Simulation-based Boot-camp Improves the Self-efficacy of Newly Inducted Hospital Residents and Interns

Mehak Ismail Rajani
Aga Khan University Hospital
Charles Docherty
Aga Khan University Hospital
Aysha Almas
Aga Khan University Hospital
Farah Khalid (khalid.farah@aku.edu)
Aga Khan University https://orcid.org/0000-0003-3643-7741
Salman Alam
Aga Khan University Hospital

Research note

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Abstract

Introduction

Expectation of competence from interns and residents from outset stresses the need for bridging the gap between undergraduate and post-graduate worlds, in terms of clinical skills. Worldwide, simulation-based boot camps ease this transition and equip novice trainees with essential foundation knowledge, technical skills, and effective communication. This study describes the introduction, change management process, and analyzes effectiveness of first-ever boot camp in Pakistan aimed at improving self-efficacy of PGME interns and residents. A boot camp of 4 days duration was conducted in December 2018 at The Aga Khan University Hospital (AKUH) for newly inducted PGME interns and residents. 40 residents and 68 interns completed a self-administered self-efficacy questionnaire after boot camp.

Results

There was a significant overall improvement in self-efficacy of trainees across all skills. Self-efficacy improved most in CVC insertion, hospital management software) and communication, while, least gain was seen in infection control post-boot camp. Boot camp approach has proven to be an efficient, safe, forgiving, experiential learning environment for healthcare professionals and prepares them to thrive in a new hospital setting. Analysis supports effectiveness of boot camp in improving the self-efficacy of new trainees and provides direction for future planning of boot camps.

Introduction

Transition from medical school to hospital environment is a challenging process. This is because healthcare providers (HCPs) are expected and required to be fully functional from very beginning of their training program (1), while new trainees experience a disconnection between academic knowledge and its clinical application (2).

Limited exposure to clinical experience along with a general lack of knowledge regarding basic skills leads to variance in trainee competence and poor patient handling (3, 4). Residency program directors report that many new trainees struggle with communication, professionalism, and organizational skills (5). Hospital set-ups are complex training environments where patients are subjected to potential harm at hands of novice trainees. Many studies have reported adverse patient outcomes during trainee change-over periods (5, 6).

Ensuring patient safety, training of HCPs before entering into hospital, in a simulated environment is vital (7), where they learn from their errors without fear of harming patients (4, 7-9). Replication of realistic clinical scenarios through simulation-based education (SBE) is an effective way to gain experience as it minimizes chances of negative learning (10-12). Furthermore, it exposes learners to challenging behaviors and attitudes which they might experience in clinical settings (12).

“Boot Camps” (BC) help new interns to transition from medical school to residency as it provides a platform to practice basic tasks and to achieve competence (13, 14). Moreover, simulation-based BC can equip novice interns and residents with more advanced skills, knowledge, and confidence to deal with complex situations in real-life situations through benefit of practice and feedback integral to high fidelity SBE (13, 15, 16). By bringing

residents and interns together for BC provides an additional opportunity for vicarious learning and social bonding within group, some of whom may be together for next 5 years.

Aga Khan University's (AKUH) Centre for Innovation in Medical Education (CIME) hosted first-ever BC for newly hired interns and residents in 2019. Centre's role in any curricular innovation is to be catalyst bringing together faculty, students, technologies, and expertise in SBE to provide solutions to otherwise daunting educational challenges. This BC curriculum included a wide range of basic clinical expertise along with patient safety procedures and soft skills such as communication, administration, and organizational conduct. It provided participants with an experiential learning opportunity aimed at strengthening both knowledge and skills, thus providing a better orientation to the working environment of AKUH.

The study aimed to evaluate the effectiveness of a BC approach to developing clinical skills and knowledge in new interns and residents, through assessing any differences before and after completing the BC.

Methodology

Planning & Designing of Course Curriculum

BC concept is new in Pakistan. Evolving from traditional way of orientation for new inductees, to simulation-based BC was a challenge. Several meetings and discussions were held with inducting committee of Post Graduate Medical Education (PGME) and CIME team to plan content and design of BC. A total of 142 inductees, comprising 80 interns and 62 residents which were divided into 10 groups with approximately 14 participants in each. 10 skills stations were created with a focus on those skills deemed by experienced faculty to be important for new trainees (Table 1). Moreover, participants were certified for BLS during BC which previously used to happen after commencement of internship/residency.

