

The impact of community medical camps on medical students and graduates' education

Fasih Ali Ahmed,¹ Russell Seth Martins,² Danish Ali,³ Mian Arsam Haroon,⁴ Amber Mehmood,⁵ Nuzhat Faruqui⁶

Abstract

Objective: To investigate the impact of volunteering at community medical camps on medical students' and graduates' clinical and soft skills, knowledge of community health, and future career goals.

Method: The cross-sectional pilot study was conducted at the Aga Khan University Hospital, Karachi from July to October 2020, and comprised medical students or trainees who had attended at least one medical camp in a community-based setting organised by any of the two non-governmental organisations who collaborated in the study. Responses were obtained through a self-reported online survey from the participants. Data was analyzed using SPSS 25.

Results: Of the 52 subjects, there were 25(48.9%) males and 27(51.9%) females with overall mean age 25.4±3.8 years. Majority of the participants 35(67.3%) had attended a private first-tier medical school while 17(32.7%) had attended other local medical schools. Overall, 40(76.9%) subjects reported improved community knowledge, 44(84.6%) had experiential learning and confidence in outpatient management, and 49(94%) had improved soft skills. Besides, 21(40.4%) participants agreed to have been influenced to pursue a career in primary care, and 25(48.1%) reported a direct impact on their choice of career specialty. Compared to males, females reported improved awareness and alertness ($p=0.016$), increased confidence approaching communities ($p=0.032$), and increased compassion towards patient care ($p=0.047$).

Conclusions: Community-based medical camps had an overall positive impact on volunteering medical students.

Key Words: Community medical camps, Community health service, Medical education, Service-learning.

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Introduction

Majority of global population lacks access to safe, affordable healthcare services. Huge disparities in access and quality exist between high-income countries (HICs) and low- and middle-income countries (LMICs), with regional and subnational disparities causing additional preventable deaths and disability¹⁻³. Populations living in small towns and rural areas are commonly faced with lack of access to healthcare services compounded by poor awareness and misconceptions about common health problems. Non-governmental organisations (NGOs) and medical volunteers have been contributing to minimise this deficit by offering time and services pro bono in remote areas with suboptimal health services, helping

with disease screening, treatment and referral to a tertiary care hospital. Such models are frequently seen in many LMICs and, increasingly, short-term medical missions are also getting popular among physicians and healthcare workers as a way of giving back to the community^{4,5}.

In Pakistan, local medical students, trainees and physicians volunteer for community-based health camps through various NGOs⁶. These camps provide a wealth of exposure and experience of community-based medicine to medical students, trainee doctors and physicians practising in hospital-based settings. Previous studies from other parts of the world have demonstrated that, unlike traditional clinics, these medical service camps employ more independent and experiential learning techniques, which could be useful for medical students moving from theoretical knowledge to real-life clinical scenarios⁷, performing clinical and administrative tasks under supervision⁸, and learning first-hand about the existing healthcare delivery systems⁹. Medical students and graduates reported to have a positive impact in communication skills, cultural competence and the ability to adapt⁸. Previous studies demonstrate the impact of such opportunities on leadership, management skills, team work^{10,11} communication skills, cultural

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competence^{9,11}, knowledge about prevalent health problems and delivery of healthcare¹¹. Such an exposure improves one’s ability to address healthcare disparities among under-privileged populations^{9,12}.

The current study was planned to investigate the impact of volunteering at community medical camps on medical students’ and graduates’ clinical and soft skills, knowledge of community health, and future career goals.

Subjects and Methods

The cross-sectional pilot study was conducted at the Aga Khan University Hospital (AKUH), Karachi, from July to October 2020, and comprised medical students or trainees who had attended at least one medical camp in a community-based setting organised by any of the two collaborating NGOs. The Unified Liaison for Promotion of Health and Advanced Treatment (ULPHAT) welfare organisation conducts monthly medical camps comprising various disciplines across the coastal belt of Pakistan in collaboration with Pakistan Navy, catering to an average of more than 600 patients who are provided treatment on site¹³.

The Christian Medical Fellowship in Pakistan (CMF-Pak)¹⁴ is registered under the Societies Registration Act, and promotes fellowship between Christian healthcare professionals and students in the country, with the goal of improving education, health and development in Pakistan.

After approval from the institutional ethics review committee, the sample size was calculated using OpenEpi with 95% confidence interval and a hypothesised frequency of increased interest as 70%^{15,16}.

The sample was raised by first generating an anonymous online survey using Google Forms, and then disseminating it to members of the two collaborating NGOs.

