




Postgraduate Master of Medicine student perspectives on data access and record-keeping for research

S Prahladh,¹ MMed (For Path) ; J M van Wyk,² MEd, PhD ; D Naidoo,³ Masters OT, PhD 

¹ Discipline of Forensic Medicine, School of Laboratory Medicine and Medical Sciences, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

² Department of Health Sciences Education, University of Cape Town; Discipline of Clinical and Professional Practice, School of Clinical Medicine, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

³ Discipline of Occupational Therapy, School of Health Sciences, College of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

Corresponding author: S Prahladh (sprahladh@gmail.com)

Background. Registrars in specialisation training programmes encounter numerous difficulties in completing the research component of the Master of Medicine degree. Poor patient record-keeping hinders the research process.

Objectives. To investigate current types of medical patient record-keeping systems (electronic v. paper) in training health facilities, and the effect data accessibility has on specialist training and research.

Methods. This was a mixed-methods study that included both descriptive and analytical components. Of 610 postgraduate students enrolled in the University of KwaZulu-Natal College of Health Sciences Master of Medicine programme, 168 completed a cross-sectional survey to collect data and 11 did follow-up interviews. The survey and interviews explored issues related to medical record-keeping in the participants' department or hospital, emphasising their experiences with data access while conducting research. The quantitative data were analysed using descriptive statistics, and the qualitative data were analysed thematically. Ethical approval was obtained from the institution's Biomedical Research Ethics Committee.

Results. Of the 168 participants, 94 (56%) reported that problems with data access hindered their research, while 56 (33%) indicated that data access did not affect their research. Only 30 participants (18%) had no difficulty in obtaining data for their research, while the rest ($n=138$; 82%) experienced varying degrees of difficulty. A total of 110 participants (65%) indicated that paper-based record-keeping was mainly being used in their department or hospital, while electronic record-keeping was reported by the rest ($n=58$; 35%). Many ($n=125$; 74%) expressed the need to improve hospital data management practices, and 39 (23%) reported that plans were being implemented to improve these practices. Participants expressed frustration with regard to accessing data even in departments that used electronic systems, and they raised concerns regarding data security.

Conclusion. The migration to electronic patient record-keeping has not yet been implemented in many hospitals, with poor patient record-keeping affecting training and research.

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International fellowship or specialist training programmes in medical fields are offered over ~24 months.^[1,2] In South Africa (SA), specialist training is usually completed over 48 months, during which the registrar has to complete a Master of Medicine postgraduate qualification.^[3] This qualification is required for registration as a medical specialist by the Health Professions Council of South Africa (HPCSA). The Subcommittee for Postgraduate Education and Training (Medical), acting under the auspices of the HPCSA, decreed a mandatory research component for registrars who commenced training after 1 January 2011 after it found that there were relative differences in the specialist training programmes throughout the country, as well as in the requirements for registration as a specialist.^[4,5] Previously, either a university-based Master of Medicine degree in the designated field or specialist examinations would be required for registration with the HPCSA as a specialist. The need for uniformity for specialist registration and common standards in postgraduate examination led to the Master of Medicine programme as a requisite third component of the specialist examination.^[6-11] The postgraduate qualification aimed to develop competency in research and was initially met with resistance.^[4,6] The specialist training programme is intensive, to prepare competent specialists who can register as independent practitioners with the HPCSA.

Registrars have identified time constraints to be the main obstacle when undertaking the study for successful completion of the Master of Medicine programme.^[3,6] Many studies have examined the challenges linked to the registrar research component and investigated ways to make the process more efficient and less time-consuming, because the delivery of essential clinical services is prioritised during specialist training.^[3,6-10] Issues raised in previous publications include lack of time (including academic time), lack of supervision and support, poor communication, and a need for training in research methodology.^[3,8,10-12] There is also a need to investigate strategies to improve the current research infrastructure for those enrolled in specialisation training, enabling them to conduct impactful and relevant research. Improved infrastructure includes ease of access to patient records.^[5] Record-keeping in hospital settings generally requires improvement, and current data registries need monitoring and evaluation to assess their efficacies and shortcomings.^[12-14]

Methods

This was an explanatory mixed-methods study. A cross-sectional survey was used to collect quantitative data, and semi-structured interviews were used to collect qualitative data. The survey and interviews were conducted during the period April 2020 - October 2021.

