0.001*
	Range	2 – 4	2 – 3	
P value		<0.001*	0.168	

(Table 3) shows that there was no significant difference in baseline characteristics (age, sex, and OB/GYN interest) between the intern study groups.

Table 3: Baseline characteristics of the intern studied groups

		Group A (n =25)	Group B (n =25)	*P value*
Age (year)	Mean ± SD	25.1 ± 1.2	24.8 ± 1.2	0.616
	Range	23 – 27	23 – 26	
Sex	Male	12 (48.0%)	10 (40.0%)	0.569
	Female	13 (52.0%)	15 (60.0%)	
OB/GYN interest	Yes	17 (68.0%)	10 (40.0%)	0.087
	No	8 (32.0%)	15 (60.0%)	

(Table 4) indicates that there was no significant difference in the baseline knowledge assessment score between the interns' study groups. After follow-up, the knowledge assessment score was significantly higher in Group A compared to Group B. The knowledge assessment score significantly increased in Group A after follow-up compared to the baseline level, but there was no significant change in Group B.

Table 4: Change of knowledge and attitude assessment scores before and after intervention in the residents studied groups.

		Group 1 (n =10)	Group 2 (n =10)	*P value*
Baseline knowledge assessment score	Mean ± SD	3.2 ± 1.1	3 ± 0.9	0.809
	Range	1 – 5	1 – 4	
Knowledge assessment score after follow-up	Mean ± SD	6.3 ± 1.4	3.1 ± 1.2	<0.001*
	Range	3 – 8	0 – 5	
P value		<0.001*	0.782	

(Table 5) presents data on 80 labor cases managed at the Banha OB/GYN emergency unit, where the partogram was utilized to track labor progress and outcomes. The table categorizes cases into four groups based on the patient's parity (Primigravida, Para 1, Para 2, and Para 3). It details the outcomes for each group, including the number of C.S, cases proceeding to normal vaginal delivery (NVD), instances of morbidity detected, and confirmation of active labor phase. Notably, the majority of interventions, including C.S. and proceeding to NVD, occurred in Primigravida cases, with a decreasing trend observed as parity increases. Morbidity was predominantly noted in the Primigravida group.

Table 5: shows the total number of cases attended for labour at Banha OB/GYN emergency unit upon which partogram was applied (80 cases) together with demonstration of progress of labour and the mode of delivery of each .

case	number	Active phase	Morbidity detected	Proceed to NVD	C.S
Primigravida	50	yes	cases 18	35	15
Para 1 vd	15	yes	cases 3	12	3
Para 2 vd	10	yes	case 1	9	1
Para 3 vd	5	yes	case 0	5	0

DISCUSSION

Our investigation centered around leveraging the partograph, a pivotal tool designed to elevate patient-centric care while fostering a team-based decision-making approach among women and medical practitioners. The WHO's Labor Care Guide aims to bolster health-focused research quality, diminish unnecessary interventions, and augment comfort for patients[10,11].

Initial observations revealed a notable deficiency in both the understanding and application of partographs among OB/GYN trainees, mirroring findings from Ogwang *et al*.[12] which highlighted significant lapses in partograph usage during labor, primarily due to systemic health care deficiencies.

Addressing this, Ogwang and colleagues advocated for enhanced educational programs, clear guideline dissemination, and sufficient resource allocation for healthcare personnel regarding partograph implementation, an initiative we embraced in our analysis[12].

Corroborating our initial insights, research by Qureshi *et al*.[13] identified key barriers to partograph adoption in Kenyan medical facilities, including workforce limitations, gaps in understanding partograph data, pervasive negative perceptions, and a lack of leadership in promoting partograph fidelity.

Echoing our post-intervention findings, Ratan *et al*.[14] uncovered the criticality of thorough preparatory work and resource readiness in enhancing resident educators' effectiveness, earmarking these as vital elements for educational success.

Similarly, a study by Okokon *et al*.[15] investigating partograph knowledge among obstetric care providers outside the physician cadre underscored the dire impacts of educational deficits, limited access to tools, and staffing shortfalls on partograph utilization.

The findings from Okokon and colleagues[15] highlighted that the primary barriers to partograph use were a lack of knowledge, unavailability of the tool, and insufficient staffing. The degree to which healthcare workers were familiar with and had access to partographs directly influenced their application in clinical settings. Concurrently, a study by Fawole *et al*.[16] evaluating the awareness and application of the partograph among medical staff in southwestern Nigeria revealed a general deficiency in understanding this crucial tool. Despite its affordability and potential benefits, the partograph was rarely utilized for monitoring labor in Nigerian women.

