

Medical Photography: Practices of Graduate Students at Makerere University

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Medical photography is a specialized genre of photography concerned with taking photographs beneficial to medical practice. This study aimed at delineating trends in medical photography practices among graduate students at Makerere University in Kampala, Uganda. Data suggest most graduate students first encounter medical photographs in their classes (68.1%), although some had taken their own medical photographs (13.5%), primarily using their mobile phone (81.6%). However, the majority of the photographs (66%) were taken by their colleagues.

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Keywords

Medical photography, photography trends, clinical photography, photography sharing, photography smart technologies

Introduction

The basic aim of medical photography is to create substantial evidence. (Emery 2003) Consequently, medical photographs illustrate and communicate medical conditions, concepts and/or procedures visually, either as still photographs, or as video. This can be for the purpose of education or training, publication, and as part of the patients' hospital record.

Traditionally, image production had been accomplished using different techniques of drawing and painting. This was a monopoly of a few talented artists. Among the famous artists remembered for studying the human body construction, as well as its mechanics, was Leonardo Da Vinci. He achieved this through dissection and his ability to draw and illustrate tissues accurately. (Jones 2012) With the introduction of the camera, image production was made possible for a wider group. According to Mitchell (1992), as cited by Cummins (2007), the camera brought with it an increased rapidity and ease of production, a new standard of precision, and a more experimental approach to composition and subject matter were realized.

Since its introduction at Makerere University Medical School in the 1950s, medical photography has evolved from black and white photographs of surgical specimens to photography of patients. Professional medical photography in Uganda commenced in 1960 with the recruitment of an expatriate who introduced patient photography. (Ssegujja 2001) However, over the years, the number of trained medical photographers has not grown proportionately to the other health professionals who are the main consumers of medical photographs. With ten universities training health professionals, only Makerere University is training medical illustrators and biomedical communicators, thus widening the gap of availability. Between 2012 and 2016, of the 2198 health professionals that graduated from Makerere University College of Health Sciences, only three graduated as biomedical communicators. (Mak PDD 2016) This gap has increased the use of photographs from the internet and those taken by unskilled photographers. These sources have presented challenges such as copyright infringement, ethical violations, as well as substandard image quality by the practitioner.

In recent times, advances in photographic technology, as well as its availability to the general population, has had an effect on the number of photographs taken. This trend has changed sharing patterns, and as a result, photography practices in general.

Based on the above literature, there was a need to evaluate medical photography practice among students at Makerere University. This assessment would determine the sources and quality of photographs available or being utilized, leading to the formulation of policies enabling improvements to the medical photography field.

Methods

This was a cross-sectional, descriptive study conducted at Makerere University College of Health Sciences. Participants were graduate students who had one year or more in training. Postgraduate students in their second year, or above, were selected for the study because they had already conceptualized their research areas and had completed more clinical work.

Those study programs which include medical photography embedded within the training, those programs that did not extensively use medical photographs, or individuals that did not consent to study participation were excluded.

A questionnaire adapted from (WHO 2008) was used for data collection. It was comprised of both open-ended and close-ended questions. Research assistants delivered the questionnaires to the participants. Data were entered into EpiData version 3.1 (EpiData Association, Odense, Denmark) then exported to SPSS 16.0 (IBM Corp., Armonk, New York, USA) for analysis of both descriptive and inferential statistics.

This study received ethical review and approval from the Makerere University School of Biomedical Sciences Higher Degrees Research and Ethics Committee. Informed consent was sought from every participant prior to study enrolment. The participants that provided consent were given a questionnaire to complete.

Results

Demographic characteristics of participants

Only 141 of 218 participants completed and returned the questionnaire, providing a response rate of 64.7%. Study participants were enrolled in 14 of 26 programs, the majority studying General Surgery 37/141 (26.2%), Pediatrics and Child Health 21/141 (14.9%), as well as Obstetrics and Gynaecology 20/141 (14.2%). The majority were male 93/141 (66%). The dominant age group was 30 year and under, contributing 48.2% of participants. (Figure 1) Study programs were grouped into surgical 84/141 (59.6%) and non-surgical 57/141 (40.4%).

Accessibility

Exposure to Medical Photography

The first medical photography encounters among the participants were in class 96/141 (68.1%), in a journal 16/141 (11.3%), from visual aids in theatre, and in laboratories 13/141 (9.2%). Other sources included the internet, textbooks, colleagues and the Department of Medical Illustration.

