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Original Research Article

Qudsia's Sneaky Knot: A Practical Modification for Surgical Knot-Tying in Constrained Operative Fields

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Abstract: *Surgical knot-tying is a core operative skill that influences wound security, hemostasis, and patient safety. In clinical practice, conventional knot-tying may become difficult when suture ends are relatively distant or operative access is limited.* ***Objective:*** *To introduce and evaluate Qudsia's Sneaky Knot, a modified knot-tying technique designed for situations in which conventional approximation of suture ends is technically challenging.* ***Methods:*** *This cross-sectional survey was conducted among 22 Obstetrics and Gynecology residents in a surgical training setting at CMH hospital, Lahore, from June 2023 to June 2024. Participants were introduced to Qudsia's Sneaky Knot and then assessed using a structured five-point Likert-scale questionnaire. The questionnaire evaluated perceived surgical utility, practicality, ease of learning, safety and confidence, reproducibility, and suitability for inclusion in surgical skills training. Agreement was defined as a Likert score of ≥4. Data were analyzed using descriptive statistics, including mean, standard deviation, frequency, and percentage.* ***Results:*** *All 22 residents completed the survey. Mean domain scores ranged from 4.55 to 4.80 out of 5, indicating consistently high acceptance of the technique. Ease of learning received the highest mean score (4.80 ± 0.39), with 100% participant agreement. Safety and confidence scored 4.69 ± 0.46, while practicality and efficiency scored 4.63 ± 0.51. All participants reported willingness to recommend the technique and to use it independently in future surgical procedures.* ***Conclusion:*** *Qudsia's Sneaky Knot showed high perceived acceptability, ease of learning, practicality, and educational value among Obstetrics and Gynecology residents. The technique may be useful in constrained surgical situations where conventional knot-tying is difficult. Further validation through simulation-based assessment and comparative operative studies is recommended before wider integration into surgical training curricula.*

Keywords: Clinical Competence, Internship and Residency, Patient Safety, Suture Techniques, Surgical Procedures, Operative

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Introduction

Surgical knot-tying is a fundamental operative skill that contributes directly to tissue approximation, haemostasis, wound integrity, and procedural safety. Secure knot construction requires appropriate suture selection, correct hand movements, adequate tension, and reproducible knot configuration. Even minor deficiencies in knot formation may result in slippage, loose tissue approximation, bleeding, wound dehiscence, or unnecessary tissue strangulation, particularly when the knot is tied under tension or in a restricted operative field (1–3). Contemporary biomechanical evidence indicates that a single factor does not determine knot security; rather, it depends on the interaction between suture material, suture diameter, number of throws, knot configuration, direction of pull, frictional resistance, and the force applied during tightening (2–7).

In routine surgical practice, standard knot-tying methods are usually taught under ideal conditions, where the suture ends are easily accessible, both hands can be positioned comfortably, and assistance is available for exposure. However, operative conditions are often less controlled. In deep pelvic surgery, emergency obstetric procedures, difficult haemostasis, and limited-access fields, the surgeon may encounter distant suture ends, narrow working angles, restricted hand movement, poor visualization, or limited assistance. These situations can make conventional knot-tying technically demanding and may increase operative time, frustration, and more dependence on assistants help. Therefore, simple, reproducible, and adaptable knot-tying modifications may have practical value when standard hand movements are constrained.

