MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.6.405.409

OPEN ACCESS

Key Words
Digital pathology, medical curriculum

Corresponding Author
Sarandeep Singh Puri,
Department of Pathology, GS Medical College and Hospital, Hapur, UP, India

Author Designation
[1]Professor and HOD
[2]Professor
[3,4]Assistant Professor
[5]Dean/Principal

Received: 25 March 2024
Accepted: 30 April 2024
Published: 13 May 2024

Citation: Sarandeep Singh Puri, Neha Goel, Mr. Niraj Kumar Yadav, Gaurav Gautam and Pradeep Garg, 2024. Awareness about Digital Pathology Amongst 2nd year MBBS Students. Res. J. Med. Sci., 18: 311-315, doi: 10.36478/makrjms. 2024.6.405.409

Awareness About Digital Pathology amongst 2nd Year MBBS Students

[1]Sarandeep Singh Puri, [2]Neha Goel, [3]Niraj Kumar Yadav, [4]Gaurav Gautam and [5]Pradeep Garg

[1]Department of Pathology, GS Medical College and Hospital , Hapur , UP, India
[2]Department of Microbiology , GS Medical College and Hospital , Hapur, UP, India
[3]Department of Community Medicine , GS Medical College and Hospital , Hapur , UP, India
[4]Department of Pathology, Saraswati Institute of Medical Sciences, Hapur, UP, India
[5]Admin, GS Medical College and Hospital, Hapur, UP, India

ABSTRACT
Digital pathology plays a crucial role in teaching and education in rural settings by overcoming the challenges associated with limited resources and access to expertise. We conducted a study where a structured questionnaire was given to 2nd year MBBS students. To assess awareness, knowledge and perception about Digital Pathology amongst 2nd year MBBS students. The present study is a cross sectional study conducted at a rural based tertiary care medical college in Northern India. The participants in the study were 2nd year MBBS students who were given a questionnaire via a goggle form link. The goggle form was sent to them via social media app. Questionnaires were administered to 2nd year MBBS batch of 150 students studying Pathology. A total of 138 students responded to the questionnaire and the response rate was 92%.Our study showed that majority of students perceive that if traditional methods of learning are combined with digital Pathology related medium, students will be able to grasp the subject in a holistic manner. Overall once incorporated in teaching undergraduates in medical curriculum, digital pathology will enrich medical education by providing a flexible, interactive and accessible learning environment.

INTRODUCTION

Digital pathology plays a crucial role in teaching and education in rural settings by overcoming the challenges associated with limited resources and access to expertise. Our medical set up is based in a rural part of the country. Pathology as a subject has seen a paradigm shift in the way it is being taught and practiced across the world. With digitalisation things have become tech savvy[1,2]. The undergraduate medical curriculum is constantly evolving and it is required that teaching Pathology to undergraduates should be done with use of digitalisation. Our branch is a visually intensive and detail oriented discipline where diagnostic competence is based upon repeated visual experience. Digital Pathology provides access to educational resources, allows students to experience virtual microscopy, facilitates remote learning in rural settings, enables educators to seek expert consultations and second opinions remotely, engagement in continuing education programs, webinars and online courses and implementation of standardized teaching protocols[3,4]. We conducted a study where a structured questionnaire was given to 2nd year MBBS students to assess their awareness, knowledge and perception about Digital Pathology.

Aim of the Study: To assess awareness, knowledge and perception about Digital Pathology amongst 2nd year MBBS students.

MATERIAL AND METHODS

The present study is a cross-sectional study conducted at a rural based tertiary care medical college in Northern India. The participants in the study were 150 , 2nd year MBBS students who were given a questionnaire via a google form link. The google form was sent to them via social media app. The questionnaire was structured in a way to assess students' awareness, knowledge and perception about Digital Pathology. Data was analysed using SPSS version 27 and reported in tabulated form.

Observations: Questionnaires were administered to 2nd year MBBS batch of 150 students studying Pathology. A total of 138 students responded to the questionnaire and the response rate was 92%.

RESULTS AND DISCUSSIONS

Awareness about Digital Pathology as a medium for studying: 46/138 (33%) students were aware about Digital Pathology. 79/138(57%) were un aware about this modality, 13/138 (10%) answered maybe. (Fig. 1)

Usage of some version of Digital Pathology by student in their practical training: 22/138 (16%) students were using some version of digital pathology for studying whereas 116/138 (84%) students were not using any version (Fig. 2).

Awareness amongst students about various types of technologies used in Digital Pathology: Majority of students 80/138(58%) were not aware of any type of technology whereas 26/138(19%) knew about multi head microscope, 12/138 (9%) knew about large monitor, 6/138 (4%) knew about image projection from microscope, 4/138 (3%) knew about microscope with digital camera and 8/138 (6%) students were not much interested in this modality and 2/138 (1%) students did not answer this question (Fig. 3).