The participants' perception of those who took medical photographs reported that fellow postgraduate students very often took medical photographs 93/141 (66%); while 55/141 (39%) reported that personnel from the Department of Medical

Illustration was never involved in the medical photography process. (Figure 2)

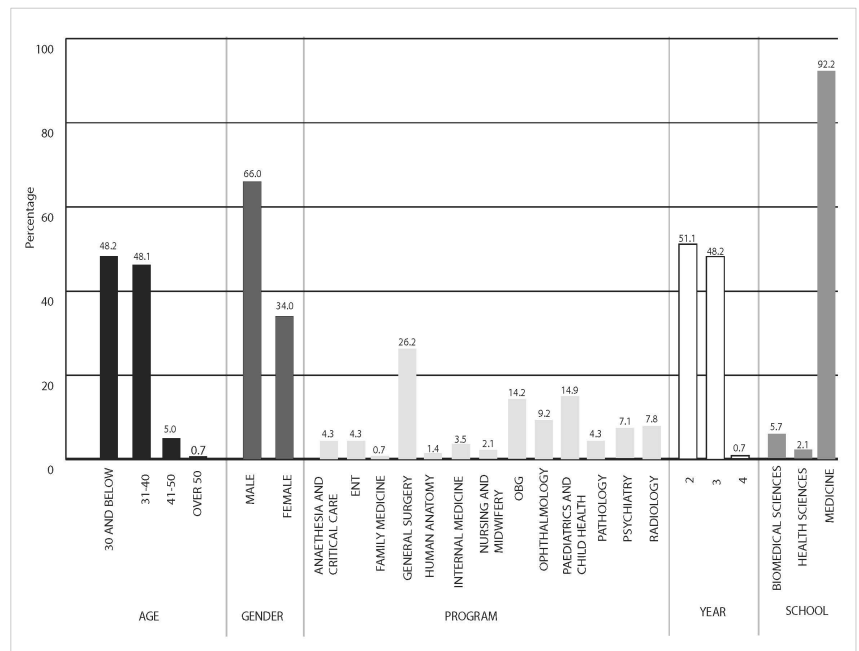


Figure 1. Demographics of participants.

Other individuals reported to take medical photographs included nurses, journalists, theatre staff, and undergraduate students.

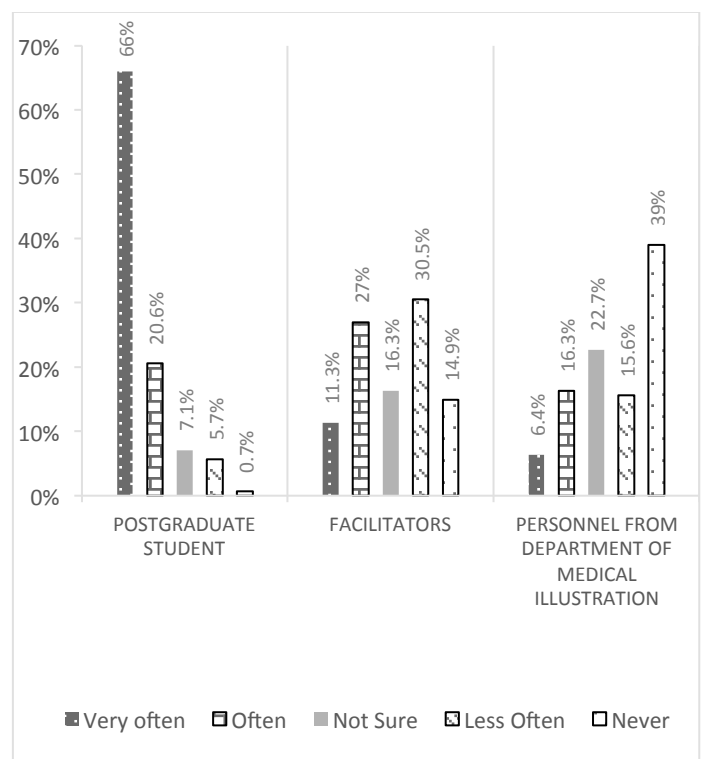


Figure 2. Participant perception about main categories of people who take medical photographers.

Source of photographs

A few of the participants 19/141 (13.5%) took their own photographs. The majority of participants 115/141 (81.6%) retrieved their photographs from the internet. The frequency of accessing this source was on a weekly basis among 68/141 (48.2%). (Table 1)

Sources of Medical Photographs	Frequency	Percentage
Internet	115	81.6
Take my own	19	13.5
Taken by Colleagues	7	5.0
Journals	1	0.7
Text Books	2	1.4

Frequency of retrieving medical photographs	Frequency	Percentage
Daily	39	27.7
Weekly	68	48.2
Monthly	27	19.1
Yearly	6	4.3
Never	1	0.7

Table 1. Availability of Medical Photography.

Equipment

The mobile phone 115/141 (81.6%) was the most frequently used device for taking medical photographs by participants. (Figure 3) Other devices included the video camera and tablet.

