Perceptions of Medical Students Regarding Rural Residency: A Study at the Faculty of Medicine, Al Neelain University, Khartoum, Sudan, 2022

Moneer A. Abdalla[1] and Dafalla Alam Elhuda[1]

1 *Community Medicine Department, Al Neelain University, Khartoum, Sudan*

Abstract

Rural residency programs in medical education aim to prepare students for healthcare in underserved areas by enhancing their clinical skills, research capabilities, and teamwork. This cross-sectional study explores medical students' perceptions of rural residency at Al-Neelain University in Sudan. Data were collected through questionnaires administered to 110 students and interviews with experts. Findings indicate that rural residency improved students' knowledge, skills, and empathy towards rural health. However, challenges such as cost and faculty engagement were noted. Recommendations include increased funding, integration of rural residency into curricula, and further research to optimize program impact.

Keywords: Al-Neelain University, Rural health, medical education, student perceptions and Sudan.

1. Introduction

Rural residency programs are essential elements of medical education, especially in regions where rural populations face significant healthcare challenges. These programs are designed to prepare medical students for practice in underserved and remote areas by providing them with a deep understanding of the distinct health issues affecting these communities. At Al-Neelain University in Khartoum, Sudan, the Faculty of Medicine offers a rural residency program that aims to equip clinical-phase students with the skills necessary to address the health needs of rural populations. The program broadens students' perspectives on healthcare delivery, exposes them to the realities of working in resource-limited environments, and enhances their ability to provide primary healthcare in underserved areas. However, understanding medical students' perceptions of rural residency is crucial to improving the program's effectiveness and ensuring its relevance to future medical practice [1,2].

Studies have shown that students' attitudes toward rural medicine are influenced by multiple factors, including their previous exposure to rural settings, the perceived challenges of rural living and working, and the nature of their educational experiences in these environments. While some students consider rural

residencies as valuable learning opportunities, others may find them less appealing due to concerns about limited infrastructure, professional isolation, and restricted access to advanced medical technologies [3,4] . Exploring these perceptions is essential for refining rural residency programs and making them more attractive to medical students, especially in developing countries like Sudan, where there is a significant demand for healthcare professionals in rural regions.

In Sudan, a predominantly rural nation with numerous healthcare challenges, improving access to and quality of care remains a major concern. The healthcare system faces significant obstacles, including limited funding, a shortage of healthcare professionals in rural areas, and insufficient resources for delivering essential services in remote regions [5,6]. The government allocates a large portion of its healthcare budget to urban centers, leaving rural areas with inadequate infrastructure [7]. In this context, medical schools play a vital role in training healthcare providers who are capable of addressing these challenges. By exposing students to rural healthcare environments, medical schools can better prepare them for future service in underserved areas, thereby improving healthcare delivery and access in these regions [8].

Al-Neelain University's rural residency program offers students an immersive experience in real-world healthcare challenges, such as community diagnosis, health education, and providing basic services like sanitation and preventive care. Despite its potential educational benefits, students' perceptions of rural residency remain underexplored. Understanding how students view this experience is critical for refining the curriculum and ensuring that the program meets both educational goals and the healthcare needs of rural communities. This study seeks to explore medical students' perceptions of rural residency at Al-Neelain University’s Faculty of Medicine in Khartoum, Sudan, with the aim of providing insights to inform future strategies for rural medical education and improving the effectiveness of rural training programs [9,10,11].

2. Methods:

This study employed a quantitative, qualitative, descriptive cross-sectional design conducted at the Faculty of Medicine, Al-Neelain University in Khartoum, Sudan. The Faculty, established in 1998, offers a six-year medical program and is supported by Bashaeer Hospital, which contributes to both education and healthcare services. The study population consisted of clinical-phase medical students, specifically those in their fourth and fifth years who had participated in the rural health training program. A sample

size of 98 students was initially calculated using a formula based on the total population of 190 students, with an additional 5% added to account for non-responses, resulting in a final sample size of 110 participants. Voluntary response sampling was employed, and data were collected through closed-ended standardized questionnaires (pre-tested for quality) and expert interviews using a checklist. The dependent variables included factors such as residence, rural area, target population, days of training, training tools, and activities, while the independent variable was students' perceptions of rural residency. Background variables included age and sex. Data analysis involved univariate methods using Microsoft Excel and bivariate analysis using SPSS version 22. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used, with associations tested using chi-square and t-tests. A p-value of 0.05 or less was considered statistically significant. Ethical approval was obtained from the Institutional Review Board at the Faculty of Medicine, and verbal consent was obtained from all participants.