Type of tool of Digital Pathology used by students: Majority of the students 53/138 (38%) were using online lecture notes , 39/138(28%) were using Images and Tutorials with interactive tools, 23/138(17%) were using digital photomicrographs for understanding Pathology, 6/138(4%) were using multimedia in form of simulations and animations, 5/138(4%) were using app based virtual microscopy to understand slides, 3/138(2%) were not using any tools and 9/138 (7%) did not answer this question (Fig. 4).

Challenges faced by students while using Digital Pathology: 35/138 (25%) students felt that they could not find online training modules , 18/138(14%) felt images had low resolution, 9/138 (7%) felt low internet speed was a hinderance for them to use these digital modules, 7/138(5%) found that image storage was not possible for revision later on, 7/138(5%) faced lack of mobile/tablet/Laptop connectivity issues, 3/138(2%) felt that they could not share images. 57/138 (41%) opted for option "others" which is challenges not mentioned in the questionnaire. 2/138 (1 %) did not answer this question (Fig. 5).

Response of students whether Online teaching modules with high resolution images will help them in understanding Pathology better as a subject: Majority of students 119/138(86%) felt that online teaching modules with high resolution if incorporated in teaching will be helpful . 3/138(2%) disagreed and 15/138(11%) were neutral about this idea and 1/138(1%) student did not answer this question (Fig. 6).

Response of students whether Gross demonstrations via digital images will be better than the traditional demonstration of gross during Practical: Majority of students 77/138 (56%) felt that Gross demonstrations via digital images will be better than the traditional demonstration of gross during practical. 12/138 (9 %)

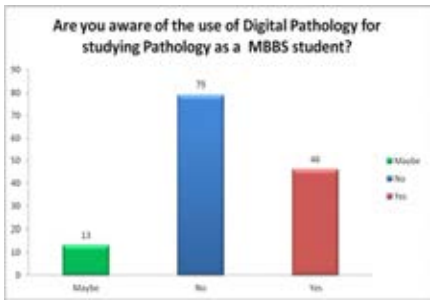

Fig. 1: Are you aware of the use of digital pathology for studying pathology as a MBBS student?

Fig. 2: For your pathology practical traning, are you currently using some version of digital pathology

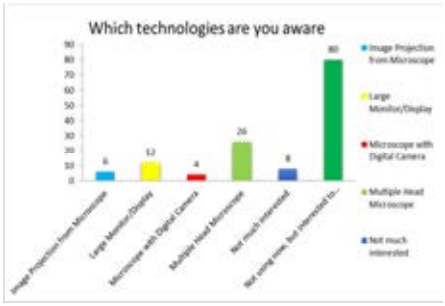

Fig. 3: Which technologies are you aware

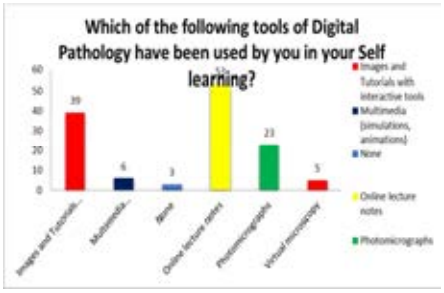

Fig. 4: which of the following tools of digital pathology have been used by you in your self learning

disagreed and 49/138 (35%) were neutral about this idea (Fig. 7).

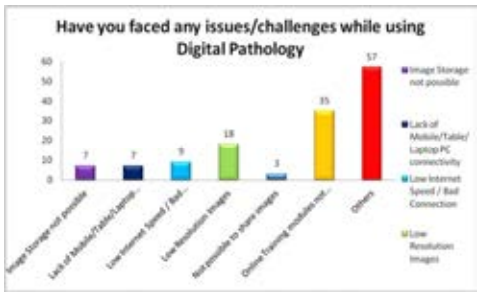

Fig. 5: Have you faced any issues/challenges while using digital pathology

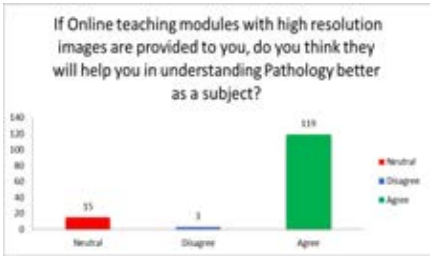

Fig. 6: If online teaching modules with high resolution images are provided to you, do you think they will help you in understanding pathology better as a subject?

