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Effectiveness of Basic Surgical Skill Development Program among Interns at Tertiary Care Centre

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Abstract
Introduction: An intern is emerging practitioners, who completed their medical course and have to be trained during their internship postings. It is a major step for every compulsory rotating medical intern to ensure the safety of each and every patient and to acquire surgical skills, knowledge and fundamental tasks. The benefits of simulation-based training include learning how to communicate and make decisions as well as understanding the repercussions of such actions in a real-world setting.
Aim: This study was done to assess the effectiveness of basic surgical skill development among interns at tertiary care centre
Material and Methods: A cross sectional observation study was conducted among interns in general surgery department for the academic year 2021-2022 (April to March). A total of 100 trainees participated in this study and were evaluated based on printed questionnaire in eleven domines of DOPS form consisting of Understanding of Indications, Obtaining informed consent, Appropriate preparation, Technical Ability, Awareness of complications, Post Procedure management, Communication skills, Professionalism, Overall ability, Overall clinical competence, and Performing procedures. Surgery faculties and postgraduates assessed the effectiveness of the program using DOPS form (direct observation of procedural skill) by mentioning it as satisfactory or not satisfactory based on understanding of their surgical skills and their performance with the mannequins. A p value of <0.05 was considered significant and all the analysis were done using SPSS 24.
Results: Comparison of various domines of DOPS on surgical skill among trainees revealed that there was signicant difference ($p<0.001$) observed before and after the skill lab using paired t test.
Conclusion: The sole domain of surgical department was building technical skills among medical students and this can be initiated with the surgical skill development program.

1. Introduction

Basic surgical techniques including suturing, knotting have traditionally been taught to the general surgery interns in the operating room, emergency department, "see one do one teach one" as advocated by william halsted[1]. This method of learning procedural skill among interns has largely been limited by approach of the attending surgeons and the theatre staff to teaching and also by the malpractice litigation of the high cost [2]. Hence students get very less opportunities and knowledge in surgical techniques and discrepancy in their competency skill. Thus basic surgical development program enable them with good knowledge, better patient care and thereby nullifying the expectations of healthcare stakeholders [3,4].

When a practitioner was a beginner, it becomes stressful for performing live procedures. For mastering these skills, the opportunities have changed into accreditation process that have become complex for both postgraduate trainees and students. To overcome this, colleges depute trainers and designated simulators for looking into various aspects of patient

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care, diagnosis, procedures and even operations earlier to handling real patients.

Confidence in procedural skill ensures positive perception of their abilities and has important implications of job satisfaction and performance. Introducing core surgical skills early, can reduce technical errors and can show significant increase in performing dexterity task and emphasis on intraoperative decision making skills. Encouraging early mastery of procedural skills during internship program paves way by increasing autonomy and confidence throughout the career. Interactive instruction, deliberate practice, and bench-marking progress are important factors in technical skill acquisition [5,6].

Compared to interns who did not engage in the programme, students who enrolled them in the fundamental surgical skill programme had greater technical abilities and knowledge, according to the Ericsson KA study [5,6]. Although suturing is a crucial competency ability needed during the internship time, little is known about how abilities are acquired. In contrast to William Halsted theory, that is instructing general surgery trainees to be trained in the operating room and emergency department directly with patients, an attempt is made to teach and train students in the skill lab with mannequins so that they could build confidence in suturing and knotting in actual patients.

AIM

To assess the effectiveness of basic surgical skill development program among interns and whether there was an improved skill acquisition after the workshop.

2. Materials and Methods

A Cross sectional observation study was conducted only among interns in General Surgery Department of Karpaga Vinayaga Institute of Medical Sciences for the academic year from March 2021 to April 2022. The study was approved by the Ethics Committee of the institute (ECR/1425/Inst/TN/2020). This study was conducted among 100 interns before being posted in General surgery department and it was done as a one day program in batches. Informed written consent was obtained from all students who underwent this training. Students were evaluated before and after skill lab program using printed questionnaires utilizing the DOPS domains where the curriculum had shown efficacy. The contents of the 11 domains were Understanding of Indications, Obtaining informed consent, Appropriate preparation,Technical Ability, Awareness of complications, Post Procedure management,

Communication skills, Professionalism, Overall ability, Overall clinical competence and Performing procedure. The students were taught by general surgery faculties and postgraduates in the skill lab using the simulation, and they were evaluated based on their knowledge and skills. The domines were scored by the general surgery faculties using satisfactory or not satisfactory rating system which was based on the understanding of their surgical skills and their performance with the mannequins. All intern students were included in this study over an informed consent and those who were absent due to medical reasons were excluded.

