Use of Clinical Anatomy Resources by Musculoskeletal Outpatient Physiotherapists in Australian Public Hospitals: A Cross-Sectional Study

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ABSTRACT

Purpose: To investigate how musculoskeletal outpatient physiotherapists in public hospitals interact with and perceive clinical anatomy resources in the workplace. **Method:** This cross-sectional study used a postal survey sent to musculoskeletal outpatient physiotherapists in 64 Australian public hospitals. Survey questions examined demographics, qualifications, experience, types of resources used, whether resources meet requirements, and what improvements could be made to current resources. **Results:** A total of 193 physiotherapists responded (75% response rate; 60% female), of whom 49% were age 35 years or younger; 67% had only an undergraduate qualification, and 37% had practised for 5 years or less. More experienced physiotherapists used resources significantly less frequently (odds ratio = 1.35; 95% CI, 1.17–1.57), and we found no significant associations between preference for online versus printed resources and age, sex, qualifications, or experience. Trends included less experienced physiotherapists identifying the absence of online access as a barrier to resource use and provision of improved online facilities as necessary to improve access to clinical anatomy resources. **Conclusion:** Results indicate distinct trends in physiotherapists' use of clinical anatomy resources, including a desire for improved online resource access on the part of less experienced physiotherapists. The findings are relevant to hospital outpatient clinics, particularly those that employ less experienced physiotherapists.

Key Words: anatomy; education; ambulatory care facilities; surveys.

RÉSUMÉ

Objet : Enquêter sur la façon dont les physiothérapeutes externes spécialistes de l'appareil locomoteur dans les hôpitaux publics interagissent avec les ressources en matière d'anatomie clinique et les perçoivent. **Méthode :** Cette étude transversale a été menée au moyen d'une enquête postée aux physiothérapeutes externes spécialistes de l'appareil locomoteur de 64 hôpitaux publics de l'Australie. Les questions de l'enquête portaient sur les données démographiques, les qualifications, l'expérience, les types de ressources utilisées, la pertinence des ressources par rapport aux besoins et les améliorations qui pourraient être apportées aux ressources actuelles. **Résultats :** Au total, 193 physiothérapeutes ont pris part à l'enquête (taux de réponse de 75 %; 60 % des répondants étaient des femmes). De ce nombre, 49 % étaient âgés de 35 ans et moins, 67 % possédaient seulement des qualifications de premier cycle d'étude universitaire, et 37 % comptaient 5 ans et moins de pratique. Les physiothérapeutes expérimentés ont dit utiliser les ressources beaucoup moins fréquemment (RC 1,35; 95 % CI, 1,17 à 1,57), et aucune association importante n'est ressortie concernant la préférence entre les ressources en ligne et les ressources imprimées selon l'âge, le sexe, les qualifications ou l'expérience. En matière de tendances, les physiothérapeutes moins expérimentés ont désigné l'absence d'un accès en ligne comme un obstacle à l'utilisation de ressources et ont décrit l'amélioration des installations en ligne comme étant nécessaire à un meilleur accès aux ressources en matière d'anatomie clinique. **Conclusion :** Les résultats démontrent des tendances distinctes concernant l'utilisation des ressources en matière d'anatomie clinique chez les physiothérapeutes, y compris le désir d'un accès amélioré aux ressources en ligne chez les physiothérapeutes moins expérimentés. Les conclusions sont pertinentes pour les cliniques externes des hôpitaux, particulièrement celles qui emploient des physiothérapeutes moins expérimentés.

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STROBE statement: Scott Farrell affirms that this article is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Ethics approval: The Hunter New England Human Research Ethics Committee approved this study. All participants gave informed consent before data collection began. NSW Human Research Ethics Committee Reference: LNR/12/HNE/210. The study conforms to the Human and Animal Rights requirements of the February 2006 International Committee of Medical Journal Editors' Uniform Requirements for Manuscripts Submitted to Biomedical Journals.

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Access to clinical information plays an integral role in modern health care practice, and a variety of information resources are available to clinicians. Clinical resources can provide up-to-date information, contribute to decision making, enhance patient care, and facilitate clinical reasoning.¹⁻⁴ The nature of clinicians' use of clinical resources is therefore important because of its potential influence on clinical practice and patient outcomes.