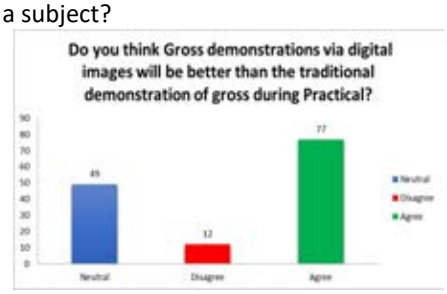

Fig. 7: Do you think gross demonstration via digital images will be better than the traditional demonstration og gross during practical?

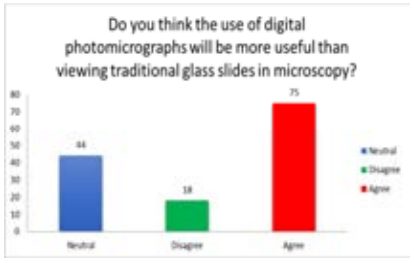

Fig. 8: Do you think the use of digital photomicrographs will be more useful than viewing traditional glass slides in microscopt?

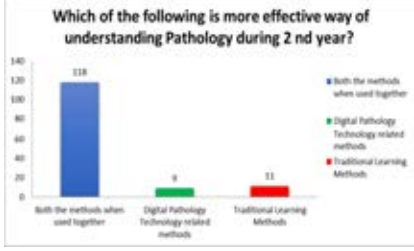

Fig. 9: Which of the following is more effective way of understanding Pathology during 2nd year?

Response of Students whether Digital Photomicrographs will be More Useful than Viewing Traditional Glass Slides in Microscopy: Majority of students 75/138 (54%) felt that digital photomicrographs will be more useful than viewing traditional glass slides in microscopy. 18/138 (13%) disagreed and 44/138 (32%) were neutral about this idea and 1/138 student (1%) did not answer this question (Fig. 8).

Response of Students to which is More Effective Way of Understanding Pathology During 2nd Year: Majority of students 118/138 (86%) felt that Traditional as well as Digital Pathology related methods if used together will help them in understanding Pathology better a s a subject. 11/138 (8 %) students felt traditional way of learning is better whereas 9/138 (6%) felt that Digital Pathology and its tools are much better in understanding Pathology. (Fig 9) With the rapid growth in use of technological means after Covid it can be said that Digital Pathology will have an edge in the future. It has an immense role in teaching as well as diagnostics. Digital pathology platforms provide a vast library of digitized slides and cases that can be accessed remotely[5,6]. In rural settings where access to physical slide collections may be limited, digital resources offer a broader range of teaching materials, including rare cases and diverse pathological conditions. This expands the learning opportunities for students and educators in rural areas . Digital pathology allows rural students to experience virtual microscopy, where they can study and manipulate digital images of tissue samples. This technology provides a simulated microscope experience, enabling students to learn and practice diagnostic skills without the need for physical slides and microscopes[7,8]. Digital pathology facilitates remote learning in rural settings. Students can access educational materials and participate in virtual classrooms, webinars and discussions from anywhere. This helps overcome geographical barriers and fosters collaboration among students and educators, even when they are physically separated. In rural areas, access to pathology experts may be limited[9,10]. Digital pathology enables rural students and educators to seek expert consultations and second opinions remotely. They can share digital slides with specialists, receive feedback and engage in interactive discussions, enhancing their learning experience and diagnostic capabilities. Digital pathology platforms offer opportunities for rural educators and students to engage in continuing education programs, webinars and online courses[11,12]. These resources help them stay updated with advancements in the field, expand their knowledge base and enhance their teaching and diagnostic skills. Digital pathology allows for the implementation of standardized teaching protocols in rural settings. Educators can create and share annotated digital slides, ensuring consistent teaching materials and approaches. Additionally, remote quality assurance programs can be established to monitor and maintain teaching quality and diagnostic accuracy. Digital pathology reduces the need for physical slide production, storage and transportation, resulting in cost savings for educational institutions in rural settings. It also optimizes resource utilization by enabling the sharing and reuse of digital materials among multiple educators and institutions[13,14,15].

Our study showed that majority of students perceive that if traditional methods of learning are combined with digital Pathology related medium, students will be able to grasp the subject in a holistic manner. Our study revealed that students will understand the subject better if Online teaching modules, digital gross images and digital photomicrographs of the slides are provided to students and discussed during lectures, practical classes. Our study depicted that majority of our students were using online lecture notes for self directed learning. Our study asked students for their valuable suggestions in context of Digital Pathology at the end of goggle form. The students suggested that Pictorial representation of histopathology will be helpful to them. Some students said that use of technology in pathology is an opportunity and it should be utilized and will create a more engaging environment and better understanding for students. Few students said that they face difficulty in interpreting finding in slides in a microscope and they will have more clarity in understanding histopathology slides in a digital format. Some students suggested that we should use more clinical based scenarios in a digital format where we show them clinical findings, gross, microscopic pictures and lab findings while explaining them a particular disease. Keeping this changing trend in mind it is very important for us as educators/ medical teachers to refine our skills and prepare ourselves to use these digital modalities. This change in our medical curriculum will be gradual and will require support and willingness of all parties involved so that we can bring out the best possible acumen in our students and ensure that they understand Pathology as a subject and develop critical thinking.