Each station was carefully planned with subject specialty experts and CIME team following standard approach. Checklists were adopted from Lippincott procedure manual. Participants were given a student booklet as pre-reading, including links to video demonstrations, procedure manuals, and checklists for each skill. Each station was given 2 hours: beginning with demonstration followed by hands-on practice. Multiple task trainers were kept ensuring each participant got ample time to practice. Participants were given checklists for peer feedback and evaluation. They had opportunity to practice again after receiving feedback on performance from peers and facilitators.

Facilitator was to supervise participants, trouble-shoot any technical difficulties, clarify learning outcomes, and facilitate learning. They were briefed regarding station content and oriented with task trainer for their station in dry run before BC to ensure consistency.

Study Design, sampling technique, Inclusion/Exclusion Criteria

It was experimental design study with purposive sampling technique. All PGME interns or residents newly hired at AKUH, for year 2019, irrespective of gender, enrolled in BC were included in this study, those who failed to complete BC were excluded. Ethics approval by AKU ERC was obtained. Anonymity was ensured and written consent was obtained.

Data Collection & Statistical Analysis

31 item self-efficacy questionnaire (SEQ) was designed based on the principles of self-efficacy (SE) theory by Bandura who defines it as an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments. Out of the four key sources of information to determines SE, performance accomplishment provides the optimum evidence and is true reflection of SE as it stems from individual's personal experience as opposed to learning from observing other's experiences, verbal persuasion, and physiological arousal. (17).

Identifying one's SE in task leads to intentional effort to improvise by virtue of behavioral change. It is described that SE is predictor of performance and behavior and therefore, BC was evaluated using SE theory (17, 18). Questionnaire was provided to participants after BC. It was retrospective pre and post-test to be filled simultaneously for each of tasks before which a written consent was taken. Along with SE, demographic information was also collected (Supplementary information). Data was entered in SPSS (Statistical Package for the Social Sciences) version 19.0. Descriptive analysis was done for all variables. Based on the same variance, few variables were combined to form four new variables: Infection control, Sahl application, Communication, and Counselling to make the data easy to analyze. Paired T-test was applied to determine if the differences in the SE levels before and after the training were statistically significant. Change in SE was also studied considering gender, designation, years of clinical experience, Medical College/University of graduation, name of Hospital of House-job/Internship, using independent T-test.

Results

BC was a four-day program attended by 142 participants and amongst whom 108 (76.05%) consented to fill the SE questionnaire and 34 (23.94%) refused to take part thus were not included in the study.

Demographics

Majority participants consisted of females (64.8%) while 35.2% were male. Mean age of participants ranged between 20-24 years (49.1%). 68 (63.56%) were interns and 39 (36.45%) were residents. Majority were non-AKU graduate (86.12%) while the AKU graduates accounted for 13.89%. 14.8% participants had completed their MBBS degree from AKU. Residents were largely from Anesthesia (25%) with multiple departments having much smaller representation. (Further details in Supplementary materials)

SE in all Variables

There was noticeable and statistically significant improvement in SE of trainees across all skills. Highest pre-SE score was in infection control (74.01) while, lowest was in CVC insertion (20.0). Further details are reported in Table 1.

SE in relation to demographics

Gender demographic was divided into two variables: male and female. There was significant association found between performances of adult female catheterization and gender when an Independent T-test was applied, females had higher pre-score (57.70) as compared to males (36.72). Interestingly, males mean SE score difference was higher (41.4) than females (24.2). Similarly, females had a higher mean SE score difference (29.36) as compared to males (23.12) in performing adult male catheterization, however, this result was not statistically significant. Significant association was also found between performance of lumbar puncture and gender where males improved most (42.34) as compared to females (30.68). While there was no significant association found in remaining skills (Table 2).

It was observed that residents had higher overall pre-mean score as compared to interns, as might be expected, however, only few variables had these differences statistically significant such as arterial blood sampling , venipuncture, dressing of surgical wound and , dressing of CVC, performing lumbar puncture , SAHL Application and communication skills (Table 2).

Graduation demographic was divided into two: those who graduated from AKU and Externals (who graduated from other universities). It was noted that AKU graduates had higher pre and post mean scores in all skills except combined clinical skills when compared to external graduates. However, these results are statistically insignificant (Figure 1).