Clinical reasoning demands a thorough understanding of the appropriate clinical subject matter;^{5,6} sources such as textbooks and online resources provide access to information that can support and facilitate the clinical decision-making process. Studies in the 1990s examining physiotherapists' use of clinical resources indicated that clinicians primarily used textbooks and spoke with other clinicians to find clinical information.^{5,7} Studies within the past decade have suggested that physiotherapists now use online resources to enhance their professional education through increased access and communication, to support clinical practice, and to provide access to clinical information at the point of care.^{2,8}

In the United Kingdom, 77% of physiotherapists surveyed in 2013 used online resources for professional purposes one to four times per week,⁹ though the most recent study on resource use in Australia, undertaken in 2004, found that fewer hospital-based physiotherapists in New South Wales (53%) used a statewide online clinical resource portal for patient care.² Given the 9-year interval between the publication of these two studies, it is likely that the difference in physiotherapists' online resource use between these two settings was influenced by the significant technological developments during this period, including advances in information technology used in the health care industry.¹⁰⁻¹³ The difference may also be related to the Australian study's focus on clinicians' use of the statewide health department online resource portal,² whereas the 2013 United Kingdom study examined the use of online resources in general.⁹ For these reasons, it is not clear whether trends in resource use reported in the 2004 study² would still be accurate.

In physiotherapy outpatient practice, a comprehensive understanding of clinical anatomy plays an important role in the assessment, diagnosis, and treatment of musculoskeletal conditions.^{14,15} Clinical anatomy resources are important in that they provide information pertinent to patient management. Yet despite the importance of clinical resources,^{5,7} the rise of online and mobile education and information,^{11,16} and the importance of clinical anatomy in diagnosis and clinical decision making,^{17,18} the use of clinical anatomy resources by physiotherapists has remained unexplored. Our study investigated how hospital-based musculoskeletal outpatient physiotherapists perceive and interact with clinical anatomy resources. More specifically, we aimed to answer the following research questions:

1. What types of clinical anatomy resources do musculoskeletal physiotherapists access?
2. How often and why do musculoskeletal physiotherapists access clinical anatomy resources?
3. How do musculoskeletal physiotherapists perceive clinical anatomy resources?
4. Do demographic factors influence the attitudes and behaviours of musculoskeletal physiotherapists with respect to clinical anatomy resource use?

METHOD

We undertook a cross-sectional observational study using an 18-question postal survey. Via telephone or email, we invited physiotherapy departments from 75 randomly selected public health facilities in the Australian state of New South Wales to participate in the study.

Survey

We developed the survey in consultation with academic colleagues and piloted it with a small number of clinicians in a hospital physiotherapy department for clarity (their responses are not included in the data reported here). The survey questions explored physiotherapists' attitudes and behaviours with respect to use of clinical anatomy resources in the workplace, including resource type, frequency of use, and primary purpose of use, as well as perceived reliability of resources, barriers to resource use, and means of improving clinical anatomy resource facilities. The survey also collected basic demographic data (age, educational background). Survey questions were multiple choice, comprising a combination of "choose all that apply" and "choose one only" structures, with a section at the end of the survey for free comment. We distributed the survey by postal mail rather than using an online survey to ensure that junior staff who might not have email or Internet access at work could also participate in the study.

Survey packets consisting of questionnaires, participant information sheets, and return envelopes were mailed to participating centres. We determined the number of eligible physiotherapists at each site via discussion with the manager of each physiotherapy department, and this guided the number of surveys sent to each facility. Informed consent was implied by participants' choosing to complete and return the survey. Site response rates were recorded using numbered return envelopes to correspond with facilities; we did not keep any record that could identify individual physiotherapists. Statewide ethical approval was granted by the Hunter New England Human Research Ethics Committee, and we obtained further research governance approvals for each of the 16 local health districts.

We used strategies recommended by Edwards and colleagues¹⁹ to increase response rates for postal surveys, including contacting potential respondents before sending the surveys, keeping the survey short (one double-

sided page), including stamped return envelopes, addressing the survey packets by hand, ensuring confidentiality, and following up with the department manager at non-responding sites after 3 weeks.

Sampling

Musculoskeletal outpatient physiotherapists from 75 randomly selected public hospitals and health facilities across 16 of the 18 local health districts in New South Wales were invited to participate. This sample can be considered representative of the population of interest because the remaining two local health districts (Sydney Children's Hospitals Network and the Justice and Forensic Mental Health Network) are specialist networks not relevant to this investigation.