CONCLUSION

Overall, once incorporated in teaching undergraduates in medical curriculum, digital pathology will enrich medical education by providing a flexible, interactive and accessible learning environment. It will enhance student's engagement, expand educational resources and promotes collaboration and active learning. By leveraging digital

pathology, teaching in rural settings can become more accessible, interactive and collaborative. These benefits contribute to improving patient care and outcomes in under-served areas. It bridges the gap in resources, enhance educational opportunities, improve diagnostic skills and promotes continuous professional development for both students and educators.

REFERENCES

1. Nam, S., Y. Chong, C.K. Jung, T.Y. Kwak and J.Y. Lee *et al.*, 2020. Introduction to digital pathology and computer-aided pathology. J. Pathol. Transl. Med., 54: 125-134.
2. Chong, Y.,D.C. Kim, C.K. Jung and D.C. Kim, 2020. Recommendations for pathologic practice using digital pathology: consensus report of the Korean Society of Pathologists. J. Pathol. Transl. Med., 54: 437-452.
3. Stathonikos, N., M. Veta, A. Huisman and P.J. van Diest, 2013. Going fully digital: Perspective of a dutch academic pathology lab. J. Pathol. Inf., Vol. 4. 10.4103/2153-3539.114206
4. Cross, S.,P. Furness and L. Igali, 2018. Best Bractice Recommendations for Implementing Digital Pathology. London: The Poyal college of Pathologists. London, Pages: 43.
5. Bernard, C., S.A. Chandrakanth, I.S. Cornell, J. Dalton and A. Evans *et al.,* 2014. Guidelines from the canadian association of pathologists for establishing a telepathology service for anatomic pathology using whole-slide imaging. J. Pathol. Inf., Vol. 5. 10.4103/2153-3539.129455
6. Ho, J., S.M. Ahlers, C. Stratman, O. Aridor and L. Pantanowitz et al., 2014. Can digital pathology result in cost savings. a financial projection for digital pathology implementation at a large integrated health care organization. J. Pathol. Inf., Vol. 5. 10.4103/2153-3539.139714
7. Fraggetta, F., S. Garozzo, G.F. Zannoni, L. Pantanowitz and E.D. Rossi, 2017. Routine digital pathology workflow: The catania experience. J. Pathol. Inf., Vol. 8 .10.4103/jpi.jpi_58_17
8. Pantanowitz, L., A. Sharma, A.B. Carter, T. Kurc, A. Sussman and J. Saltz, 2018. Twenty years of digital pathology: An overview of the road travelled, what is on the horizon and the emergence of vendor-neutral archives. J. Pathol. Inf., Vol. 9 .10.4103/jpi.jpi_69_18
9. Al-Janabi, S., A. Huisman and P.J.V. Diest, 2011. Digital pathology: Current status and future perspectives. Histopathol., 61: 1-9.
10. Hamilton, P.W., Y. Wang and S.J. McCullough, 2012. Virtual microscopy and digital pathology in training and education. APMIS., 120: 305-315.
11. Harris, T., T. Leaven, P. Heidger, C. Kreiter, J. Duncan and F. Dick, 2001. Comparison of a virtual microscope laboratory to a regular microscope laboratory for teaching histology. Anatom. Rec., 265: 10-14.
12. Heidger, P.M., F. Dee, D. Consoer, T. Leaven, J. Duncan and C. Kreiter, 2002. Integrated approach to teaching and testing in histology with real and virtual imaging. Anatom. Rec., 269: 107-112.
13. Krippendorf, B.B. and J. Lough, 2005. Complete and rapid switch from light microscopy to virtual microscopy for teaching medical histology. Anatomi. Rec. New Anatom., 285: 19-25.
14. Gilbertson, J.R., J. Ho, L. Anthony, D.M. Jukic, Y. Yagi and A.V. Parwani, 2006. Primary histologic diagnosis using automated whole slide imaging: A validation study. BMC. Clin. Pathol., Vol. 6. 10.1186/1472-6890-6-4
15. Jukic, D.M., L.M. Drogowski, J. Martina and A.V. Parwani, 2011. Clinical examination and validation of primary diagnosis in anatomic pathology using whole slide digital images. Arch. Pathol. Lab. Med., 135: 372-378