ORIGINAL ARTICLE

The Perception on Pathology Museum in Learning Pathology: A Survey of Undergraduate Medical Students at the Universiti Kuala Lumpur Royal College of Medicine Perak.

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Abstract

Background: Pathology has traditionally been taught at medical schools through theoretical and practical teaching activities, oral lectures, clinical autopsies, and the display of macro-and microscopic specimens in pathology museums. On the other hand, the role of pathology museums has declined significantly in recent years. This study aimed to assess the perception of Bachelor of Medicine and Surgery (MBBS) students in using the pathology museum of the Universiti Kuala Lumpur, Royal College of Medicine Perak (UniKL RCMP) and its role in teaching pathology.

Methods: A cross-sectional study was conducted as an online survey on 284 MBBS students using a self-administered, questionnaire. The questionnaire include sociodemographic characteristics of medical students, their basic knowledge, attitude and their perception towards pathology museum. **Results:** The response rate to the online survey was 100% (n=284) Most respondents (n=265, 93.31%) had good perceptions of the pathology museum. Eighteen respondents (6.34%) were neutral about the pathology museum, and one respondent had a poor perception. Despite the good perception, about half (53.5%) of students only sometimes visit the museum.

Conclusion: The study revealed that undergraduate medical students of UniKL RCMP have a good perception of the pathology museum, and the highest frequency is seen in Year 5 (senior level) medical students. Students welcomed any improvement to the pathology museum, especially the incorporation of innovative technology.

Keywords: pathology museum, MBBS, perception, RCMP.

Introduction

A thorough understanding of pathology is essential for a successful medical practice. Pathology education aims to improve medical students' knowledge of the disease process and better to comprehend the clinical manifestations and treatment of diseases. Pathology has traditionally been taught at medical schools through theoretical and practical teaching activities, oral lectures, clinical autopsies, and the display of macro-and microscopic specimens in pathology museums.

Well-kept pathology museums are repositories for conservation and preservation of human pathologies and serve to raise disease awareness among students, instructors, and the public. Museums that maintain pathological collections of diseases that have been either entirely eradicated or are extremely rare in modern times provide crucial historical data to aid the current understanding of disease pathogenesis, prognosis, and clinical reasoning.^[1]

Pathology museums played a crucial role in medical teaching from the early nineteenth century to two decades ago by providing medical students with engaging and meaningful learning experiences. Pathology museums display fully labelled pathologic and forensic specimens placed in formalin-based solutions in glass jars. This environment supports effective self-study as medical students can study gross specimens and microscopic images in person. The confines of these museums' physical spaces also support small group teaching via tutorials and practical classes and promote genuine specimen research. An effective pathology museum should be well organized, appealing, and updated regularly to achieve quality perfection.^[2]

Despite their established value, the role of pathology museums in medical education has declined significantly in recent years, following breakthroughs in information technology and web-based learning that have altered how students learn and communicate. According to Diane Kenwright et al [6], one of the factors that cause these roles of pathology museum to

diminish is that the progression of today's technology causes all the information to become easily accessible and can be found digitally. In addition, the virtual museum today also consists of 360 degrees rotatable representation of unlimited specimens compared to the physical pathology museum.^[3] As a result, several medical schools have closed their museums. Some schools gradually donated their pathology collections and converted former museum spaces into additional classrooms, lecture halls, and laboratories.

In the UniKL RCMP pathology museum, student attendance has recently declined. We designed the study to evaluate the perception of the Pathology Museum and its role in pathology education among the medical undergraduates' of UniKL RCMP. Insights of this study may help identify steps to encourage students' use of the pathology museums.

Materials and methods

We conducted a cross-sectional, descriptive study as an online survey among UniKL RCMP's undergraduate Year 2 to 5 students. The study excluded the Year 1 students as they lacked exposure to pathology lessons at the time of the survey. The study period was from 27 December 2021 until 21 January 2022. At the time of the study, the total enrolment was 546 students: Year 2 (n=152), Year 3 (n=150), Year 4 (n=144) and Year 5 (n=101). The proportional sample size was determined using Version 3.01 of OpenEpi, followed by 90% of frequency from the study.^[2] 5% of absolute precision, and 1.0 for standard sampling. The study sample size of 274 students required a 99.99% confidence level. To account for the possibility that the response rate may be less than 100%, we added another ten invitations, totaling to 284 participants (n = 284). 284 participants were divided equally among the 4 year batches, subjected to stratified random sampling, and resulted in 71 participants per year. A questionnaire was developed in English and pre-tested with 10 MBBS students and

adjustments were made for better understanding of the questionnaire. The questionnaire consisted of 3 sections in which the first section consisted of basic demographics data, the second section consisted of students' knowledge and attitude and the third section consisted of students' perception towards pathology museum. The online survey was posted on the Google Forms platform, and participants' invitations were sent to students via the WhatsApp messaging platform.