The target population was 610 postgraduate students in the College of Health Sciences at the University of KwaZulu-Natal (UKZN) who were enrolled in the Master of Medicine programme in 2020. The students were purposively sampled because of their involvement in research as a compulsory requirement of their specialist training. They were therefore the population of interest owing to their experiences in having to collect data in their respective departments or hospital settings. The recruitment process for the questionnaires and interviews was conducted via the University Notice System because of COVID-19 lockdown restrictions. A notice was released on the system after permission and ethical approval had been obtained from the University Registrar and the Biomedical Research Ethics Committee (ref. no. BE458/2019), respectively. Informed consent was obtained from each participant before completing the survey on Google Forms. All the participants were informed of their right to withdraw at any stage of the study. The academic head of each medical department was informed via electronic communication of the purpose of the study, and requests were made to attend academic online sessions to inform prospective participants about the study objectives (this was done at the end of the session with a 5-minute presentation promoting the recruitment of participants for the study).

The cross-sectional survey included descriptive and analytical components. The descriptive component collected biographical details such as the participants' current year of enrolment and their departmental association in one of the schools in the UKZN College of Health Sciences. Information relating to their gender and faculty association was collected from the interviews. The analytical component explored the factors that influenced participants' access to data, the current state of patient record-keeping systems, and the possible effect of access/lack of access to data on their research. The manual version of the questionnaire and the interview questions were created by the researcher (author SP), and the design of the instrument was informed by the literature. The data collection tools were reviewed by an education expert and were therefore considered to have good face validity. The university-assigned statistician then assisted in refining the online questionnaire, and assisted with the subsequent quantitative analysis using descriptive frequencies. The content validity was assessed by the researcher, statistician and education expert to check the clarity, simplicity and relevance of each question. The questions were considered easy to understand and were in English (the primary language medium used at UKZN). The survey questionnaire had good construct validity, with the respondents able to respond to multiple-choice items regarding their experiences. The respondents were also able to answer independently of the available choices with open-ended questions. The questionnaire was first piloted with 80 students from the College of Health Sciences, almost half of the total number of eventual respondents to the study. In total, 168 participants completed the survey at the conclusion of the online survey.

The questionnaire data were collected through Google Forms, and the data were downloaded onto a spreadsheet (Microsoft Excel 365, USA) before the university statistician conducted the statistical analysis. The online survey was conducted remotely through a web-based platform with no interaction between the researcher and the respondents, increasing objectivity.

The statistical data analysis was conducted using R statistical computing software, version 3.6.3 (R Foundation for Statistical Computing, Austria). The results were presented in the form of descriptive and inferential statistics. The quantitative data analysis included testing the associations between two independent categorical variables. The χ^2 test or Fisher's exact test was

used to evaluate the null hypothesis that data accessibility has no effect on postgraduate students' research. Using G Power software, version 3.1.9.7 (Heinrich-Heine-Universität Düsseldorf, Germany, 2021), for sample size calculation, it was estimated that a sample size of at least 105 participants would be required to detect an effect size of 0.38 ~80% of the time. Therefore 168 participants were recruited for an effective sample for the study to have statistical significance.

The qualitative aspect of the study used semi-structured interviews with volunteer participants to explore the findings further, with 9 individual interviews and 1 dyad interview where two people participated simultaneously. The interview guide was piloted, and feedback regarding the comprehensibility of the questions was positive.

The interviews were conducted via digital platforms, which included Zoom and the video chat function of WhatsApp. The interviews were conducted ~1 month after the recruitment process had begun, according to the interviewees' availability, and the online survey continued during this process. The semi-structured interview tool consisted of 10 open-ended questions that prompted discussion about the participants' research data, how they obtained the data for their research, and what issues they encountered. The questions aimed to elicit whether the participants sought assistance when they encountered problems during research. The participants were also asked questions regarding issues and benefits associated with electronic recording systems, or whether they were aware of plans for electronic record systems to be instituted in the future. The participants were assured of their anonymity, so only faculty association and gender were utilised for demographic purposes, but the interviews were recorded for accuracy and transparency. Recordings and transcription records from the interviews, as well as the quantitative data downloaded into an Excel spreadsheet for analysis by the statistician, were kept safely in a locked cabinet or on a password-protected computer. The anonymity of participants was ensured, as the survey data were de-identified and confidentiality was promoted by using pseudonyms for the interview transcripts.