Newly enrolled residents did their internship from either AKUH or outside AKUH. Internship hospital variable had two possibilities: AKUH and Externals Hospitals. It was found that residents who had done their internship from AKU had higher pre mean and post mean score than those who completed their internship outside AKUH, however, these results were statistically significant in only SAHL Application, communication skills and Counselling Skills, while all the rest of the variables were insignificant (Table 2).

Newly enrolled residents belonged to multiple specialties, broadly categorized into two variables: Surgery and Medicine. It was seen that in some skills residents from surgery had higher pre-mean scores (Clinical skills, Infection Control) while in SAHL Application, communication and counselling skills medical residents had higher pre-mean scores. However, none of these differences were statistically significant (Table 2).

Discussion

BC was introduced as unique concept not only in AKU but also in Pakistan. Arranging such intense activity with such many participants was very challenging. Execution of this concept was only made possible because our Centre provided suitable learning spaces for smooth management of these dynamic stations rotating every 2 hours and its' live-video technology helped in supervising multiple stations to ensure quality. Aiming to train 142 participants in basic skills also came with a cost that all was budgeted extensively during the planning phase. Each station had at least one and a maximum of 3 facilitators, who were briefed in detail regarding their stations and oriented with task trainers individually before BC. Successful execution of this first BC was only possible because of extensive and rigorous pre-planning. It resulted in improvement of SE of the participants throughout all skills ranging from clinical, hospital management system (Sahl application), and soft skills such as counseling and communication.

Amongst clinical skills, in infection control showed smallest improvement which could mean that skill was too basic for participants and that it didn't offer for 'new' learning opportunities for participants. Having highest pre-boot camp SE (Table 1) would support this conclusion. Whereas, low pre-boot camp scores in CVC insertion indicate a lack of previous experience in this specialized skill, therefore with an appropriate teaching strategy highest gain in SE was witnessed.

Relationship between gender of participants and SE was not significant. It was noted that females tended to have a higher pre-boot camp SE score in performing female catheterization (p-value 0.002, Table 2) and lower for male catheterization. A possible explanation for this finding can be due to institutional policies requiring same gender urinary catheterization, (19), leading to decreased exposure and practice as students, hence, less pre-training SE.

Since BC was structured for both interns and residents with same curriculum content, a significant difference in pre-boot camp SE was recorded, with residents being more efficacious than interns (Table 2). As residents entered their program with at least one year of clinical internship experience, difference between two groups can thus be explained.

SE scores according to graduate college and internship hospital, low pre-boot camp SE scores with most improvement in Sahl application are explained by induction of trainees who either graduated or did their internship from outside AKUH and therefore were not familiar with system as opposed to participants internal to AKUH. Similarly, part of communication category included paging technique, using hospital SBAR notes for giving/receiving patient's hand over, therefore, trainees who previously did their internship within AKUH had higher pre-boot camp scores as compared to the externals (Figure 1).

In a study conducted in a north Indian medical college, final year students were recruited for a BC. Majority of participants agreed that after activity they could counsel patient confidently and had improved their communication skills (20). In another study, interns of general surgery had reported self-improvement in their interpersonal skills and communication after attending BC (21). Similarly, there has been evidence of improvement in learner's clinical skills, knowledge, and confidence as reported in a meta-analysis by Blackmore et al (2014) (1). In another systematic review, Neylan et al (2017) studied effectiveness of boot camps and concluded that although BC positively affect confidence level of medical graduates entering hospitals, none of studies measured objectively clinical performance of interns (22).

In conclusion, this BC was successful in preparing new inductees for their clinical training, as evidenced by above results. It also highlighted areas of learning that were successful that could be developed as stand-alone workshops or adapted for incorporation in any future BC. This analysis supports that BC provide an effective, safe, forgiving experiential learning environment for HCPs and prepare them to thrive in a new hospital setting. This study also highlights effectiveness of SE measurement as an evaluation tool in determining the effectiveness of teaching-learning strategy used in BC educational design.

Limitations

Participants might have had recall bias while rating themselves in SE. Qualitative method can be employed in future and through interviews, in-depth insight into participants' learning can be achieved. It may be valuable to

survey participants again after commencement of their internship/residency to assess exact impact of BC on their efficacy to perform tasks. Since these results are calculated for a specific population, it cannot be generalized. Whereas, there has not been any BC for newly inducted doctors in Pakistan as per information of authors, this study was one of its kind. It can serve as a national example for other universities and teaching hospitals to adapt and introduce into their programs.