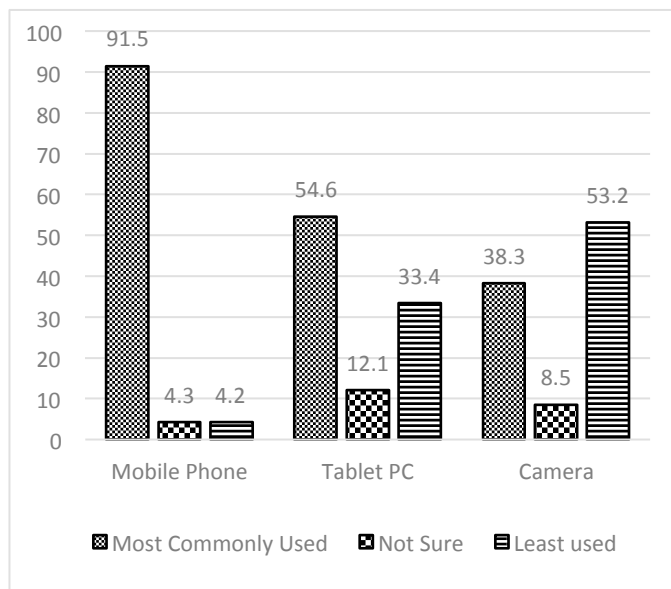


Figure 3. Equipment commonly used for taking medical photographs.

Photography sharing patterns

Over 82% of participants reported that they very often shared their medical photographs with fellow postgraduate students, 2.2% said they never share medical photographs with fellow postgraduate students. (Figure 4)

The source of medical photographs and sharing patterns indicated that 113 of participants that downloaded photographs from the internet, shared them with fellow postgraduate students, while only six shared photographs taken by their colleagues. (Table 2)

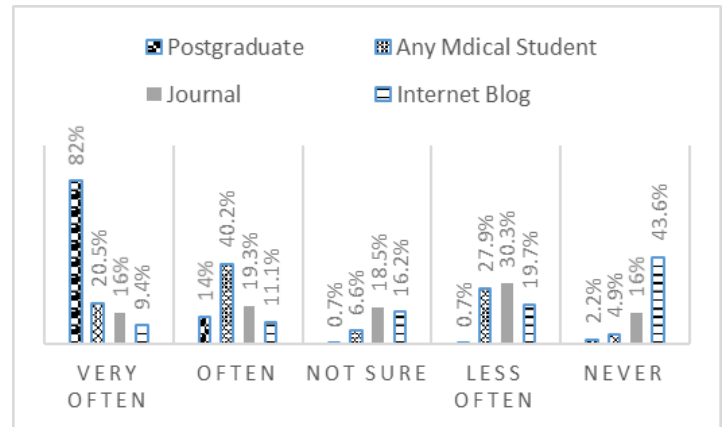


Figure 4. Summary of frequency of dissemination of medical photographs by Postgraduate students.

	Yes	No
Shares photographs with fellow Postgraduate students, sourced from:		
Internet	113	2
Take my own	17	2
Taken by Colleagues	6	0
Shares photographs with any medical student sourced from:		
Internet	68	41
Take my own	7	11
Taken by Colleagues	3	2
Shares in journals		
Internet	33	62
Take my own	7	11
Taken by Colleagues	2	3
Share on a blog		
Internet	21	77
Take my own	4	15
Taken by Colleagues	0	5

Table 2. Medical photography source and sharing patterns among participants.

Association of demographic characteristics and practicing medical photography

Bivariate analysis revealed that the gender of the participants, program of study, and year of study were statistically significant (95% confidence interval) for practicing medical photography. Male participants (OR; 5.14, 95% CI; 1.14-23.29) were 5.14 times more likely to have taken their own medical photographs compared to their female counterparts. Participants in surgical programs (OR; 34.24, 95% CI; 2.02-579.82) were 34.24 times more likely to practice medical photography compared to those in non-surgical programs. Participants in their second year of study (OR; 133.00, 95% CI; 3.68-4802.37) were 133 times more likely to practice medical photography than their fourth-year counterparts. (Table 3)

Variable	Practicing medical photography		OR (95% CI)	P-value
	Yes (n=19)	No (n=121)		
Age				
≤30	8	60	1.0	
31-40	9	56	0.83(0.30 - 2.30)	0.72
41-50	2	5	0.33(0.06-2.01)	0.23
>50	0	1	0.42(0.02-11.20)	0.39
Gender				
Male	17	76	1.0	
Female	2	46	5.14 (1.14-23.29)	0.03*
Program				
Surgical	19	65	1.0	
Non- Surgical	0	57	34.24 (2.02-579.82)	0.01*
Year of Study				
2	6	66	133.00 (3.68-4802.37)	0.008*
3	12	56	13.56 (0.52-352.80)	0.12
4	1	0	1.0	

*Statistically significant P value < 0.05

Table 3. Association of demographic characteristics and practicing medical photography.