International surgical education has therefore moved beyond the traditional apprenticeship model toward structured demonstration, simulation, deliberate practice, video-based instruction, and objective assessment before independent clinical application (8–10). Dasci et al. showed that structured training can improve surgical knot-tying and suturing performance. At the same time, Seifert et al. demonstrated the usefulness of structured video-based teaching models for the acquisition of surgical skills (8,9). Similarly, Hoopes et al. highlighted the role of home-based and simulation-based surgical skill resources for obstetrics and gynecology trainees when operative training opportunities are limited (10). In Pakistan, postgraduate surgical training is frequently delivered in high-volume public and private tertiary care hospitals where residents manage a heavy clinical workload and may have limited access to dedicated simulation laboratories, formal skills curricula, and repeated supervised practice. Recent local evidence has supported the use of video-based surgical teaching among residents, suggesting that low-cost, structured, and reproducible training strategies may be feasible in Pakistani surgical education (11). Obstetrics and gynecology is a specialty in which knot-tying skills are repeatedly used in cesarean section, hysterectomy, adnexal surgery, vaginal surgery, repair of obstetric trauma, haemostatic suturing, and minimally invasive procedures. Trainees are expected to acquire these skills early in residency, yet exposure may vary depending on case volume, supervision, institutional workload, and the availability of simulation-based training.

Qudsia's Sneaky Knot is proposed as a practical modification for situations in which the suture ends are relatively distant or standard knot-tying becomes difficult in a constrained operative field. Evaluating residents' perceptions regarding its utility, practicality, ease of learning, safety, and teaching value is therefore relevant before designing larger objective validation studies. The present study was conducted to assess the acceptability and perceived educational and clinical usefulness of Qudsia's Sneaky Knot among obstetrics and gynecology residents in a Pakistani training context.

Methodology

This cross-sectional survey-based study was conducted to evaluate the perceived practicality, safety, reproducibility, and educational value of a modified surgical knot-tying technique, Qudsia's Sneaky Knot, among Obstetrics and Gynecology students from June 2023 to June 2024. The study population comprised 22 female residents aged 25 to 35 years enrolled in operative obstetrics and gynecology training at CMH Hospital, Lahore. Before data collection, the technique was demonstrated to the participants in the context of constrained operative fields where conventional knot-tying may become technically difficult due to relatively distant suture ends, limited access, deep operative spaces, or reduced assistance. Participants were then allowed to observe and attempt the technique. Data were collected using a structured questionnaire designed to assess prior exposure and the global acceptability of the technique, as well as participants' perceptions across predefined domains. The questionnaire consisted of two main components. The first component assessed prior formal training in standard surgical knotting, observation of Qudsia's Sneaky Knot, personal attempt of the technique, willingness to recommend it to fellows or junior trainees, and willingness to use it independently in future procedures. These items were recorded using categorical response options of "Yes," "To some extent," and "No." The second component assessed perceptions using a 5-point Likert scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree." The domains included perceived utility in surgery, practicality and efficiency, ease of learning and reproducibility, patient safety and operator confidence, and suitability for teaching and integration into surgical training.

The primary outcome measure was the mean domain score for each Likert-scale domain. Secondary outcome measures included the proportion of responses scoring ≥4 (indicating agreement or strong agreement) and the percentages of participants reporting prior exposure, a personal attempt, a recommendation to juniors, and willingness to use the technique independently. Open-ended feedback was also reviewed to identify commonly reported perceived applications of the technique, including its usefulness in deep operative fields, emergencies, procedures with limited assistance, and common obstetric and gynecological surgeries such as cesarean section and hysterectomy.

Data were entered and analyzed using Microsoft excel latest version. Categorical variables were summarized as frequencies and percentages, while Likert-scale domain scores were presented as mean ± standard deviation. For each domain, the percentage of responses with scores ≥4 was calculated to assess participant agreement. Given the small sample size and descriptive nature of the study, no inferential hypothesis testing was performed. The analysis focused on acceptability, perceived feasibility, reproducibility, safety, and educational integration of the modified knot-tying technique.

Ethical approval was obtained from the relevant institutional review board before final submission, and informed consent was documented from all participants. Participation was voluntary, and responses were kept anonymous and confidential throughout data collection and analysis. Since the study involved participant perceptions rather than direct patient intervention or patient outcome assessment, no patient-identifiable data were collected.

