ORIGINAL ARTICLE

INTEGRATION OF RADIOLOGY IN THE MODULAR SYSTEM AT THE UNDERGRADUATE LEVEL

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Background: Integration of Radiology is challenging because in the traditional system it is introduced with a clinical subject while in an integrated curriculum, vertical integration of Radiology is done with anatomy in the first year and with pathology, forensic medicine, ophthalmology, ENT, gynaecology surgery, and medicine till the final year. This study was done with the purpose to evaluate Radiology teaching in an integrated curriculum in undergraduate students of Azad Jammu Kashmir Medical College/Sheikh Khalifa Bin Zaid Hospital Muzaffarabad. **Method:** This study was done to determine student's perceptions regarding Radiology teaching at Azad Jammu Kashmir Medical College (AJKMC), starting from the foundation module of the first year till the final year. It was a descriptive cross-sectional type conducted in the Radiology department of AJKMC. The study duration was six months. Students of final year and recent graduates were included in the study. All the information was collected on *pro forma*. *Pro forma* included 11 structured, close-ended, quantitative types of questions. Five points Likert scale was given starting from strongly agree to strongly disagree. Data was analysed by descriptive statistics. **Results:** In 100 students who gave feedback, the age range was from 23 to 26 year. Male students were 32 (32%) and female 68(68 %). 70% of students agreed and 14% strongly agreed for the integration of Radiology at the undergraduate level. Six percent students disagreed with the integration of radiology at the undergraduate level. **Conclusion:** Integration of Radiology in a modular system for undergraduate students at AJKMC was supported by the majority of participants.

Keywords: Radiology; Integrated curriculum; Undergraduates; Modular System

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INTRODUCTION

To medical students, radiology was just two weeks' rotation in the Radiology department in the final year in the recent past. In this era of dynamism, a lot of work is being done on curriculum development. Integration has not only beautified the curriculum but enhanced the role of Radiology in undergraduate teaching. The importance of integration of Radiology at the undergraduate level is recently highlighted in publications from the European Society of Radiology in the White Paper.[1–3]

Integration of Radiology is challenging because in the traditional system it was introduced with the clinical subject while in an integrated curriculum, vertical integration of radiology is done with Anatomy in the first year and with Pathology, Forensic Medicine, Ophthalmology, ENT, Gynaecology, Surgery and Medicine till the final year.

We worked on radiology integration in AJKMC and tried our best to fulfil this responsibility. Radiology should be integrated into the curriculum by specialized radiology leaders.[4]

This article is a reflection of the integration of Radiology at the undergraduate level which was implemented in AJKMC from first year to final year. Positive feedback from students is indicative that it is an important milestone in curriculum development.

MATERIAL AND METHODS

Multiple meetings of the curriculum committee were conducted before each module. Adequate time was allocated for Radiology in maximum modules. It was started from the introduction of Radiology and the importance of radiation protection, in the foundation module. Imaging modalities in Radiology and modern gadgets in imaging were introduced to sensitize students regarding its significance in clinical practice. Normal radiological anatomy in basic modalities (X Rays, Computed tomography) was correlated with Anatomy in small group discussions. Radiological features of common diseases were correlated with respective pathology topics. The significance of radiology in the determination of bone age and medicolegal problems were highlighted in the forensic module. Similarly, adequate time was given to the Radiology class in Ophthalmology, ENT, Gynaecology, Surgery and Medicine.

This cross-sectional study was held from June to November 2019, in which 100 *pro forma*

were distributed to final year students and recent graduates of AJKMC. They were requested to read it thoroughly and give feedback regarding Radiology teaching at the undergraduate level. The questionnaire included 11 close-ended quantitative types of questions. Their answer was according to the Likert Scale starting from strongly agree to strongly disagree. Where 5 strongly agreed and 1 disagreed and 3 was neutral. Data was analysed using SPSS 20.0.

RESULTS

Among 100 students who gave feedback, the age range was from 23 to 26 years. Male students were 32 (32%) and female 68 (68%) in this study. Seventy percent of students agreed and 14% strongly agreed for the integration of Radiology at the undergraduate level. In total, 94% gave positive feedback whereas 6% disagreed for the integration of Radiology at the undergraduate level. Table-1 gives an account of data on the questions.

Table-1: Positive feedback of students regarding radiology integration (according to *pro forma*)

Perception of Student	Number of Students (agreed)
Early exposure to radiology has a positive impact	94
Teaching strategies are adequate	70
Time allocation for radiology in each module is adequate	62
The concept of normal versus abnormal is well conveyed	60
Hospital equipment is at a satisfactory level regarding radiology teaching	36
Awareness regarding modern gadgets of radiology	35

DISCUSSION

This study revealed that early exposure of Radiology to undergraduate students has not only increased interest in the specialty but also enhanced the quality of the curriculum. Various advantages of integration of Radiology are documented by many authors. Branstetter *et al*. considered the positive impact of Radiology teaching in pre-clinical years.[5] It has also increased the rate of selection of Radiology as a research topic, elective rotation, and even as a carrier.[6] A sizeable number of our recently graduated students have opted for Radiology for post-graduation.

In AJKMC integrated curriculum was implemented, wherein the integration of Radiology was a unique experience. Multiple meetings of module planning teams were conducted in which the radiologist was a permanent member, integration of radiology was tailored according to student need at the undergraduate level. Adequate time was allocated in each module. Teaching strategies vary from large group interactive sessions, small group discussions, and case-oriented radiology teaching. Radiology was incorporated at the earliest level and it enhanced the impact of anatomy and embryology in initial modules.[7] Later on CORE (case-oriented radiology education) was implemented in clinical clerkships. The motivation of students is also an important aspect and assessment is a significant tool to attain the target. No separate radiology examination was conducted; instead, a small percentage was given to radiology in OSCE (objectively structured clinical examination)/ TOACS (Task-oriented assessment of clinical skill). Because of its radiology content was not neglected and was taken seriously by students.

High response from students of AJKMC in the form of positive feedback is justification for the integration of Radiology. Results show that 94% of students agreed to Radiology integration in a modular system. Similarly, a study conducted on Radiology integration at Albaha University Saudi Arabia showed student satisfaction of 92%.[8] In comparison to a study done by Christiane M, *et al* in which medical students criticized the lack of radiology teaching at the undergraduate level, junior doctors felt that less radiology teaching at the undergraduate level left them ill-prepared for medical practice.[9] This study also emphasizes the need for adequate radiology integration for undergraduate students.

The strength of the study is its uniqueness whereas the weaknesses include a small sample, descriptive design, and only one medical institution.

CONCLUSION

Integration of Radiology in a modular system for undergraduate students at AJKMC was a unique experience. It not only enhanced the impact of Radiology in the early years of medical education but also gave confidence to radiologists and enhanced the quality of the curriculum. Due to the development in imaging technology, it is a need of time that doctors should be well aware of it.

AUTHORS' CONTRIBUTION

IA: Concept and literature search. AA: Proof reading, data analysis. SHK: Data collection. FA, RB: Proof reading, data collection.

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