3. Results

3.1.Quantitative data

3.2.1. Participant Demographics

Data on the participants' gender was collected, as shown in Figure 1.

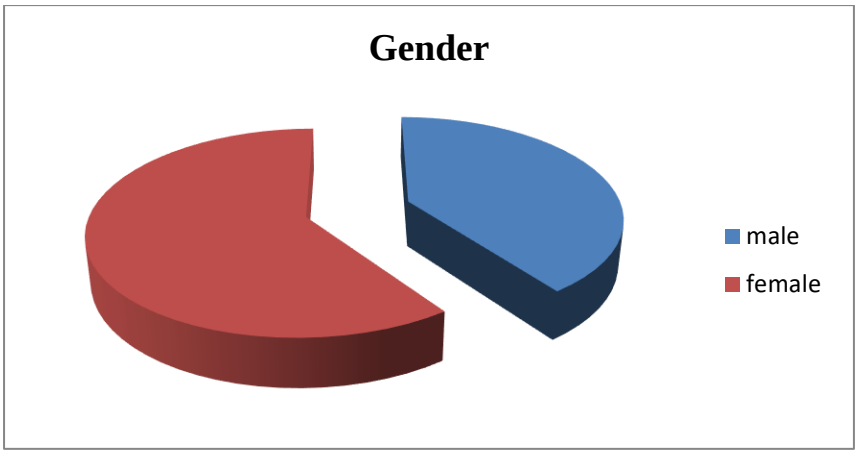

Fig.1: Distribution of the participant according their gender

The age distribution of the participants is presented in Table 1. The majority of participants (42.8%) were between 19-21 years old, followed by 40.9% aged 25 and above, and 16.4% were aged between 22-24 years.

Table.1: Distribution of the participant among their age

Age Group	Frequency	Percent
19 - 21	47	42.8%
22 - 24	18	16.4%
25 and above	45	40.9%
Total	**110**	**100%**

The participants' original home regions are depicted in Figure 2.

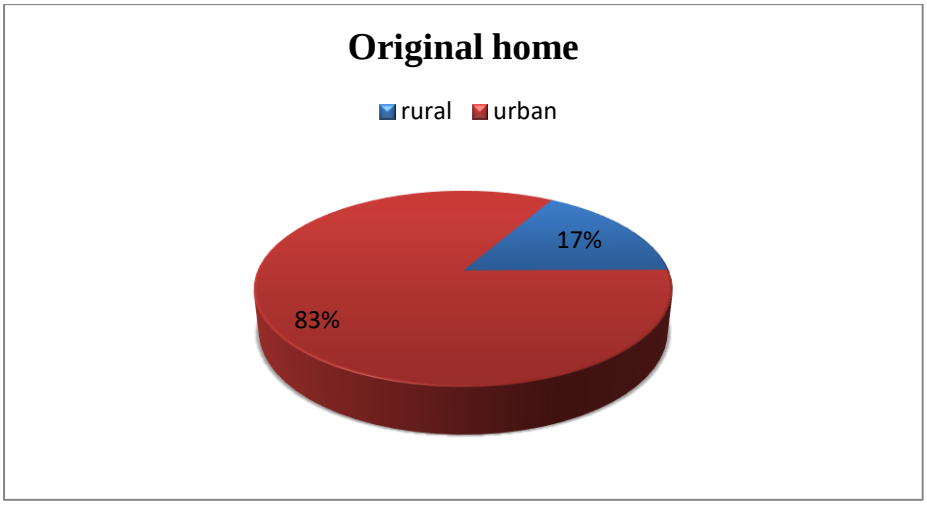

Fig.2: Distribution of the participant according their original home

The usefulness of the rural health training program was assessed, with the majority of students either strongly agreeing (39.1%) or agreeing (34.5%) that the program was beneficial. A smaller proportion strongly disagreed (17.3%) or disagreed (3.6%), with 5.5% of students remaining neutral, as shown in Table 2.