The audio recordings of the interviews were manually and electronically transcribed verbatim. Audio recording of interviews and the verbatim transcription ensured that the participant's voice was captured and contributed to the transparency and trustworthiness of the data. The qualitative data were analysed thematically. This process included the researcher reading and re-reading the transcripts to become familiar with the data and then coding the initial data. The codes were grouped into categories, and the categories were grouped into themes (Fig. 1). During the write-up process, an independent coder and the investigators discussed the coding to reach a consensus to clarify and finally consolidate the themes. The reliability or trustworthiness of the qualitative data was enhanced by going through the audio recording more than once to transcribe the data. The codes were identified by the researcher and two reviewers and then cross-checked to ensure accuracy. Two research supervisors checked the data from the verbatim transcriptions, which were uploaded to Google Forms electronically to decrease analysis bias. In addition, the participants were asked to verify and clarify their responses at the end of the interviews to increase dependability, including summarising and repeating the participant's words and asking whether the interpretation was correct to decrease analysis bias.

Method triangulation was employed by using both surveys and interviews, thereby improving the credibility of the data. The interview sought to evaluate and better understand the participants' experiences

with further elaboration of the questionnaire answers. This process reduces potential analysis bias by using multiple methods of collecting data and uncovers potential common themes from quantitative and qualitative data. The survey and interviews were conducted over a long period (over a year) with results remaining largely unchanged in the pilot number and the total number of respondents, increasing the reliability of the data.

Results

Biographical representation for respondents

The sample of 168 participants consisted of 131 students enrolled in the School of Clinical Medicine, 32 in the School of Laboratory Medicine and Medical Sciences, and 4 in the School of Nursing and Public Health. One of the students had recently completed the registrar training period (4 years) in the School of Clinical Medicine but was still registered in the postgraduate programme for an extended period (Table 1).

Quantitative results (Table 1)

Despite the MMed officially extending over a 4-year period, the majority of the participants ($n=43$; 26%) had been enrolled for ≥ 5 years at the time of data collection. A total of 36 (21%) were in their 4th year, 16 (9%) were in their 3rd year, 38 (23%) were in their 2nd year, and 35 (21%) were in their 1st year. With regard to difficulty in obtaining data for their research, the majority of participants reported having some difficulty ($n=69$; 41%), while 42 (25%) reported moderate difficulty and 27 (16%) reported great difficulty. Only 30 participants (18%) reported no difficulty in obtaining data for their studies.

Of the participants, 166 responded to the question regarding software used for their research for data processing, and 2 chose not to answer. A total of 110 (66%) used software for their research, with a large majority ($n=104$; 62%) using Microsoft Excel. Other software programs included SPSS (Statistical Package for the Social Sciences) ($n=44$; 26%), EndNote ($n=40$; 24%), GraphPad Prism ($n=21$; 13%), a laboratory information system ($n=9$; 5%), Google Forms ($n=7$; 4%), Microsoft Access ($n=6$; 4%), BORIS ($n=4$; 2%), REDCap (Research Electronic Data Capture) ($n=3$; 2%), Numbers on iOS ($n=3$; 2%), Microsoft Office ($n=2$; 1%) and Mendeley ($n=1$; 1%). Some participants used more than one software program.

The majority of the participants ($n=110$; 65%) reported that their departments and hospitals mainly used paper-based record-keeping systems, while 58 (35%) reported the use of electronic record-keeping systems (Fig. 2).

A total of 127 participants (76%) reported that data accessibility had influenced their choice of research topic, while 94 (56%) reported that lack of access to data had hindered their research.

Most of the participants ($n=125$; 74%) thought that data management practices in their hospitals and departments could be improved, while 40 (24%) were uncertain about this and 3 (2%) did not think that data management practices could improve. Sixty-eight participants (41%) were unsure whether their hospitals or departments had been improving data management practices, 61 (36%) said that there were no plans to improve, and the remaining 39 (23%) were aware of plans to improve.