Those included were medical students or residents who have volunteered for at least one medical camp in community-based settings. Attendings or paramedical staff who assisted in conducting the medical camps were excluded.

After taking informed consent from the participants, data was collected using the self-designed questionnaire which demonstrated excellent internal validity with Cronbach’s alpha value 0.945. The questionnaire started with demographic data like age, gender, current position, year of graduation from medical school, and monthly household income. It then moved to details of participation, like the NGO, number of total medical

camps attended, and frequency of participation in medical camps. In the final section the questionnaire explored the experience of participation in medical camps. The participants were required to rate their agreement to statements on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

Scores ranging 1-2 were categorised as negative, 3 was categorised as neutral, and 4-5 as positive. The results of individual questions with similar themes were tabulated for composite ratings. Subsequently, the results were summed up under 4 themes: Knowledge of the communities (Q. 4-11,19); Experiential learning and confidence in patient management (Q. 12-15); Soft skills (Q. 3,13,16,17, 21); Choice of career (Q. 23, 24,25,27,28).

The cumulative ratings in each section were further stratified into low impact (<50%), moderate impact (50-75%) and high impact (>75%).The data collected was analysed using SPSS 25. Qualitative variables were reported as frequencies and percentages, and were compared using Chi-square or Fisher Exact tests, as appropriate. Quantitative variables were reported as means and standard deviations, and compared using independent sample t-test. P<0.05 was considered statistically significant.

Results

Of the 112 subjects approached, 52(46.42%) completed the questionnaire. Of the 52 subjects, there were 25(48.9%) males and 27(51.9%) females with overall mean age 25.4±3.8 years. Majority of the participants 35(67.3%) had attended a private first-tier medical school while 17(32.7%) had attended other local medical schools. At

Table-1: Demographic characteristics

| | |
|---|-----------|
| Age (Mean±SD) | 25.4±3.8 |
| Gender | n(%) |
| Male | 25(48.1%) |
| Female | 27(51.9%) |
| Level of Education | |
| Medical Student | 22(42.3%) |
| Medical Graduate | 30(57.7%) |
| Year of Graduation from Medical School | |
| 2005-2010 | 3(5.8%) |
| 2011-2015 | 7(13.5%) |
| 2016-2020 | 28(53.8%) |
| 2021-2025 | 14(26.9%) |
| Medical School Attended | |
| AKU | 35(67.3%) |
| Other | 17(32.7%) |
| Household Income | |
| <PKR150,000 | 18(34.6%) |
| >PKR150,000 | 34(65.4%) |

Table-2: Challenges faced in healthcare delivery at medical camps

| Challenges | Proposed Solution |
|--|--|
| <p>Shortage of resources/time</p> <p>Shortage of manpower/skilled medical personnel: Several medical students were interested in volunteering but only 2 students could be accommodated for every attending physician who were few.</p> <p>Time constraints: It was difficult to coordinate a time and day where every physician, medical student and ancillary staff who agreed to volunteer were free.</p> | <p>There should be a central directory of the staff and students who are interested in volunteering along with their 6-month availability in order to devise a schedule in advance.</p> |
| <p>Infrastructural Challenges</p> <p>Absence of infrastructure: The destinations for medical camps were often located in remote areas that lacked structures to hold medical camps in. Therefore, makeshift arrangements by the sponsoring NGOs consumed a lot of time.</p> <p>Transport: Owing to the remote nature of the destinations, appropriate measures for security had to be taken and transport had to be arranged by the NGOs.</p> | <p>The NGOs may collaborate with local schools and organizations to make these arrangements on-site.</p> |
| <p>Barriers to diagnosis</p> <p>Lack of technological support: The sites for medical camps often lacked necessities such as electricity as well as a medical equipment/access to laboratory. Hence, the clinicians had to rely solely on their clinical acumen to assess patients and decide for immediate management versus referral.</p> <p>Chances of inaccuracy of diagnosis: Relying solely on physical examinations and history in the absence of laboratory workup left a huge margin of error in diagnosis. Hence, the attendings had to be limited to experts in their respective specialty.</p> <p>Language barrier: Most of the patients only spoke their local regional language and therefore, arrangement of interpreters caused further delays.</p> | <p>A mobile laboratory equipped with conventional tests should be arranged and accompany the team at the camps. Secondly, algorithms for diagnosis and management under these special conditions need to be tailored and distributed among the medical staff in advance.</p> <p>Sponsoring NGOs should partner with local schools to arrange interpreters.</p> |

the time of participation in the survey, 28(53.8%) participants had graduated medical school between 2016 and 2020, 3(5.8%) between 2005 and 2010, and 7(13.5%) between 2011 and 2015, while 14(26.9%) were scheduled to graduate between 2021 and 2025 (Table 1).