Table.2: Usefulness of Rural Health Training Program

Usefulness of Rural Health Training Program	Frequency	Percent
Strongly Agree	43	39.1%
Agree	38	34.5%
Neutral	6	5.5%
Strongly Disagree	19	17.3%
Disagree	4	3.6%
Total	**110**	**100%**

When asked about the adequacy of the rural residency duration, 32.7% strongly agreed that the period was adequate, and 30% agreed. However, 20% strongly disagreed, and 14.5% disagreed, with 6.4% remaining neutral, as shown in Table 3.

Table.3: Adequate Duration of Rural Residency

Adequate Duration of Rural Residency	Frequency	Percent
Strongly Agree	34	32.7%
Agree	32	30.0%
Neutral	7	6.4%
Strongly Disagree	21	20.0%
Disagree	16	14.5%
Total	**110**	**100%**

Participants' preferences for their place of work after graduation were explored in Table 4. The majority expressed a preference for working in regional areas (40%), followed by inner urban areas (30.9%). A smaller percentage preferred rural (20.9%) or remote areas (8.2%).

Table.4: Preferred Place of Work After Graduation

Preferred Place of Work After Graduation	Frequency	Percent
Regional	44	40.0%
Inner Urban	34	30.9%
Rural	23	20.9%
Remote	9	8.2%
Total	**110**	**100%**

Figures 3 and 4 illustrate participants' opinions regarding the role of rural residency in improving their knowledge and skills. The majority of participants agreed that rural residency contributed positively to both their knowledge and skills development.

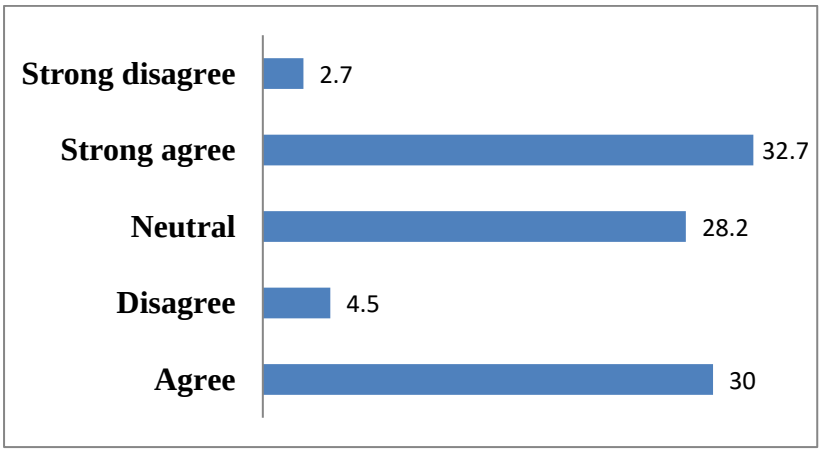

Fig.3: Distribution of the participants according to their opinion on the role of rural residency in improving students' knowledge

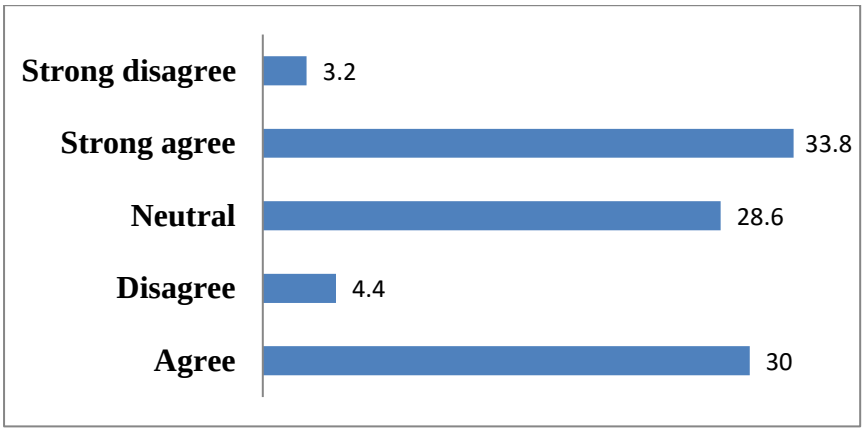

Fig.4: Distribution of the participant among their opinion toward role of rural residency in improve students' skills