While only 135 participants responded to the question regarding limitations and challenges of an electronic system, 91 of these (67%) identified maintenance of the system and 85 (63%) data security issues as major concerns. Other concerns were funding ($n=56$; 41%), infrastructure

Table 1. Results from questionnaire (N=168)

	<i>n</i> (%)
Participant characteristics	
School	
Clinical Medicine	131 (78.0)
Laboratory Medicine/Medical Sciences	32 (19.0)
Nursing and Public Health	4 (2.4)
Completed 5 years	1 (0.6)
Current year	
1	35 (20.8)
2	38 (22.6)
3	16 (9.5)
4	36 (21.4)
≥ 5	43 (25.6)
Data access	
Difficulty accessing data	
Some difficulty	69 (41.1)
Moderate difficulty	42 (25.0)
Great difficulty	27 (16.1)
No difficulty	30 (17.9)
Influenced choice of research topic	
Yes	127 (76)
No	39 (23)
Unsure	2 (1)
Hindered research	
Yes	94 (56.0)
No	56 (33.3)
Unsure	18 (10.7)
Data management	
Can be improved	
Yes	125 (74.4)
No	3 (1.8)
Unsure	40 (23.8)
Aware of current plans in the department to improve systems	
Yes	39 (23.2)
No	61 (36.3)
Unsure	68 (40.5)
Software	
Software used	
Yes	110 (65.5)
No	56 (33.3)
No response	2 (1.2)
Name of software*	
Microsoft Excel	104 (61.9)
SPSS	44 (26.2)
EndNote	40 (23.8)
GraphPad Prism	21 (12.5)
Google Forms	7 (4.2)
Microsoft Access	6 (3.6)
BORIS	4 (2.4)
REDCap	3 (1.8)
Numbers iOS	3 (1.8)
Microsoft Office	2 (1.2)
Mendeley	1 (0.6)
Laboratory information system	9 (5.4)
Other	22 (13.2)
None	11 (6.6)
No response	1 (0.5)

SPSS = Statistical Package for the Social Sciences; REDCap = Research Electronic Data Capture.
*Some participants used more than one type of software.

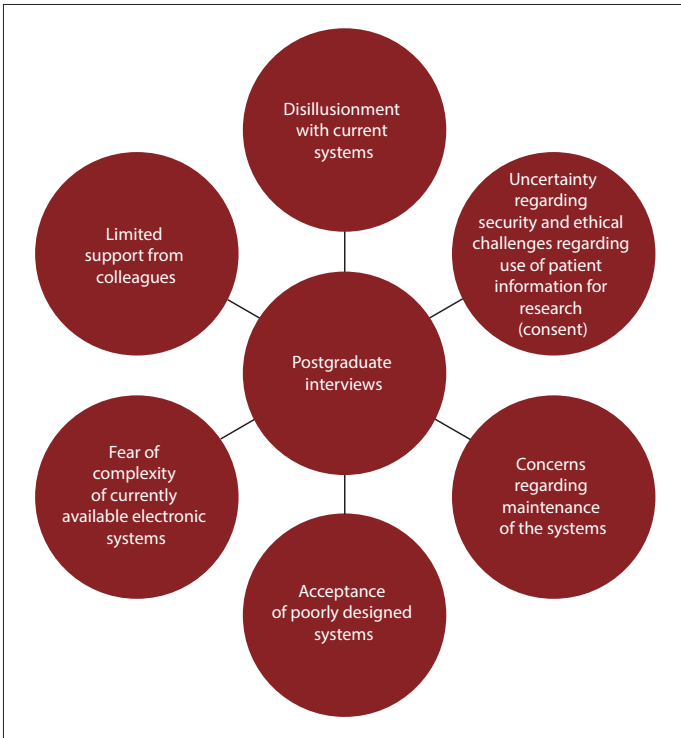


Fig. 1. Categories related to themes.

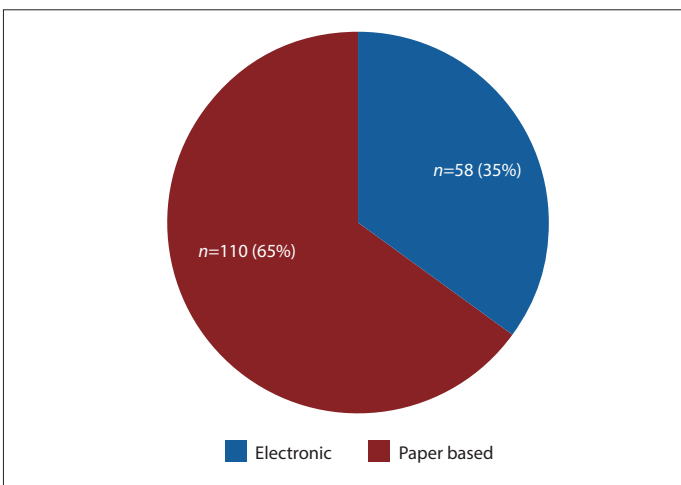


Fig. 2. Current form of records in the respondents' hospitals/departments.