Overall, 40(76.9%) subjects reported improved community knowledge, 44(84.6%) had experiential learning and confidence in outpatient management, and 49(94%) had improved soft skills (Figures 1-3). Besides, 21(40.4%) participants agreed to have been influenced to pursue a career in primary care, and 25(48.1%) reported a direct impact on their choice of career specialty (Figure 4). The respondents also identified challenges they faced at the medical camps and also suggested various solutions (Table 2).

Of the total, 18(34.6%) participants attended 1 camp per year, 27(51.9%) 2-4 per year and 7(1.5%) attended 5 or more. Further, 28(53.8%) participants had attended 1-5 medical camps in total, 13(25%) had attended 6, and 11(21.2%) had attended >10. The participants felt that attending the camps enhanced their medical education

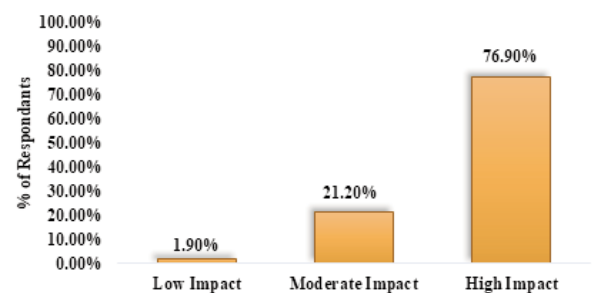


Figure-1: Knowledge of communities.

Table-3: Overall impact on the medical education of the participants.

| | Number of Medical Camps | | | P-value |
|---|-------------------------|-----------|----------|---------|
| | 1-5 | 6-10 | >10 | |
| Attending medical camps enhanced my medical education | 16(57.1%) | 10(76.9%) | 11(100%) | 0.034 |

(p=0.034) (Table 3).

The participants reported greatest improvement in their

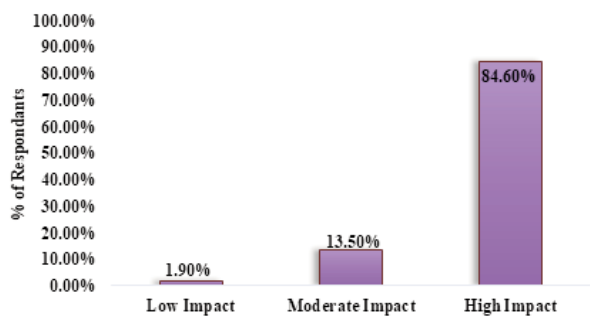


Figure-2: Experiential learning and confidence in patient management.

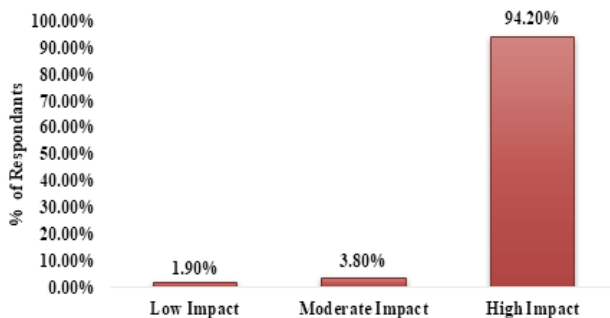


Figure-3: Soft skills.

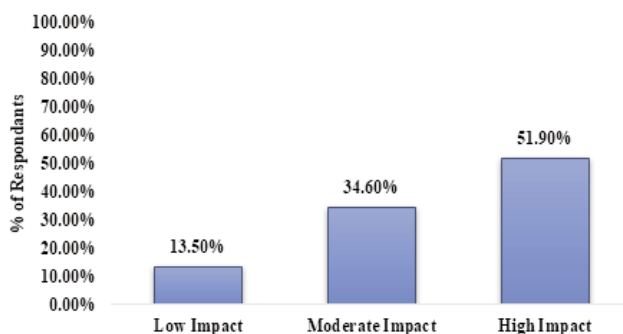


Figure-4: Choice of career

Table 4: Experience of participation with respect to gender distribution.

| Attending medical camps; | Male | Female | P-value |
|--|-----------|-----------|---------|
| Improved confidence on how to approach the community | 19(76%) | 26(96.3%) | 0.032 |
| Improved awareness and alertness | 15(60%) | 24(88.9%) | 0.016 |
| Developed more compassion for patients | 14(38.9%) | 22(61.1%) | 0.047 |
| Obtained wider clinical exposure to disease not routinely seen | 9(31.0%) | 20(69%) | 0.006 |

ability to work in groups 49(94.2%), followed by confidence in approaching the community 45(86.5%), and in their ability to work in resource-limited settings 41(78.8%).