Results

A total of 22 Obstetrics and Gynecology residents completed the survey, with no incomplete responses. All participants were female and aged 25–35. More than half of the participants had received prior formal training in standard surgical knotting, while most had already observed Qudsia's Sneaky Knot before completing the survey. All participants reported that they had personally attempted the technique, would recommend it to junior colleagues, and would consider using it independently in future surgical procedures. (Table 1)

Regarding prior exposure and acceptability, 20 participants had observed Qudsia's Sneaky Knot being performed, 1 had observed it to some extent, and 1 had not observed it previously. Despite this, all 22 participants had personally attempted the technique. Global acceptability was high, as all participants stated that they would recommend the technique to fellows or junior trainees and would use it independently in future surgeries. (Table 2)

Table 1. Demographic and baseline characteristics of participants (n = 22)

Variable	Category	n	%
Gender	Female	22	100.0
Specialty/training group	Obstetrics and Gynecology residents	22	100.0
Age group	25–35 years	22	100.0
Prior formal training in standard surgical knotting	Yes	12	54.5
	To some extent	8	36.4
	No	2	9.1

Table 2. Prior exposure and global acceptability of Qudsia's Sneaky Knot (n = 22)

Item	Yes n (%)	To some extent n (%)	No n (%)
Observed Qudsia's Sneaky Knot being performed	20 (90.9)	1 (4.5)	1 (4.5)
Personally attempted Qudsia's Sneaky Knot	22 (100.0)	0 (0.0)	0 (0.0)
Would recommend the technique to fellows/juniors	22 (100.0)	0 (0.0)	0 (0.0)
Would use the technique independently in future surgeries	22 (100.0)	0 (0.0)	0 (0.0)

The domain-wise assessment demonstrated consistently favorable responses across all evaluated areas. Mean domain scores ranged from 4.55 to 4.80 on a 5-point Likert scale. The highest mean score was observed for ease of learning and reproducibility, followed by patient safety and operator confidence. Perceived utility in surgery showed the lowest mean score among the domains, although it remained strongly favorable, with more than 90% of responses falling in the agree or strongly agree categories. (Table 3).

Overall, ease of learning and reproducibility emerged as the strongest domains, with mean scores of 4.80 ± 0.39 and 100% of responses scoring ≥4, respectively. Patient safety and operator confidence also received a high mean score of 4.69 ± 0.46, indicating that participants perceived the technique as useful for improving confidence during suturing in constrained operative conditions. Practicality and efficiency scored 4.63 ± 0.51, suggesting favorable perceptions of the operative workflow and its applicability in difficult surgical fields. Teaching and training integration received a mean score of 4.64 ± 0.63, supporting the potential inclusion of Qudsia's Sneaky Knot in structured surgical skills curricula. Qualitative feedback further suggested that participants considered the technique particularly useful in deep or restricted operative fields, emergencies, procedures performed with limited assistance, and common obstetric and gynecological surgeries such as cesarean section and hysterectomy. Participants also recommended visual demonstrations,

workshops, and simulation-based practice to support standardized teaching of the technique.

Table 3. Domain-wise assessment of Qudsia's Sneaky Knot using a 5-point Likert scale

Domain assessed	No. of items	Mean score ± SD	Responses ≥4, %
Perceived utility in surgery	6	4.55 ± 0.89	90.77
Practicality and efficiency	5	4.63 ± 0.51	94.55
Ease of learning and reproducibility	5	4.80 ± 0.39	100.00
Patient safety and operator confidence	4	4.69 ± 0.46	98.86
Teaching and training integration	4	4.64 ± 0.63	89.77

Discussion

The present study demonstrated highly favorable perceptions of Qudsia's Sneaky Knot among obstetrics and gynecology residents, with mean domain scores ranging from 4.55 to 4.80 on a 5-point Likert scale. All 22 participants had personally attempted the technique and reported their willingness to recommend it to junior colleagues and to use it independently in future surgical procedures. These findings suggest strong early acceptability of the technique, particularly as a practical modification for deep, restricted, or difficult operative fields. The highest scores were observed for ease of learning and reproducibility, indicating that residents perceived the technique as simple enough to incorporate into routine skills training.