($n=53$; 39%), patient consent to store or use data ($n=47$; 35%), data quality ($n=44$; 33%), time management challenges ($n=34$; 25%), ethical challenges ($n=20$; 15%), and buy-in from users ($n=2$; 2%) (Fig. 3).

The preliminary findings showed that hospitals mainly used paper-based record-keeping systems. Issues related to record-keeping and research were further explored through the interviews that explored the participants' experiences in their relevant disciplines related to data access and their research.

Qualitative data

A total of 9 individual interviews and 1 dyad interview were conducted, the participants consisting of 6 males (54.5%) and 5 females (45.5%). Of these, 8 (73%) were enrolled in the School of Clinical Medicine, 2 (18%)

in the School of Laboratory Medicine, and 1 (9%) in the School of Public Health. The thematic analysis revealed four themes. These were access to information, challenges accessing data in existing electronic systems, benefits of electronic record-keeping, and recommendations to improve existing systems.

Access to information

Participants reported varied experiences with accessing information. Some admitted to conducting their study where electronic records were available and they were free to choose a topic that allowed for this. Others experienced difficulty in accessing data for their chosen topic. Some strategies used to facilitate access to data included approaching their supervisors to assist, approaching the head of the department who was developing a program for record-keeping, and enlisting assistance from management to access records. One supervisor had personal records of his cases, which he provided to the student for their research. There was also a sense of reluctant acceptance of poorly designed record-keeping.

'[Name of the hospital] has online records stored; I wanted to do a study where information is easily available, and don't have to sift through files and stored in the computer, so yeah it did influence my research. Even though the patient information is stored on computers, sometimes it's not saved correctly, etc.' (School of Clinical Medicine, male, interviewee 3)

'You speak to your seniors, and they generally say it's going to be a mission to change things, avoid the process of doing it, change is slow ...' (School of Clinical Medicine, male, interviewee 7)

'Co-supervisor attempting to create a database and HOD currently in talks regarding ethics approval for database system.' (School of Clinical Medicine, male, interviewee 4)

'I was motivated for another week off, which started off with me going into a dusty garage filled with spiders trying to find these [hospital] files. I think my total sample was 801, and I couldn't find a total of 160 files which to me, has had an impact on my research. It is also a huge medicolegal burden ... I did inform the hospital CEO. Even in COVID ICU, we currently have two people daily allocated to deal with admin, someone who has completed medical school and sits and looks at the computer to deal with data collection ...' (School of Public Health, male, interviewee 1)

Another student who was frustrated by lack of access to patient records was developing an electronic database in her personal capacity to improve service delivery and ease of data collection for research.

'Yes, big challenges facing [currently], many factors, paper-based filing, lost files, difficult to extract, whether referrals appropriate. Cannot follow up with a patient because the file is lost and therefore have to start clerking again ... [Name of the department] developing an electronic patient database, I have personally undertaken to do so ...' (School of Clinical Medicine, female, interviewee 8)

Challenges with accessing data

The participants who indicated that they had access to electronic databases at their training hospitals were asked about their access to patient information, ease of use of existing systems, and familiarity with the systems that were in place in the hospitals. They identified that the most critical obstacle to obtaining data from the electronic databases at some hospitals related to the complexity of the electronic system. Obtaining the information was also challenging if records were only searchable, for example, by patient