Figures 5 and 6 show participants' views on the role of rural residency in improving collaboration between colleagues and in team building. Most participants acknowledged that rural residency had a positive impact on fostering teamwork and collaboration.

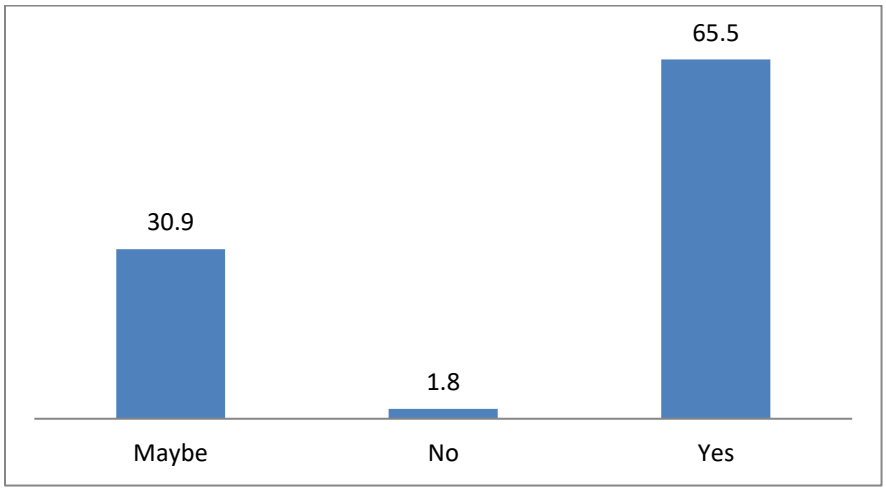

Fig.5: Distribution of the participant among their opinion toward role of rural residency in improves of collaboration between colleagues.

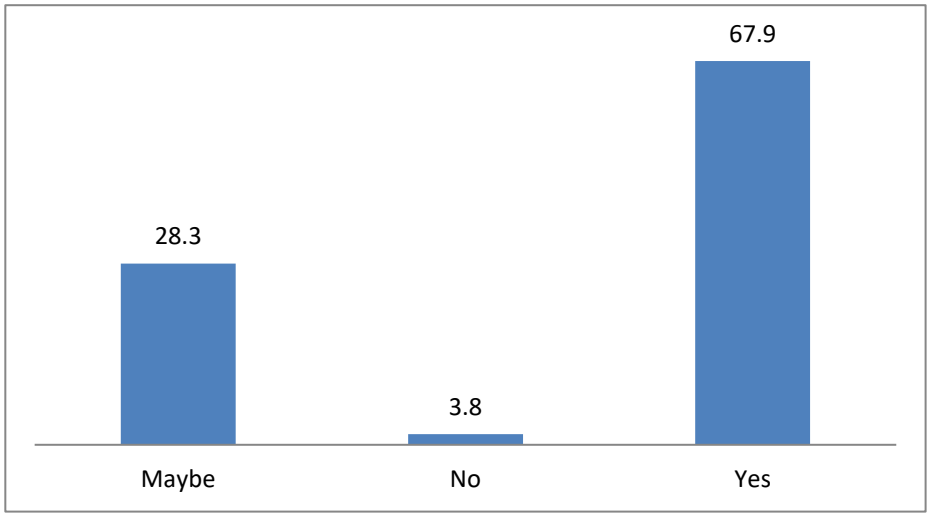

Fig.6: Distribution of the participant among their opinion on the role of importance of rural residency in team building.