List Of Abbreviations

AKUH: The Aga Khan University Hospital

BC: Boot Camp

BLS: Basic Life Support

CIME: Centre for Innovation in Medical Education

CVC: Central Venous Catheters

ERC: Ethics Review Committees

HCPs: Healthcare providers

PGME: Post Graduate Medical Education

SBE: Simulation based education

SE: Self-efficacy

SEQ: Self-efficacy questionnaire

SPSS: Statistical Package for the Social Sciences

Declarations

Ethics Approval: This research was reviewed by The Aga Khan University's Ethics Review Committee and was exempted. A written consent was taken from all the participants prior to the filling of questionnaire.

Availability of data and materials: The data that supports the findings of this study are available on request from the corresponding author. The data are not publicly available due to ethical considerations.

Competing interests: There are no competing interests.

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Authors' contributions: MIR initiated the idea, analyzed & interpreted the data and wrote the abstract, introduction and discussion of the manuscript. CD provided supervision in execution of the research and

interpretation of the data.and reviewed the manuscript. AA supervised the research, collected data and reviewed the manuscript. FK performed data analysis and wrote results. MSA entered the data on SPSS.

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Consent for Publication: Informed Consent was obtained with the SEQ.

References

1. Blackmore C, Austin J, Lopushinsky SR, Donnon T. Effects of postgraduate medical education “boot camps” on clinical skills, knowledge, and confidence: a meta-analysis. Journal of graduate medical education. 2014;6(4):643-52.
2. Ataya R, Dasgupta R, Blanda R, Moftakhar Y, Hughes PG, Ahmed R. Emergency medicine residency boot camp curriculum: a pilot study. Western Journal of Emergency Medicine. 2015;16(2):356.
3. Parent RJ, Plerhoples TA, Long EE, Zimmer DM, Teshome M, Mohr CJ, et al. Early, intermediate, and late effects of a surgical skills “boot camp” on an objective structured assessment of technical skills: a randomized controlled study. Journal of the American College of Surgeons. 2010;210(6):984-9.
4. Monrouxe LV, Bullock A, Tseng H-M, Wells SE. Association of professional identity, gender, team understanding, anxiety and workplace learning alignment with burnout in junior doctors: a longitudinal cohort study. BMJ open. 2017;7(12):e017942.
5. Young JQ, Ranji SR, Wachter RM, Lee CM, Niehaus B, Auerbach AD. “July Effect”: Impact of the Academic Year-End Changeover on Patient Outcomes: A Systematic Review. Annals of Internal Medicine. 2011;155(5):309-15.
6. Monrouxe LV, Bullock A, Gormley G, Kaufhold K, Kelly N, Roberts CE, et al. New graduate doctors’ preparedness for practice: a multistakeholder, multicentre narrative study. BMJ open. 2018;8(8):e023146.
7. Arora S, Hull L, Fitzpatrick M, Sevdalis N, Birnbach DJ. Crisis management on surgical wards: a simulation-based approach to enhancing technical, teamwork, and patient interaction skills. Annals of surgery. 2015;261(5):888-93.
8. Escher C, Creutzfeldt J, Meurling L, Hedman L, Kjellin A, Felländer-Tsai L. Medical students’ situational motivation to participate in simulation based team training is predicted by attitudes to patient safety. BMC medical education. 2017;17(1):37.
9. Al-Elq AH. Simulation-based medical teaching and learning. J Family Community Med. 2010;17(1):35-40.
10. Bischof JJ, Panchal AR, Finnegan GI, Terndrup TE. Creation and validation of a novel mobile simulation laboratory for high fidelity, prehospital, difficult airway simulation. Prehospital and disaster medicine. 2016;31(5):465-70.
11. Lopreiato JO, Sawyer T. Simulation-based medical education in pediatrics. Academic pediatrics. 2015;15(2):134-42.