PROCEDURE

A one day program was conducted using a surgical skill module which was developed for this program with 11 domines. Students were assesed before skill lab program by self made printed questionnaire in 11 domines with the topics covering their knowledge and skill in scrubbing, gloving, gowning, and other procedural core skills like venflon insertion, foleys catheterisation, suturing, knotting techniques using simulations, instrument handling along with the patient care and basic pre-procedural knowledge like consent, preparation and their importance in medico-legal issues regarding condition and prognosis of the patient, risks involved in surgery and post operative care and they were taught and assessed in the same domines after the one day workshop. Following the programme printed questionnaire were used by the facilitator (surgical faculties) and evaluated based on the knowledge and skill performance as satisfactory and not satisfactory.

STUDY DATA ANALYSIS

Data were analyzed using descriptive and inferential statistics. Frequency and percentages were used. Comparison of various domines before and after the workshop among the participants was analysed with paired t test and there was significant difference

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observed at p<0.001.The data were analyzed using SPSS software 24.

3. Results

A total of 100 trainees participated in this study and evaluated based on knowledge and performance with regard to satisfaction in eleven domines of DOPS assessment (Table/Fig 1). There were approximately equal numbers of male and female trainees (46 and 54 respectively).

Comparison of various domines were done before and after the workshop and there was significant difference observed with P< 0.001using paired sample t test.(Table/Fig 2).

To end, the skill lab gives the interns more confidence in dealing the patients in real environment and also gives them more awareness in every sector of surgical lab skills.

Table/Fig 1. Distribution of trainees with regard to satisfaction In various domines of DOPS before and after work shop.

DOMINES AND CONTENTS	SATISFACTORY BEFORE THE WORKSHOP	UNSATISFACTORY BEFORE THE WORKSHOP	SATISFACTORY AFTER THE WORKSHOP	UNSATISFACTORY AFTER THE WORKSHOP
UNDERSTANDING OF INDICATIONS	26	74	95	5
OBTAINS INFORMED CONSENT	18	82	94	6
APPROPRIATE PREPARATION	40	60	82	18
TECHNICAL ABILITY	12	88	89	11
AWARENESS OF COMPLICATIONS	27	73	13	87
POST PROCEDURE COMPLICATIONS	32	68	17	83
COMMUNICATION SKILLS	38	62	25	75
PROFESSIONALISM	40	60	92	8
OVERALL ABILITY	21	79	86	14
OVERALL CLINICAL COMPETENCE	34	66	78	22
PERFOEMING PROCEDURE	20	80	90	10

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Table/Fig 2. Distribution Of Satisfaction In Various Domines Of DOPS On Surgical Skill Among Trainees Before and After Work Shop .

Domines	Measures	Before workshop	After workshop	p value
Understanding of Indications	Mean	0.26	0.95	<0.001*
	Standard Deviation	0.4	0.2	
Obtains Informed consent	Mean	0.18	0.94	<0.001*
	Standard Deviation	0.38	0.23	
Appropriate preparation	Mean	0.40	0.82	<0.001*
	Standard Deviation	0.49	0.38	
Technical ability	Mean	0.12	0.89	<0.001*
	Standard Deviation	0.32	0.31	
Awareness of complications	Mean	0.27	0.13	<0.001*
	Standard Deviation	0.44	0.33	
Post procedural complications	Mean	0.32	0.46	<0.001*
	Standard Deviation	0.17	0.37	
Communication skills	Mean	0.38	0.48	<0.001*
	Standard Deviation	0.25	0.43	
Professionalism	Mean	0.40	0.92	<0.001*
	Standard Deviation	0.49	0.27	
Overall ability	Mean	0.21	0.86	<0.001*
	Standard Deviation	0.4	0.34	
Overall clinical competence	Mean	0.34	0.78	<0.001*
	Standard Deviation	0.47	0.41	
Performing	Mean	0.20	0.90	<0.001*

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procedure	Standard Deviation	0.40	0.30	
*p <0.05 – Statistically significant difference is present before and after the workshop (paired t test)				

4. Discussion

In the recent medical era there has been constant issue in the competency of medical students and lack of preparedness in surgical specialties as they are completing their clerkship without basic knowledge in surgical skill. Students feel unprepared for clinical practice because of their significant challenge in surgical techniques and skill [7].This study has shown significant improvement in their overall performance and better handling of patients were observed in wards after study .Thus emphasizing the importance of this training,so similar training were carried out in other departments and was also followed in our department for further batches. Comparison with various study is tabulated below.(Table/Fig 4)

In previous study Peter McAnena et al, students were instructed to scrub under a simulation guide and instructions were provided to practice and give feedback. At the end of the session, students reported positively of the previous training and increase in confidence and interest in surgical assistance after the training session was reported [8].