In a contrasting study conducted by Yisma *et al*.[17], an assessment of partograph knowledge and use among obstetric care providers in public healthcare settings showed moderate familiarity with the instrument. A significant portion of respondents could identify at least one element of the partograph, and a majority understood the critical functions of the alert and action lines. Notably, partograph usage to monitor labor was more prevalent in healthcare centers than in hospitals, with over half of the caregivers employing this tool.

Subsequently, the research included a division of 50 interns into two cohorts: one group of 25 interns paired with resident instructors and another with residents in a listening role. Analysis revealed no substantial differences in initial characteristics, knowledge, or attitudes towards the partograph between the two intern groups.

Post-intervention knowledge assessments demonstrated a significant improvement in understanding among interns associated with the teaching residents, especially regarding the active labor phase, the importance of hydration and

nutrition during labor, partograph comprehension, and the normal fetal heart rate range. Moreover, these interns were more likely to recognize the significance of analgesic administration, the use of IV oxytocin to prevent postpartum hemorrhage, the implications of late deceleration, and the assessment of fetal head position.

The post-study attitude evaluation revealed interns linked with teaching residents reported a greater enrichment from their learning experience, including practical skills such as performing pelvic exams and interpreting partographs and cardiotocography, alongside enhanced patient communication abilities.

Despite the initial similarity in knowledge levels among the interns, the group taught by residents showed a notable increase in knowledge post-study, whereas the listeners' group did not. This outcome aligns with Ratan *et al*.'s[14] findings, which emphasized the effectiveness of well-prepared resident educators who have specific teaching topics and resources readily available, thereby enhancing the learning experience for students. This approach underscores the value of learning from seniors with firsthand experience and preparedness in the subject matter.

A study analogous to ours by Kensinger *et al*. in 2015[18] introduced a peer-assisted learning framework for educational institutions lacking formal non-clinical education. This approach, termed the "resident as educator" (RAE) model, enables residents to take charge of designing the educational curriculum, fostering a dedication to education, skill enhancement, and teamwork. It particularly allows senior residents to craft and implement the curriculum, highlighting the model's foundation on educational commitment and collaborative growth.

Kensinger and colleagues[18] determined that such a model not only augments the educational program by being economical and efficient but also significantly contributes to the professional growth of residents and fosters an educational culture within the institution.

Echoing our findings, Okokon *et al*.[15] emphasized that regular instructional refreshers and the development of clear guidelines could substantially improve partograph knowledge and use in healthcare settings. This enhancement is further supported by bolstering the workforce in delivery units to ensure the partograph's availability and effective utilization.

Similarly, a study by Gaba *et al*.[19] aimed to evaluate the impact of a residents-as-teachers initiative on teaching competencies. Involving twenty-four residents in a controlled trial, the intervention group underwent a comprehensive 10.5-hour workshop. The findings revealed notable improvements in the teaching capabilities of participants, as evidenced by their self-assessment and feedback on the workshop, underlining the program's effectiveness.

In line with our post-study observations, Yisma *et al*.[17] underscored the necessity of both pre-service and continuous training for obstetric caregivers in the use of partographs. They advocated for institutional policies to safeguard laboring women in Ethiopian public health facilities, noting that a lack of partograph knowledge and application contributes to the high rates of maternal mortality in Ethiopia and other developing nations.

Nyamtema *et al*.'s research[20] also underscored the critical need for urgent training to enhance labor management and partograph documentation practices, aiming to curb maternal and newborn fatalities. Their study focused on midwives, indicating a broad applicability of training across different healthcare provider categories.

Ogburn et al.[21] conducted a study to identify factors predicting high-quality teaching among residents. Including 43 participants, the research aimed to highlight how outstanding resident educators could positively influence medical students' views of obstetrics and gynecology, suggesting that selecting residents with a potential for teaching excellence should be a priority for program directors.

Our investigation validates that resident training significantly boosts their knowledge base and instructional abilities. Furthermore, it shows that experienced residents who teach their juniors not only enhance their own understanding but also elevate the overall educational experience, a finding supported by other studies indicating that such training programs markedly improve residents' self-perception of their teaching skills, albeit without corresponding recognition in student evaluations.

CONCLUSIONS

Our study demonstrated that OB/GYN residents, when acting as educators, significantly enhanced partogram application skills and heightened awareness of vaginal deliveries, embodying the principle that "to teach is to learn twice." Interns mentored by these residents not only gained superior knowledge but also showed marked improvements in patient communication, clinical assessments, and decision-making abilities, leading to improved clinical outcomes, including effective labor monitoring and reduced morbidities, aligning with the ideal of minimal mortalities. Despite previous underutilization of the partograph in Egypt and similar settings, influenced by a lack of training and its limited use as a mere labor record, our findings indicate a transformative shift towards its proactive use in labor management post-study, underscoring the critical need for and impact of comprehensive educational strategies.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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