All respondents in the survey were required to answer four questions reflecting their perception of pathology museums (please see Supplementary Material). The scoring for perception was as follows: Poor: 0- 7, Neutral: 8-13 and Good: 14-20. (Table 1). The mean perception for poor is 1, neutral is 2, and good is 3. A Student T-test was performed, level of significance was obtained at p<0.05.

All submitted data were summarized in Microsoft Excel (total number and percentage) and analyzed with the Statistical Package of Social Science (SPSS) software version 26. Student T-test and Chi square test was performed to identify the association of categorical data. The ANOVA test was performed on the ordinal data to detect statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable.

Respondents included in the analysis had provided written consent to participate in the study.

Results

The response rate was 100%, following submitted responses to all 284 surveys distributed online. (Table 2) shows the sociodemographic profile of respondents. 68% (n=193) are female, while 32% (n=91) are male. Table 3 shows most MBBS students (42.3%) preferred practical based learning of pathology, followed by lectures (25.7%), pathology museum (17.6%), internet (8.5%), books (5.6%) and the least was utilizing

videos (0.4%). There is no significant difference between year of study and the preferred way of studying pathology (p=0.172).

Table 4 shows slightly more than half of medical students (53.5%) sometimes visit the pathology museum while 39.4%, which was quite substantial, had only one visit to the pathology museum.

The less frequent visits are due to several reasons, including restricted time (68.3%; n= 194), isolated location (61.6%; n= 175) and lack of interest (46.5%; n= 132).

Many students (72.2%; n= 205) agreed on the suggestion to incorporate innovative technology into the pathology museum for improvement. In addition, more than half of the respondents agreed on the suggestions to add labelling or tagging, information on specimens (58.5%), adding more specimens (62%) and quizzes as an interactive way of learning in the pathology museum.

The is no correlation between gender and the perception of MBBS students on pathology museum in learning pathology (p value = 0.785), but there is a correlation between year of study and the perception (p value = 0.045). Regarding the perception towards pathology (Figure 1 and Figure 2), most of the respondents (93.3%, n= 265had good perception, 18 respondents (6.3%) had a neutral perception, and only one female respondent (0.35%) who was in year 4, had poor perception.

Figure 2 depicts the association between the academic year of study and students' perception of the pathology museum. Among the respondents with good perception of the pathology museum the highest were Year 5 respondents (24.6%; n=70), followed by Year 2 (24.3%; n=69), Year 3 (22.9%; n=65) and Year 4 (21.4%; n=61).

Discussion

This study established that most undergraduate medical students had a favourable perception of UniKL RCMP's pathology museum for the learning of pathology. The finding is similar to a study conducted in New Delhi, India, where 87.9% leakage). Some respondents thought that lack of of the students agreed that pathology was essential for clinical practice, and 92.2% agreed that the museum was a "silent teacher".^[5] Moreover, in a poll conducted by Chatein et al., 93% of students also believed pathology had a significant role in modern medicine and strongly agreed that pathology museums should be emphasized to function as pathology learning centers.^[6]

Most of the students, despite their seniority and genders, choose practical class as the most preferred way for learning pathology. Practical classes and pathology museums are closely related since both methods require visual stimulation and illustrations for students to see and focus on the gross and microscopic organ samples physically. This finding correlates with Ahmed Alsoufi, which stated that student absenteeism at lectures and reliance on private lessons are significant concerns for many universities worldwide.^[4] Listening to lectures is entirely in contrast to the pathology museum teaching method, which actively combines theoretical lectures with practical sessions in the same classroom setting.

Generally known, most respondents are clinical year students (year 3 to 5) who have a packed schedule and spend most of their time in the hospital. Besides, the respondents have limited free time due to the packed class schedule. In addition, the pathology museum is in an isolated location located at level 3 of the main building UniKL RCMP. This nonstrategic spot causes the students to have less interest in visiting the pathology museum than the anatomy museum, which is on the first floor of its building that is easily accessible. Apart from the location of the

pathology museum, there are also other reasons which are the museum's condition itself, such as shortage of specimens, poor arrangement of the specimen, lack of tagging, microscopy, and chart information, lack of space, poor lighting, and deteriorated specimens (discoloration and interest was the reason for not visiting the pathology museum. Based on the survey, we found that the students preferred that the incorporate innovative pathology museum technology.

Hence, to overcome the problem, a few improvements have been agreed upon by the respondents: incorporating innovative technology, adding labels and information on specimens, adding more specimens, adding quizzes for an interactive way of learning, and improving on space and lighting.