Compared to males, more females reported improved awareness and alertness ($p=0.016$), increased confidence approaching communities ($p=0.032$), increased compassion towards patient care ($p=0.047$), and found the camps to be instrumental in providing exposure to the diseases not routinely seen in clinics ($p=0.006$) (Table 4).

Discussion

The current study found that most participants had positive feedback about the experience of attending medical camps, which is in line with literature¹⁷.

The camps help participants in combining theoretical knowledge with clinical scenarios in the community¹⁸ by allowing students to operate more autonomously, thus confirming that they direct their own learning⁷. Students also learn to complete the clinical and administrative tasks of running a clinic while understanding healthcare delivery systems. While the learning is deemed to be independent, students are always under direct supervision of a medical professional even though the fate of these camps depends largely on the medical students as they outnumber the involved leadership^{7,9}. Thus, these service-learning experiences are favoured over traditional classroom lectures⁹. However, there is a paucity of literature on what the minimal and the ideal duration of such community service should be for them to have an adequate impact on medical education.

The current study found enhancement in the education of the participants as the number of camps they attended increased. A study previously demonstrated the importance of domestic service learning trips at a border town between Arizona and Mexico⁸.

Majority of the current respondents indicated that the medical camps had helped them gain confidence in patient management and had improved their experiential learning. Such learning outside of a hospital environment adds to the knowledge about community-based health practice and inequities in healthcare access¹⁹.

Composite analysis also showed a definite enhancement in participants' empathy and communication skills as well as comprehension of other spoken languages, team work and awareness about limited resources available to such communities, as has been reported earlier as well^{6,20}. Students learn clinical skills and cultural competence while interacting with patients and fellow team members. Previous studies have shown a positive relation between patient satisfaction and health outcomes among physicians who practise empathy, altruism, sincerity and compassion^{10,12,18,21}. Several studies have mentioned

improvement in empathy score following volunteering in the communities^{18,21}. Similarly, participants of prior studies also reported improved awareness of privileges and surroundings, and perspectives of the elements of humanism in medicine following voluntary community service^{8,18}. Therefore, promoting and teaching such a behaviour should be a priority from the early levels of training, as such an experience is difficult to practise without concrete experiences^{10,21}. Students in two studies felt that such experiences in global medicine programmes are beneficial in reaching their final goal^{8,9}.

The camps played a role in determining the career choice of the participants in the current study. Several studies have shown that such service in the communities, whether as part of the curriculum or on a voluntary basis, leads the participants to broaden their choice of career⁸. Exposure to rural communities is not common among medical students based in urban settings with tertiary care hospitals as teaching centres. According to the alumni survey report of one of Pakistani institution from 2016, 81% served overseas, while only 9% of the total alumni served in rural areas²². Thus, a long-term study should be conducted to assess if such opportunities can bring about a change in these figures towards giving back to the underprivileged communities.

Furthermore, the current study found that more females developed compassion towards patients, felt confident in approaching communities, and reported improved awareness and alertness after attending the camps. A possible explanation for this is the increased likelihood of females to choose primary care specialties in their career. A study done in Spain reported an increased percentage of women in Family Medicine specialty even after controlling for family responsibilities and workload²³. A study discussed the emphasis placed on domesticity in Pakistan for female medical graduates — possibly propelling them to choose a career in primary care specialties²⁴. Therefore, future studies should investigate whether different career preference by gender can be extrapolated to explain the current findings.

Comparisons between current and previous data were found to be difficult because standardised assessment tools were missing at both ends. Besides, variations in sample size and study populations also made the task difficult. It is recommended that future research should focus on standardising the definition of medical camps, the degree of student involvement, stratification of the community of outreach, and the impact of medical camps on the attendees. Availability of such opportunities in a formal and accredited fashion would not only increase the participation of medical students, but also improve

community outreach and healthcare services.

The current study has a few limitations, the most notable being a small sample size. The information was collected using a self-reported questionnaire which can potentially introduce a bias. Despite the limitations, however, the current study, to the best of our knowledge, is a pioneering effort in the country, and lays a platform for further research on the topic.