12. McGaghie WC, Issenberg SB, Cohen MER, Barsuk JH, Wayne DB. Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. Academic medicine: journal of the Association of American Medical Colleges. 2011;86(6):706.
13. Cohen ER, Barsuk JH, Moazed F, Caprio T, Didwania A, McGaghie WC, et al. Making July safer: simulation-based mastery learning during intern boot camp. Academic Medicine. 2013;88(2):233-9.
14. Esch LM, Bird A-N, Oyler JL, Lee WW, Shah SD, Pincavage AT. Preparing for the primary care clinic: an ambulatory boot camp for internal medicine interns. Medical education online. 2015;20(1):29702.
15. Naylor RA, Hollett LA, Castellvi A, Valentine RJ, Scott DJ. Preparing medical students to enter surgery residencies. The American Journal of Surgery. 2010;199(1):105-9.
16. Antonoff MB, Swanson JA, Green CA, Mann BD, Maddaus MA, D'Cunha J. The significant impact of a competency-based preparatory course for senior medical students entering surgical residency. Academic Medicine. 2012;87(3):308-19.
17. Bandura A. Reflections on self-efficacy. Advances in behaviour research and therapy. 1978;1(4):237-69.
18. Gist ME, Mitchell TR. Self-efficacy: A theoretical analysis of its determinants and malleability. Academy of Management review. 1992;17(2):183-211.
19. Zang YL, Chung LY, Wong TK. A review of the psychosocial issues for nurses in male genitalia-related care. Journal of Clinical Nursing. 2008;17(8):983-98.
20. Mahesh NK, Verma N, Mohan C, Mahesh A, Verma P, Mannan R. Introduction of a skills boot camp for final year undergraduate medical students entering internship in General Medicine in a North Indian medical college: A pilot study. Journal of Education Technology in Health Sciences. 2018;5(2):110-7.
21. Schoolfield CS, Samra N, Kim RH, Shi R, Zhang WW, Tan T-W. Evaluating the effectiveness of the general surgery intern boot camp. The American Surgeon. 2016;82(3):243-50.
22. Neylan CJ, Nelson EF, Dumon KR, Morris JB, Williams NN, Dempsey DT, et al. Medical school surgical boot camps: a systematic review. Journal of surgical education. 2017;74(3):384-9.

Tables

Table 1: Self-Efficacy in all Variables

	Before Boot Camp	After Boot Camp	Mean Difference	P-Value
Perform intravenous cannulation with standard protocols	51.63	76.9	25.6	<0.001
Perform arterial blood sampling	42.3	73.4	31.8	<0.001
Perform venipuncture for collecting samples for laboratory testing	61.4	83.4	21.6	<0.001
Perform adult female catheterization while maintaining a sterile field	50.63	79.5	30.0	<0.001
Perform adult male catheterization while maintaining a sterile field	55.2	81.8	27.2	<0.001
Infection Control	74.01	94.05	19.6	<0.001
Perform dressing of a surgical wound	54.8	84.6	29.6	<0.001
Perform dressing of a central venous catheter	36.9	66.8	30.4	<0.001
Give sutures efficiently and use the appropriate suture material	53.3	80.9	26.8	<0.001
Pass nasogastric tube in an adult with standard protocol	58.4	81.4	22.9	<0.001
Perform Lumbar puncture in an adult with standard protocol	35.7	69.6	34.6	<0.001
Insert a central venous catheter with standard protocol	20.0	59.6	40.1	<0.001
Give Basic Life Support	65.2	90.6	26.7	<0.001
SAHL Application	26.0	75.5	49.3	<0.001
Communication Skills	26.21	77.47	51.2	<0.001
Counselling Skills	50.2	77.5	27.41	<0.001

Table 2: Self-efficacy in relation to Gender

	Male			Female			P-Value
	Pre-Mean Score	Post-Mean Score	Difference	Pre-Mean Score	Post-Mean Score	Difference	
Perform intravenous cannulation with standard protocols	51.41	77.5	26.09	51.75	77.11	25.37	0.85
Perform arterial blood sampling	48.91	78.13	29.21	39.05	72.27	33.22	0.45
Perform venipuncture for collecting samples for laboratory testing	61.72	82.03	20.31	61.35	83.73	22.83	0.65
Perform adult female catheterization while maintaining sterile field	**36.72**	**78.13**	**41.4**	**57.7**	**81.98**	**24.29**	**0.002**
Perform adult male catheterization while maintaining sterile field	61.09	84.22	23.12	52.3	81.67	29.37	0.218
Infection Control	76.57	94.72	36.3	72.15	94.05	43.91	0.963
Perform dressing of a surgical wound	51.88	84.69	32.81	56.43	84.44	28.02	0.392
Perform dressing of a central venous catheter	40.32	72.1	32.77	35.17	65	29.83	0.733
Give sutures efficiently and use the appropriate suture material	53.28	77.34	24.06	53.33	81.67	28.33	0.389