Julio A Diaz Perez also suggested that those specimens should be completely labelled such that medical students can view and study them in a self-guided fashion.^[7]

Conclusion

The findings of this study supported the hypothesis that the level of experience of the medical students and not the gender influences medical students' perceptions of UniKL RCMP's pathology museum. Pathology museums should improve its environment and ensure that specimens are well labelled so that students and faculty can benefit from its resources. The pathology museum should also introduce interactive technology such as audio-visual aids, QR codes for specimens and a pan-tilt-zoom camera to assist the learning process.

Ethical approval: This research obtained approval from Medical Research Ethics of Committee UniKL RCMP: UniKLRCMP/MREC/2021-2022/SSM-182.

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Declaration: The manuscript has been read and approved by all the authors. The requirements for authorship have been met, and each author believes that the manuscript represents honest work.

Total score	Category
0-7	Poor perception
8-13	Neutral perception (neither good nor poor)
14-20	Good perception

Table 1. Response categories

Table 2.	Sociodemos	graphic i	profile of 1	respondents.

	Ye	ar 2	Ye	ear 3	Ye	ear 4	Ye	ear 5	T	otal
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Male	21	7.39	24	8.45	24	8.45	22	7.75	91	32.0%
Female	50	17.6	47	16.65	47	16.65	49	17.25	193	68.0%
Total	71	25%	71	25%	71	25%	71	25%	284	100%

	Most preferred way to learn pathology							
	Books	Internet (Website, Apps)	Lectures	Pathology museum	Practical	Videos	Total	Significance
Year of study	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	Pearson Chi-Square
Year 2	3 (4.2)	3 (4.2)	19 (26.8)	15 (21.1)	31 (43.7)	0 (0.0)	71 (100)	p= 0.172
Year 3	4 (5.6)	12 (16.9)	18 (25.4)	14 (19.7)	23 (32.4)	0 (0.0)	71 (100)	
Year 4	3 (4.2)	7 (9.9)	20 (28.2)	11 (15.5)	29 (40.8)	1 (1.4)	71 (100)	
Year 5	6 (8.5)	2 (2.8)	16 (22.5)	10 (14.1)	37 (52.1)	0 (0.0)	71 (100)	
Total	16 (5.6)	24 (8.5)	73 (25.7)	50 (17.6)	120 (42.3)	1 (0.4)	284 (100)	

Table 3. Preferred way to learn pathology. 4 1

Table 4. Frequency of visit to pathology museum.

	Frequency of visiting pathology museum					
	Frequently	Sometimes	Once during orientation week	Never	Total	
MBBS	n (%)	n (%)	n (%)	n (%)	n (%)	
students	8 (2.8)	152 (53.5)	112 (39.4)	12 (4.2)	284 (100)	



Figure 1. Perceptions of the pathology museum, based on gender.



Figure 2. Perception of students towards pathology museum, based on year of study.

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Supplementary materials:

Questionnaire

Socio-demographic	Name
	Year of study: a) Year 2, b) Year 3, c) Year 4, d) Year 5
	Gender: a) Male, b) Female
Questions on students'	What are the ways you like to learn pathology? (Choose as many as
basic knowledge and	possible)
attitude towards pathology	1. Books
museum.	2. Online website
	3. Lectures
	4. Practical
	5. Pathology museum
	6. Others
	Which of the ones you chose is the most preferred way?
	1. Books
	2. Online website
	3. Lectures
	4. Practical
	5. Pathology museum
	6. Others
	Frequency of visiting pathology museum.
	1. Frequently
	2. Sometimes
	3. Once during orientation week
	4. Never
	Reasons of visiting pathology museum.
	1. Own interest
	2. Required to visit (practical classes)
	3. Others
	Less medical students visit our pathology museum. What are the
	reasons you can think of?
	1. Isolated location
	2. Shortage of specimens
	3. Poor arrangement of specimen
	4. Lack of tagging, microscopy, and chart information
	5. Restricted time
	6. Lack of interest

	7. Lack of space and poor lighting
	4. Smell of formalin
	5. Deteriorated specimen (discolouration and leakage)
	6. Staffs are unavailable
	7. Others
	Preferred time to visit pathology museum.
	1. During break hours
	2. During office hours
	3. Weekend
	From students' perspective, what are the suggestions that can be made
	to improve the pathology museum?
	1. More specimens
	2. More model and information charts
	3. Add labelling/tagging of specimen
	4. Adequate space and lighting
	5. Orderly arrangement
	6. Installation of innovative technology (audio-visual aids)
	7. Add quizzes for interactive way of learning
Questions on students'	Five point likert scale
perception towards	
pathology museum	Pathology museums are tools to understand the concept of basic
	pathological process which is important in clinical practice
	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly
	disagree
	Learning pathology is effective through visiting pathology museum.
	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly
	disagree
	I am willing to visit pathology museum if there are improvements.
	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly
	disagree
	Do you agree that physical museum is better than virtual museum?
	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly
	disagree