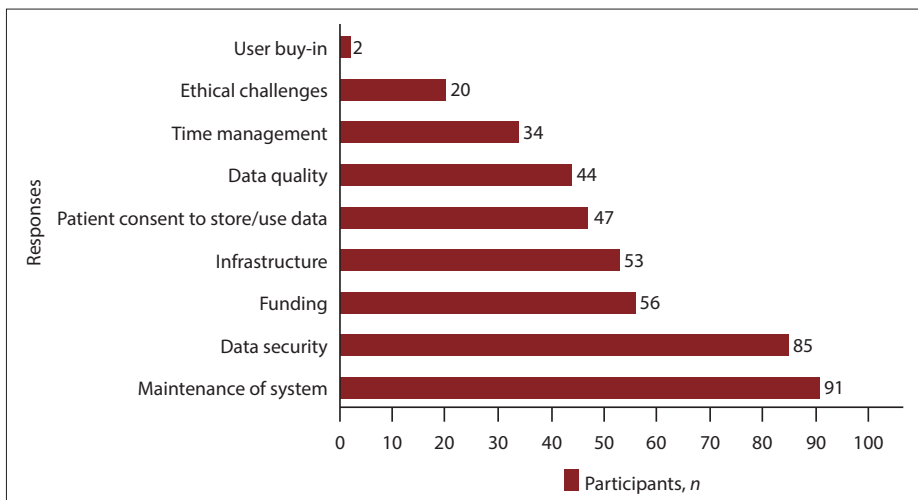


Fig. 3. Limitations and challenges of an electronic system as perceived by the respondents (N=135).

number. They were therefore not linked to a diagnosis, treatment or department to indicate whether they were relevant to the research topic. Among other obstacles mentioned was participants encountering a ward-based database that was specific to the patients admitted only to that particular ward, with a separate system in the form of Word documents for admission and discharge. This system was problematic for rotating registrars, who are generally allocated for a specific period on a rotational basis. They would therefore not have access after completing their rotation out of the ward, which limited their use of and access to the data.

'So when I rotate through ICU, they have a critical care database, called ICES only for patient referrals, admissions and discharges in ICU ... In my department, we don't have a formal database ... we have discharge summaries typed in Word, reports all done in Word and stored according to months of the year, stored in a folder.' (School of Clinical Medicine, male, interviewee 3)

'Even though the patient information is stored in computers sometimes it's not saved correctly etc. ... A lot of patients are readmitted ... Word documents are not centralised or backed up, depending on where the documents are saved or located and can pose problems. A database would help reduce these mistakes ... if it's more accessible, may drive people to do more research.' (School of Clinical Medicine, male, interviewee 10)

The students expanded on the issues they encountered when they tried to complete their discipline-related research study, which included

having to do data collection after hours or having to take leave which impacted on personal time, revealing sub-themes of personal issues and lack of support. There was also unwillingness of information technology (IT) staff to assist when participants had difficulty accessing records. Participants expressed a general sense of disillusionment with the complexity of existing systems.

One of the participants voiced his frustration about the existing systems as follows.

'I think it needs to be better categorised ... the IT guys were totally not willing to help even with ethics approval even though it's a database. We as a department have been booking cases but now suddenly it's a mission, certain bits of paperwork need to be done, actually quite cumbersome ... Fortunately for me, my supervisor was keeping his own records, and the department system also had some records ...' (School of Clinical Medicine, male, interviewee 9)

Benefits of electronic record-keeping for service delivery and research

Participants indicated that electronic records in databases at the hospitals where they worked mainly included summaries of admission and discharge in Word document format. Comprehensive electronic records would reduce re-investigation of patients due to lost files, which can negatively impact on clinical care resources. Patient follow-ups would be efficient, benefiting patients and preventing wastage of resources. Training would be more accessible because of better patient follow-up for examination purposes. The students proposed

that improved record-keeping would keep their research on a similar platform to international standards, facilitate the publication of gold-standard research, and advance their research careers. Departments would be able to establish evidence-based protocols by reporting on more significant case numbers with fewer errors, thus improving the quality of their research and standard operating protocols and developing patient profiles specific to the African region.

'... A lot of patients are readmitted, prior admissions on a computer, centralised, benefit the patients as well, helping the doctors to not miss anything. Drawbacks can be the maintenance of the system, programming, or if the program crashes, then records are lost ...' (School of Clinical Medicine, male, interviewee 3)

'... produce protocols for management, more evidence for cases, patient profiles, specific to regions/area geographically, more of own data, specific to own patients – more research opportunity, publications, and maybe PhD.' (School of Clinical Medicine, male, interviewee 7)

A student described better record-keeping as crucial. Others concluded that research would be higher powered, with improved quality of research, and collaboration and publication would also be made easier.