Discussion

Most participants (68.1%) first encountered medical photographs in the classroom. This is likely due to the setting where students mainly access learning aids, by either buying their own books or borrowing from the library. However, with changes taking place at the University, such as availability of free internet, this pattern is shifting. For example, downloading electronic books onto portable devices is becoming increasingly popular.

A few of the participants (13.5%) reported taking their own medical photographs. This number is small, considering that the majority (66%) reported that fellow graduate students frequently took medical photographs. Secondly, the University does not have a policy barring students from taking their own photographs to aid in their studies. Thirdly, though participants reported the mobile phone as the most frequently used device and the majority owned one, this did not increase the number of postgraduates that took their own photographs. There was a possibility that postgraduates did not carry or use their mobile phones when on rounds. This finding differs from a survey by Sandler et al. (2009), carried out among members of the Angle Society of Europe, which established that 60% of orthodontists took their own clinical photographs. This discrepancy might be due to the fact that orthodontists have been widely known to take their own photographs to have a record, before and after treatment. However, the discrepancy might also be due to underutilization of smart technology by those that own them. In a study carried out in 40 countries concerning internet usage and smartphone ownership by Poushter (2016), it was noted that technology usage had a 33% point gap between emerging and developing nations.

Sharing of photographs taken by the participants was highest (89.5%) among fellow postgraduate students. This is an important factor because medical photographs need to consider patient privacy. However, the high percentage of photograph sharing among the postgraduates could be as a tool in learning. Note that all the participants are affiliated with a teaching hospital; therefore, using these images for education purposes is permitted. In a study by Keegan (2007), since childhood, images have been part of the learning mechanism to stimulate imagination. Therefore, students who are learning new subject matter need images to help them to visualize and relate.

Participants in surgical programs were 34.24 times more likely to practice medical photography compared to those that offered non-surgical programs. Participants in their second year of study were 133 times more likely to practice medical photography than their fourth-year counterparts. Male participants were 5.14 times more likely to have taken their own medical photographs compared to their female counterparts. In their study, Rute-Pérez et al. (2014) report that that demographic factors such as geographic location, age, gender and educational background affect both the adaption and attitude toward technologies. Further, Whitten and cited by Hill, Corbett, and St. Rose (2010), highlight the culture of a department and how it influences the choices a student makes. Departments that provided policies that were perceived as 'friendly' reported positive results. Surgical disciplines, for example, are encouraging proper documentation of patient

records. With photographs, recording of more detailed information can be documented, supplementing any written notations.

Postgraduate students ranked highest among the main categories of people that frequently take medical photographs, followed by facilitators and lastly by professional medical photographers. This may be due to changes in the entire photography process, no longer requiring one to have an understanding of the core photography principles of optics, chemistry and art. This has changed the attitude toward the utilization of professional photographers, since the majority of people with access to a camera assume that they can take quality photographs. Additionally, the number of professional medical photographers is not sufficient to satisfy the needs of those in need of their services. (Mak PDD 2016) This finding is similar to a study by Sandler et al. (2009) where 60% of the participants took photographs themselves, 35% were taken by staff and only 5% utilized professional medical photographers. Globally, medical specialists' training of task performance is similar and governed by similar codes of ethics, therefore, they may develop similar behavioural patterns.

This study suggests that postgraduate students used mobile phones most frequently (81.6%) for taking medical photographs compared to stand-alone cameras (36.2%). The dependence on the mobile phone as the main device used for photography may be attributed to the increased ownership of mobile phones among the participants; advancements in photographic technology, as well as new trends such as 'bring your own device' (BYOD). According to Kirk et al. (2014), these changes have resulted in the uncontrolled presence of digital cameras in hospitals worldwide. Notably, 96.3% of participants were 40 years and under, and according to Deloitte (2016), this age demographic tends to adopt technologies faster than other age groups.

A study conducted in 1979 by Arnold et al. revealed that in actual practice, rapport and an appreciation of the task of the photographer are far more important than the use of the most sophisticated equipment. (Hansell 1979) However, good results in medical photography are easier to achieve with the right equipment, setup, and technical knowledge of the field.

Conclusion

This study indicates that the majority of the participants first encountered medical photographs in class, and a few took their own medical photographs. Additionally, the main device used for photography by the participants was the mobile phone and majority of participants very often shared available

photographs with each other. Therefore, there is need to train postgraduate students in medical photography, increasing the number of professional medical photographers in medical training institutions in order to maintain the original aim of medical photography.

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