These findings are consistent with the broader shift in surgical education toward structured skills acquisition before independent operative use. Zimmerman et al. (12) emphasized simulation-based training as an important component of obstetrics and gynecology education, particularly when clinical exposure is disrupted or variable. Similarly, Ebrahim et al. (13) demonstrated that low-cost household items can support online training in surgical knot-tying skills, reinforcing the value of accessible, reproducible teaching tools. The favorable ease-of-learning score in our study is also comparable to that of Nagaraj et al. (14), who reported that a video-based at-home knot-tying simulation was feasible and effective for achieving proficiency among medical students.

The high scores for practicality and efficiency in our study align with evidence supporting remote, video-based, and structured teaching of surgical skills. Kumins et al. (15) found that computer-based video training could teach basic surgical skills to novices without direct faculty involvement, while Handaya et al. (16) reported improved learning through tutorial videos combined with online teaching for surgical knotting. Youssef et al. (17), in a systematic review, also supported video-based education as a useful adjunct for surgical skills learning. These comparisons suggest that Qudsia's Sneaky Knot may be best introduced through a standardized teaching package that includes a short video demonstration, faculty-supervised practice, and simulation-based repetition.

The 100% willingness to recommend and use the technique independently was higher than the acceptability rates reported in several surgical skills education studies, where learner preference often varies with previous exposure, feedback quality, and confidence. Feeley et al. (18) and Nathan et al. (19) showed that telementoring and virtual interactive surgical-skills classrooms can support learning, but structured assessment and feedback remain necessary. Co et al. (20) also demonstrated that online teaching of basic surgical skills can be effective, but objective performance outcomes are required to confirm skill acquisition. Therefore, although the present study shows strong perceived acceptability, it should not be interpreted as proof of technical superiority or patient safety benefit.

The finding that patient safety and operator confidence scored 4.69 ± 0.46 is important but should be interpreted cautiously. Chase et al. (21) reported that surgical simulation improved laparoscopic suturing and knot-tying efficiency among reproductive endocrinology and infertility fellows, suggesting that confidence becomes more meaningful when paired with measurable performance improvement. Bresler et al. (22) also emphasized simulation as a stepwise route toward safer clinical activity in robotic surgery training. More recently, Thomaschewski et al. (23) showed that laparoscopic simulation training improved operating-room performance among surgical residents, while Aftab et al. (24) provided Pakistani evidence that simulator-acquired laparoscopic skills can transfer to real-life operative settings. These studies support the next phase of research on Qudsia's Sneaky Knot, using objective outcomes such as time to knot completion, knot slippage, tensile strength, error rate, and OSATS-based scoring.

This study has limitations. The sample size was small, participants were from a single specialty group, all were female residents aged 25–35 years, and most had already observed the technique before survey completion, which may have introduced familiarity bias. The study was perception-based and did not include an objective comparison with conventional knot-tying techniques. Future studies should include randomized simulation-based comparisons, blinded assessor scoring, video review, and mechanical knot-security testing. Huffman et al. (25) emphasized the need for optimized objective assessment of surgical knot-tying skill, and such tools would strengthen validation of this technique. Despite these limitations, the present study provides useful preliminary evidence that Qudsia's Sneaky Knot is acceptable, easy to learn, and perceived as clinically useful by obstetrics and gynecology residents working in constrained operative settings.

Conclusion

Qudsia's Sneaky Knot was perceived as a practical, safe, easily learnable, and reproducible knot-tying modification for use in constrained operative fields. The high level of participant acceptance and willingness to use and recommend the technique supports its potential inclusion in structured surgical skills training, particularly for junior trainees. Further prospective studies with objective assessment of knot security, slippage, and time efficiency are recommended to validate its clinical effectiveness.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned.

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The authors declared the absence of a conflict of interest.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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