'Better collaboration for departments ... and publish gold-standard research and protocols and [information] sharing. It is crucial for registrars.' (School of Laboratory Medicine, dyad interview with one male and one female student)

'Research [made] a lot easier, improve the quality with large numbers over longer periods of time ... high-powered research.' (School of Clinical Medicine, male, interviewee 4)

Recommendations to improve existing or future electronic records

The students (previous quotes included) provided suggestions to advance electronic records and improve current systems and software to analyse trends in the data. They also suggested the need to improve the categorisation of patients and health records for potential use in teaching, research and service.

'It would be good to have a trauma database that has a collection of different injuries ... anatomical standpoint ... different zones to analyse trends.' (School of Clinical Medicine, male, interviewee 3)

One of the main concerns regarding instituting electronic records was the ability of the department to maintain the database. One student relayed their concern and uncertainty regarding security and ethical challenges in terms of the use of patient information for research, and suggested that existing or future electronic systems should have the data password protected and encrypted. Improved data security would mitigate the risk of patient data being unintentionally disclosed and the ethical aspect of having to justify having patient data that are easily accessible.

'Definitely the risks to the patient with data being leaked and ethical standpoint to justify having patients' data that's easily accessible and definitely anything set up has to be password protected or encrypted ... in case of legal issues.' (School of Clinical Medicine, male, interviewee 3)

Discussion

The present study investigated current record-keeping in specialist training hospitals where Master of Medicine students performed their service. It also explored how access to data may influence students' progress and success in the research related to their studies. Medical practitioners are busy with the duties of treating patients, and administrative tasks that take up a lot of time making it difficult to balance the additional responsibility of research. Previous studies focused on research challenges regarding personal and work-related factors such as workload and lack of time, poor supervisor support, and funding of research projects, which were issues also raised in our study.^[15-17] Although in these studies, lack of access to information sources was also cited as a significant challenge, this was not explored further.^[15-17] The present study is the first of its kind to focus primarily on the perspectives of postgraduate students regarding their challenges in obtaining data for their research.

Almost half of the respondents were in the 4th and 5th years of their registrar training period. This finding may indicate that many registrars are unlikely to complete their research in the allocated period and will have to extend their time owing to challenges related to research, an issue previously reported in the literature.^[3-6] New researchers may encounter many obstacles during their groundwork; scrutinising these factors to reduce their impact may therefore increase research accuracy, success and output.^[1,8-12,18-20] A lack of protected academic time away from service work is an issue much cited by registrars nationally and internationally. This situation can be compounded by poor patient record-keeping, which may extend the data collection period.^[3,5,6,8,11,12,20]

The participants indicated that most departments and hospitals do not have electronic record-keeping systems and rely on paper-based records, hindering the research process. The interviewees had recommendations for advances in existing electronic systems, including improved or refined categorisation of patient data to assist in analysing emerging health trends. Countries that have instituted electronic record-keeping systems have found that these systems pose many challenges with regard to accessing data. This is because the systems were not primarily designed for research purposes and therefore present various limitations.^[21-23] These challenges include misclassification of diagnoses, difficulty in retrieving the information due to poor data linkage within systems, and, importantly, security and privacy issues related to patient information, which was a concern also voiced by respondents in the present study.^[21,24-25] There are many ways to improve data security, including data encryption, secure logins, and digital signatures.^[24] Although the literature indicates that approximately a third of hospitals in SA have moved to an electronic

system (which is also reflected in the results of the present study), these systems are not readily accessible and are complicated, requiring training or assistance from IT specialists.^[14,26] Accessing the data then becomes a time-consuming task for registrars who, although aware of the benefits and contribution of research to their education, already have a demanding burden of service work.^[1-4,6,8-12,19] In Western Cape Province, a compromise between electronic records and paper records was instituted where paper patient records are scanned into an electronic database, thereby making historical electronic patient records available to healthcare workers.^[26] This was a so-called 'hybrid solution' and did not eliminate paper records completely, and was therefore considered more acceptable to healthcare practitioners.^[26] Involvement of the medical fraternity in the development or modification of these electronic health record systems could further enhance their acceptability.^[22,23]