Conclusion

Community-based clinical practice is an integral part of medical education. There was a positive impact on the volunteers regarding knowledge-based practice, experiential learning, soft skills and future specialty choice.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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Supplement - I

Demographics (results are displayed in the main manuscript)

Age (years): _____

Gender: M F

Stage of Career: Medical Student Intern
 In-Training (Resident, Fellow, MO/SMO) Consultant/Attending

Total number of Medical Camps Attended: 3 3-5 >5

Frequency of Medical Camps Attended: 1/year 2-4/ year
 Monthly Weekly

Monthly Household Income: < 100,000 100,000-300,000
 > 300,000

Section 1: Experience of Participation in Medical Camps

| | SD/D | Neutral | A/SA |
|---|-----------|-----------|-----------|
| 1. My educational experiences of the medical camps I attended matched my expectations | 1(1.9%) | 11(21.2%) | 40(76.9%) |
| 2. I enjoyed participating in the medical camps I attended. | | 2(3.8%) | 50(96.2%) |
| 3. I had positive interactions with the patients I encountered during the medical camps. | 1(1.9%) | 2(3.8%) | 49(94.2%) |
| 4. Attending camps has increased my clinical knowledge base. | 4(7.7%) | 11(21.2%) | 37(71.2%) |
| 5. During the camps, I felt like I was able to draw connections between what I saw/experienced in the community and my previous experiences/knowledge | 1(1.9%) | 9(17.3%) | 42(80.8%) |
| 6. This trip enhanced my ability to speak Urdu/local language | 5(9.6%) | 6(11.5%) | 41(78.8%) |
| 7. I was exposed to a variety of local opinions on community issues. | 3(5.8%) | 2(3.8%) | 47(90.4%) |
| 8. Attending camps has enhanced my knowledge of rural health. | 1(1.9%) | 4(7.7%) | 47(90.4%) |
| 9. Attending camps has enhanced my knowledge of alternative medicine and health. | 8(15.4%) | 10(19.2%) | 34(65.4%) |
| 10. Attending camps has enhanced my knowledge of issues that are unique to border communities. | 4(7.7%) | 5(9.6%) | 43(82.7%) |
| 11. I learned about the importance of involving the local community in the development/implementation of community programming | 2(3.8%) | 5(9.6%) | 45(86.5%) |
| 12. Attending camps has enhanced my ability to educate patients. | 1(1.9%) | 2(3.8%) | 49(94.2%) |
| 13. Attending camps has enhanced my ability to communicate with patients | 1(1.9%) | 6(11.5%) | 45(86.5%) |
| 14. Attending medical camps has enhanced my medical education. | 2(3.8%) | 15(28.8%) | 35(67.3%) |
| 15. The experience I have gained from attending these medical camps will help me/helped me be a better clinician. | 1(1.9%) | 4(7.7%) | 47(90.4%) |
| 16. The experience I have gained from attending these medical camps has allowed me to enhance my team interaction skills. | 1(1.9%) | 1(1.9%) | 50(96.2%) |
| 17. The experience I have gained from attending these medical camps has allowed me to enhance my community interaction skills | 2(3.8%) | 11(21.2%) | 39(75%) |
| 18. I saw and learned about health programs that had an impact on the local community | 4(7.7%) | 3(5.8%) | 45(86.5%) |
| 19. I am grateful for being able to participate in the medical camps | 1(1.9%) | 2(3.8%) | 49(94.2%) |
| 20. I had experiences while I was attending medical camps that made me aware of my privilege of access and/or social position as a medical student/professional. | 1(1.9%) | | 51(98.1%) |
| 21. Participating in medical camps has made me more aware of the prevalence of socioeconomic privilege within our society based on race, economics, and/or social position. | 1(1.9%) | 1(1.9%) | 50(96.2%) |
| 22. The experience I have gained from attending these medical camps has led me to consider working/work in a rural area | 8(15.4%) | 7(13.5%) | 37(71.2%) |
| 23. The experience I have gained from attending these medical camps has led me to consider working/work in an area with limited healthcare resources. | 5(9.6%) | 9(17.3%) | 38(73.1%) |
| 24. The experience I have gained from attending these medical camps has led me to consider pursuing/pursue a career in primary care specialties. | 19(36.5%) | 12(23.1%) | 21(40.4%) |
| 25. I continue to think about what I experienced and what I learned during the medical camps. | 5(9.6%) | 7(13.5%) | 40(76.9%) |
| 26. The experience I have gained from attending these medical camps has had an effect on where I practice. | 8(15.4%) | 12(23.1%) | 32(61.5%) |
| 27. The experience I have gained from attending these medical camps has had an effect on my choice of career specialty. | 17(32.7%) | 10(19.2%) | 25(48.1%) |

SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

Section 2: Areas of Improvement

Which of the following have you learned or improved on as a result of attending medical camps?

| | No | Yes |
|---|-----------|-----------|
| How to build rapport with a patient/family | 16(30.8%) | 36(69.2%) |
| Working in a group/teamwork | 3(5.8%) | 49(94.2%) |
| Confidence on how to approach the community | 7(13.5%) | 45(86.5%) |
| Awareness and alertness | 13(25%) | 39(75%) |
| History taking | 29(55.8%) | 23(44.2%) |
| Working in a resource-poor setting | 11(21.2%) | 41(78.8%) |
| Developed More Compassion for Patients | 16(30.8%) | 36(69.2%) |
| Management of Social Health Initiatives | 24(46.2%) | 28(53.8%) |
| Obtained wider clinical exposure to diseases not routinely seen | 23(44.2%) | 29(55.8%) |

Results of Correlation Analysis

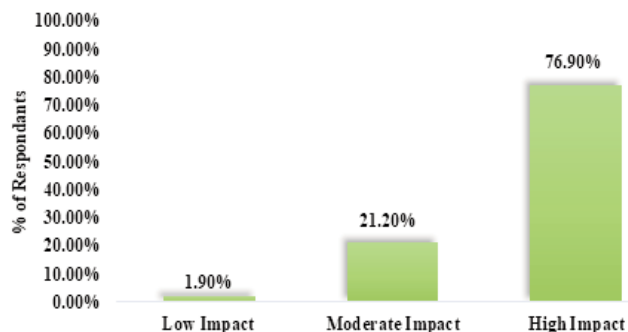
Table 1. Experience of participation by gender

| Attending medical camps; | Male | Female | P-value |
|--|-----------|-----------|---------|
| Improved confidence on how to approach the community | 19(76%) | 26(96.3%) | 0.032 |
| Improved awareness and alertness | 15(60%) | 24(88.9%) | 0.016 |
| Developed more compassion for patients | 14(38.9%) | 22(61.1%) | 0.047 |
| Obtained wider clinical exposure to disease not routinely seen | 9(31.0%) | 20(69%) | 0.006 |

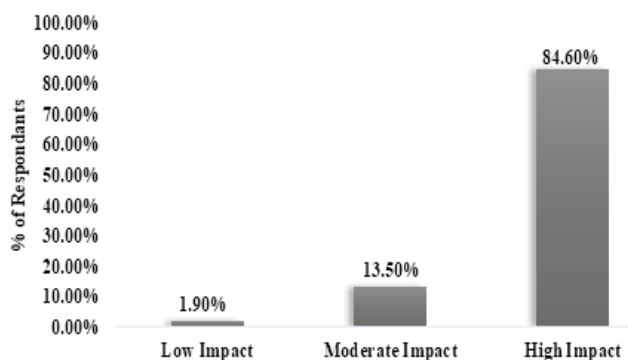
Table 2. Overall impact on the medical education of the participants

| | Number of Medical Camps | | | P-value |
|---|-------------------------|-----------|----------|---------|
| | 1-5 | 6-10 | >10 | |
| Attending medical camps enhanced my medical education | 16(57.1%) | 10(76.9%) | 11(100%) | 0.034 |

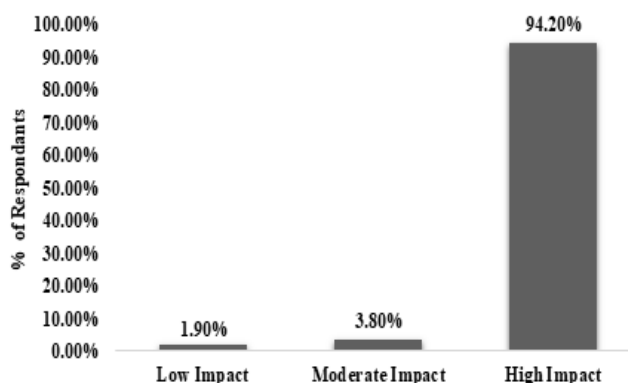
A. Knowledge of Communities



B. Experiential Learning and Confidence in Patient Management



C. Soft Skills



D. Choice of Career