Pass nasogastric tube in an adult with standard protocol	59.06	80.78	21.72	58.1	81.67	23.57	0.682
Perform Lumbar puncture in an adult with standard protocol	**27.92**	**71.87**	**43.96**	**39.77**	**70.68**	**30.91**	**0.026**
Insert central venous catheter with standard protocol	21.67	60.63	38.96	22.5	61.82	30.91	0.73
Give Basic Life Support	64.58	91.87	27.29	65	91.48	26.49	0.884
SAHL Application	28.19	78.03	49.84	23.73	72.43	48.7	0.79
Communication Skills	28.84	76.22	48.6	28.84	78.11	49.2	0.934
Counselling Skills	58.15	79.35	21.5	45.66	76.51	30.4	0.13
Self-Efficacy in relation to Designation							
	Intern			Resident			P-Value
	Pre-Mean Score	Post-Mean Score	Difference	Pre-Mean Score	Post Mean Score	Difference	
Perform intravenous cannulation with standard protocols	47.37	73.02	25.6	58.61	84.17	25.5	0.981
Perform arterial blood sampling	**23.22**	**64.37**	**41.15**	**73.75**	**90.42**	**16.66**	**<0.001**
Perform venipuncture for collecting samples for laboratory testing	**48.56**	**76.44**	**27.88**	**82.64**	**94.17**	**11.52**	**<0.001**
Perform adult female catheterization while maintaining sterile field	47.03	76.44	29.4	56.53	87.64	31.11	0.756
Perform adult	48.56	77.88	29.32	66.25	90.14	23.88	0.271

male catheterization while maintaining sterile field							
Infection Control	73.63	94.11	19.46	74.38	94.37	20	0.903
Perform dressing of a surgical wound	**40.75**	**79**	**37.2**	**70.4**	**90**	**17.22**	**<0.001**
Perform dressing of a central venous catheter	**18.25**	**54.5**	**35.45**	**57.6**	**84.6**	**22.91**	**0.021**
Give sutures efficiently and use the appropriate suture material	46.63	76.75	27.62	56.4	83.3	25.69	0.69
Pass nasogastric tube in an adult with standard protocol	49.5	74.75	24.49	69.6	92.9	20.41	0.355
Perform Lumbar puncture in an adult with standard protocol	**23.75**	**63**	**39.37**	**58.4**	**84**	**26.8**	**0.013**
Insert central venous catheter with standard protocol	14	55.5	41.06	38	72.8	38.61	0.65
Give Basic Life Support	65.25	92.38	25.46	60.8	89.8	29	0.524
SAHL Application	**14.87**	**70.82**	**55.9**	**40.78**	**79.57**	**39.6**	**0.012**
Communication Skills	**18.21**	**72.44**	**54.1**	**44.78**	**85.02**	**41.5**	**0.049**
Counselling Skills	44.06	75.26	30.7	58.59	80.78	22.4	0.149
Self-Efficacy in relation to Internship							
Clinical Skills	External			AKU			P-Value
	Pre-Mean Score	Post-Mean Score	Difference	Pre-Mean Score	Post-Mean Score	Difference	

Perform intravenous cannulation with standard protocols	54.09	82.27	28.18	65.71	87.14	21.42	0.273
Perform arterial blood sampling	71.59	91.14	19.54	77.14	89.29	12.14	0.179
Perform venipuncture for collecting samples for laboratory testing	77.95	93.18	15.22	90	95.71	5.71	0.095
Perform adult female catheterization while maintaining sterile field	51.59	88.86	37.27	64.29	85.71	21.42	0.116
Perform adult male catheterization while maintaining sterile field	61.14	90.23	29.09	74.29	90	15.71	0.075
Infection Control	68.03	93.42	23.86	82.5	96.43	13.92	0.138
Perform dressing of a surgical wound	64.71	88.24	21.36	82.5	93.75	10.71	0.074
Perform dressing of a central venous catheter	50.59	81.47	27.5	72.5	91.25	15.71	0.103
Give sutures efficiently and use the appropriate suture material	52.35	82.65	27.04	65	86.25	23.57	0.587
Pass nasogastric tube in an adult with standard protocol	70.59	93.24	19.77	67.5	90	21.42	0.825
Perform Lumbar puncture in an adult with standard protocol	58.82	86.47	26.13	57.5	78.75	27.85	0.821
Insert central	45.29	75.88	34.09	22.5	66.25	45.71	0.171