It is often challenging to decide on a research topic, and some students choose their topics out of interest or after encountering a group of patients with a similar or unusual presentation. Many of our participants indicated that data access in their respective departments/hospitals influenced their choice of research topic. This situation may further compound the fear and concern that the research being conducted may be poorly designed or underpowered, or have a high false-positive rate.^[5] Time for non-clinical work or research should be incorporated into the learning environment and has shown benefits to the sustainability of postgraduate education.^[27] The UKZN website informs all Master of Medicine students of the mandatory research methodology course to be completed in a workshop or online to assist the postgraduate students in their research.^[28] The methodology training may help alleviate issues encountered in other studies, such as lack of research trainers and lack of previous research experience, improving the chance of conducting research successfully.^[15-17,29]

Improved health data management and record-keeping systems can support efficient disease surveillance, improve quality of care, patient-centredness and safety, and decrease patient waiting time, thus impacting positively on the patient experience and on public health.^[13,14,30-34] Unfortunately, the migration of health records to a more automated system has been hampered by lack of resources in many countries.^[13,30,35-39] In SA, a combination of multiple factors impedes the proposed implementation of the National Health Insurance directive strategy, including the implementation of electronic health records.^[14] These factors include poor supporting infrastructure, lack of user training and commitment, political influence or strategy, absence of legislation and regulations, and no framework for implementation and management of electronic health records.^[14] Challenges in maintaining systems, infrastructure, and issues regarding data security were also concerns brought out in the questionnaires and interviews in the present study. An appropriate legislative framework to implement secure patient databases (using de-identified data) and storage of patient data can be beneficial to ensure the protection of patient privacy, and has been successfully implemented in other countries such as Switzerland and the UK.^[35-39] The current regulations in SA support the implementation of electronic record-keeping, but policies to motivate funding and stakeholder collaboration to propose or produce these electronic health initiatives in the health sector are notably lacking.^[40-44]

Study strengths and limitations

So far, no studies in SA have reported on the effect of access (or lack of access) to data on the mandatory research component for postgraduate

students in specialist training. The present study also shows how access to patient information affects participants' choice of a research topic. The perspectives and lived experiences of the participants are important, as they will contribute to the growing body of researchers, and we hope that the study will inspire discussion for change, as many students would have had or are currently experiencing similar ordeals.

The Protection of Personal Information Act No. 4 of 2013 (POPIA)^[45] prevents direct contact with study participants being made without consent, and the participants could therefore not be approached directly via email or text messaging. Owing to the COVID restrictions during the questionnaire dissemination and interviews, mainly online platforms were used to recruit participants and obtain the data. The interviews were conducted to explore the issues that we highlighted in the survey regarding data access for training and research. However, a small number of participants agreed to be interviewed, and the recruitment restrictions of POPIA allowed for recruitment through the University Notice System and informed recruitment through academic meetings. The limitations of this study are associated with the purposive sampling method utilised and the sample being recruited from a single site, which may limit the generalisability of the findings.

Conclusion

Medical research plays a pivotal role in public health and providing quality healthcare to patients. All registrars enrolled in the 4-year specialisation programmes must complete a mandatory research component. The present study was undertaken to determine the different systems of record-keeping in various departments and hospitals in KwaZulu-Natal Province, and whether and how access to patient records affects postgraduate research. It is evident that data access and record-keeping do influence and limit the choice of research topics and that they may also affect the quality of the research of the postgraduate student. Lack of data accessibility and the complexity of current electronic record-keeping systems further frustrate the researcher, ultimately hindering the progress and efficacy of research. They also impact on students' ability to complete their studies on time, with many having to extend their specialist training time. Supporting and encouraging the move to electronic health record-keeping systems is a key strategy that will advance research in the local context. However, it must be highlighted that issues such as data security, the complexity of systems, and infrastructure may prove to be challenges to be overcome in this context. Future research should examine the creation of low-maintenance systems with available resources, including enlisting interested individuals in the healthcare sector and IT support. Greater collaboration to support research should be encouraged between the Department of Higher Education and the Department of Health, as students typically enrol for the qualification while providing health services at public hospitals and clinics. Government support to regulate and fund electronic health record-keeping would be another vital step to better migration.

Declaration. The research for this study was done in partial fulfilment of the requirements for SP's PhD degree at the University of KwaZulu-Natal.

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