3.3.Qualitative Insights from Expert Interviews

Dr. Abdelmageed Osman Musa *shared insights into the history and challenges of the rural residency program in Sudan. He highlighted that the rural residency initiative began at the University of Khartoum's Faculty of Medicine and was later adopted by other medical faculties in Sudan. The program aims to provide students with hands-on experience in rural areas, enabling them to develop clinical skills in low-resource environments, diagnose community health problems, and enhance their research abilities through field visits and reports.*

Despite these benefits, several challenges were identified, including the increasing cost of the program due to higher student enrollment and the limited involvement of physicians in supervising students. Moreover, changes in population dynamics and urbanization in rural areas have reduced the cost-effectiveness of the program.

Dr. Musa *suggested that while some medical colleges have shortened the duration or minimized visits to isolated regions, rural residency should continue in a modified format to ensure the development of community-based healthcare skills among students.*

4. Discussion

This was descriptive cross sectional faculty based study was conducted in at faculty of medicine, Al Neelain university 110 medical students including Sudanese and foreigners medical students were involved. Data was collected by self-administrative questionnaire; data was analyzed by using SPSS version 26. The majority of participants were originally from urban areas. More than half of them were females and the participants ranged in age from 16 to 25. More than two-thirds of participants agreed that rural residency was very useful for participating students this study is similar to some extent to a previous study conducted in the USA [12].

A little less than half of the participants stressed that this program increases students' skills and scientific information and develops a spirit of cooperation between them. Asking about the possibility of working after graduation in rural areas varied the participants' views, although the majority would prefer to work in the same areas. Nearly half of the participants agreed that rural residency strengthened the spirit of teamwork among the team. A study conducted by Farah and their colleagues suggested that there is some evidence from developed countries to document the success of community-based training programs, there is a dearth of similar studies from India [13-17]. But Study participants in these studies include general practitioners and not medical students. A critical review of North American studies found that rural experiences influenced students toward primary care specialties and rural practice. Students generally valued the experience and had a high degree of satisfaction. Although evidence supports the role of rural training in influencing practice site and career choice, it is not clear whether they reinforce preexisting interest or have ability to motivate previously uninterested students to consider careers in primary care or rural medicine [16]. Published literature from India on similar programs in other medical colleges is limited to descriptive points of view of faculty and students.[18,19] We did not find studies that generate evidence on the effectiveness of rural training for medical students. Acceptance of students by the local community and their participation in our program may be challenging and can be addressed by building and ensuring good rapport with community members and leaders. Meetings are held before each RHTP with local leaders to discuss student activities in villages, and village leaders provides logistic support for the community program. Faafetai*etal* [20] suggest that The need to train a competent health workforce to meet the needs of increasingly diverse communities is widely acknowledged [21–23]. Responsiveness to the patient's socio-cultural context is critical [24]. Researchers have examined cultural

competency and how best to train health professionals to meet the needs of diverse communities [25]. This immersion programmer enables students to experience the realities and context of a minority community "from the inside". Being part the community gave students the privilege to observe and learn about the challenges minority communities experience in efforts to improve their health. The Pacific Immersion Programmer allows student learning within a patient-centered cultural care model [26] in a community setting. The model emphasizes the need for doctors to recognize their own biases and assumptions. In addition to this, it incorporates aspects of the intersectional framework approach [27] which requires doctors to appreciate the importance of the patient's social context (the social determinants of health. [28].

5. Conclusion:

The results of our study show that rural residency training plays a role in improving the quality of student learning. This is backed by data that show that rural residency training not only increases subject knowledge but also plays a role in molding attitudes of students toward the care of people in rural areas and improves communication skills. increase in knowledge levels of the students. Reflections on the program by the students showed that it brought about positive change in attitudes. These learning 'have a long-term impact in shaping the careers of future doctors.

Recommendations:

- Policy Makers: Integrate rural residency into medical curricula nationwide.
- Ministry of Health: Offer incentives for graduates to serve in rural areas.
- Universities: Increase funding and faculty involvement in rural programs.
- Future Research: Conduct longitudinal studies to evaluate program impact on graduates' careers.

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