Another study by Moulton C-AE et al (2006) conducted surgical skill training with 38 trainees in a single day and compared with weekly training sessions under distributive module, and found out that skills were significantly higher in the second group[9]. In previous studies, appealing and cost-effective method is teaching suturing and knotting on bench-top synthetic models with intense practice[10].

A 2016 report from 705 medical trainees in UK reported that 86.5% of them lacked adequate suturing skills[11]. Lack of adequate cases, duration, opportunities provided to students were identified as the main barriers to proficiency of surgical skills among students, based on previous studies, to overcome this simulation environment is much important location[12].

Advantage of our study includes the inexpensive structured questionnaire. The results were enclosed anonymously. Synthetic pads for suturing and surgical basic equipment's were used in our study.

Table/Fig 3. Comparison Of Previous Studies.

S. no	STUDY NAME	SAMPLE SIZE	PLACE OF STUDY	MODE OF STUDY AND TRAINING	RESULTS
1.	**Current Study**	100 interns	Karpaga vinayaga institute of medical science,MGR university ,chennai	One day programme using surgical module	90% of trainees showed improvement in overall performance
2	**Peyre SE et al** (2006)	23 Interns and 3 medical students	University of Southern California Keck School of Medicine, LA	21 performance skills on cadaver for 3 weeks.	Significant improvement in confidence level of interns than medical students.

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3.	**Peter McAnena et al** (2017)	18 students and 14 interns	Royal Academy of Medicine in Ireland	Technical skills were observed (basic interrupted sutures) as 10 week programme.	Significant improvement in surgical scrubbing ,basic suturing skills.
4.	**Molten C-AE et all** (2006)	38 junior surgical residents	University of Toranto,Canada	Microvascular anastomosis were taught to students as four training session in 1day for one group and 1 week/session for another group.	Both group showed significant improvement in performance.weelky practiced regimen showed better outcome.
5.	**Rufai SR et al** (2016)	705 medical students	University Of Southampton, UK	Online survey on overall opinion of medical school suture training.	526 students repoted inadequate suture training 133 students had paid for additional training.
6.	**Luhoway JA,Ryan JF,Istl AC et al [14]** (2019)	340 interns	University Hospital,London Health Sciences Centre,London	1 day training programme and 2 additional simulation session	253 students completed the survey, majority of them showed improvement in overall skills
7.	**Lella M et al [15]** (2021)	80 medical students.	Sri Devaraj Urs Academy of higher education and research, Kolar, Karnataka.	procedural skills assessment using questionnaire at the end of clerkship	They were competent in performing simple surgical tasks independently
8	**Ahmad R et al [16]** (2019)	107 surgical residents	Alnafees Medical College, PIMS, Islamabad, Pakistan	video demonstrations and extensive hands-on sessions as 3 day programme	Surgical residents improved significantly after workshop.
9	**Padmavathy and**	110 interns	Malla Reddy	Questionnaire	Only 2% of the

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	Tekulapally et al (2021)		Medical College for Women, Suraram, Hyderabad, Telangana.	prepared and validated by expert panel was administered to the interns before and after the two-day internship orientation program.	interns were highly prepared for hospital practice before the orientation program while this number increased to 78% after the program

PICTURES

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Limitations

The sample size is small. The long-term follow-up is essential to assess the effectiveness of basic surgical skill lab. However, learning under clinical establishment and supervision with defined intervals cannot be replaced as it is the best method shown to improve surgical retention hence operating in theaters and engaging with surgeons is an invaluable experience during internship [13].

5. Conclusion

Henceforth comprehensive skill training in skill lab for the interns before starting their clerkship can bring betterment in handling patients, knowledge and administrative tasks. It also minimizes the discrepancy of procedural skills between interns and improve their perception on technical skills. While each student's hands-on exposure throughout each rotation varies greatly over the internship period, having a basic understanding of surgery is crucial. As a result, developing skills using simulation programme is a crucial component of basic technicality and aids in the development of surgical competency.

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Declarations

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