venous catheter with standard protocol							
Give Basic Life Support	52.94	87.35	34.41	77.5	95	17.5	0.054
SAHL Application	**6.12**	**71.78**	**65.65**	**86.25**	**90.71**	**4.46**	**<0.001**
Communication Skills	**11.43**	**77.21**	**68.5**	**86.84**	**95.51**	**9.04**	**<0.001**
Counselling Skills	**43.68**	**76.58**	**32.89**	**78.21**	**86.43**	**8.21**	**0.001**

Figures

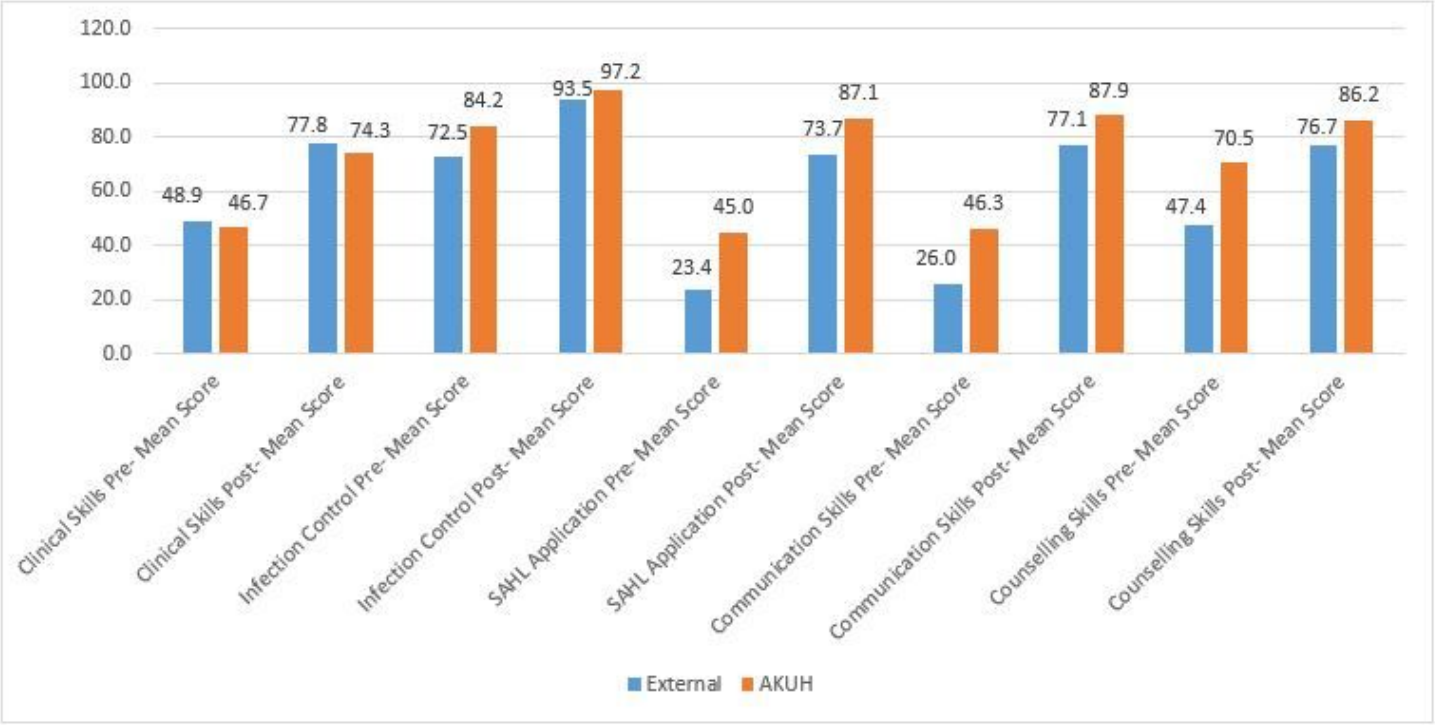

Figure 1

Pre and Post mean scores in relation to Graduation

Supplementary Files

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