Using information published on the New South Wales Ministry of Health Web site,²⁰ we identified 122 facilities as potentially eligible (i.e., offering a physiotherapy outpatient service); the accuracy of this information was confirmed via discussion with physiotherapy regional managers. Of these 122 facilities, 8 were identified by the corresponding managers as not offering a physiotherapy outpatient service; we removed these from the list of eligible facilities, resulting in a final list of 114 eligible facilities. On the basis of this total, the resources available for the study, and the scope of the project, 75 facilities across the 16 applicable local health districts (66% of eligible facilities across metropolitan and regional settings) was deemed to be a fair representation of the population of interest. At the invited facilities, physiotherapists were eligible for inclusion if they were routinely working with outpatients with musculoskeletal impairments or had done so in the previous 12 months (to accommodate clinicians in rotating positions).

Data analysis

For our data analysis, we used R software (R Foundation for Statistical Computing, Vienna, Austria). We used descriptive statistics and logistic regression models to investigate relationships between demographic predictors, attitudes, and behaviours regarding resource use. We used dichotomous and proportional odds ordinal logistic models for certain analyses, and identified statistically significant odds ratios (ORs; $p < 0.05$). ORs were used to measure the association between categorical predictors and categorical outcomes, with CIs reported concurrently as an estimate of the precision of each OR. We analyzed open-ended responses using qualitative thematic analysis and grounded coding to identify common themes.

RESULTS

Respondents

A total of 193 surveys were returned from 64 sites (75% response rate, 85% site response rate). Of the respondents, 115 (60%) were female, and approximately

Table 1 Distribution of Demographic Characteristics of Respondents

Characteristic	No. (%) of responses (<i>n</i> = 193)*
Gender	
Male	68 (35)
Female	115 (60)
Age, y	
<26	48 (25)
26–35	47 (24)
36–45	31 (16)
46–55	41 (21)
56–65	16 (8)
Qualifications	
Undergraduate only	129 (69)
Postgraduate	54 (28)
Experience, y	
<1	29 (15)
1–5	43 (22)
6–10	19 (10)
11–15	24 (12)
16–20	14 (7)
>20	54 (28)

*Percentages may not add to 100 because not all respondents answered all questions.

half ($n = 95$; 49%) were younger than age 36 years. Age and other demographic information for respondents are presented in Table 1. We found a strong positive correlation between physiotherapist age and years in practice ($r = 0.9$). An undergraduate qualification was most frequently reported as the highest level of education ($n = 129$; 67%).

What types of clinical anatomy resources do musculoskeletal physiotherapists access?

A total of 127 respondents (66%) reported that they most frequently accessed printed clinical anatomy resources (e.g., textbooks); 66 (34%) indicated that they accessed online resources most frequently. Search engines ($n = 134$; 69%) and online journals ($n = 111$; 58%) were the primary online resources used; respondents also reported using Wikipedia ($n = 54$; 28%), Australian Physiotherapy Association webinars ($n = 29$; 15%), Access Medicine ($n = 16$; 8%), and "other" ($n = 29$; 16%). Few physiotherapists said they never used online resources ($n = 30$; 16%), and only 3 (2%) never used printed resources. One respondent indicated no access to printed clinical anatomy resources; 34 (18%) reported having no Internet access.

How often and why do musculoskeletal physiotherapists access clinical anatomy resources?

Clinical anatomy resources were mostly used to inform current patient management ($n = 111$; 58%); other uses included professional development ($n = 16$; 8%), education ($n = 11$; 6%), and personal interest ($n = 2$; 1%). More than one quarter of respondents ($n = 53$; 27%)

Figure 1 Proportions of selections for perceived barriers to online clinical anatomy resource use by physiotherapists, split by increasing practical experience.

Figure 2 Proportions of selections for those factors indicated to improve clinical anatomy resource access, split by increasing practical experience.

answered this question inappropriately, identifying multiple reasons for using clinical anatomy resources when asked to specify only one; these answers were not included in the analysis.

A total of 27 respondents (14%) reported accessing clinical anatomy resources more than once a day; the highest frequency of access was 1–5 times per week ($n = 80$; 41%). Fewer respondents reported access frequencies of 1–5 times per fortnight ($n = 24$; 12%), 1–5 times per month ($n = 36$; 19%), and 1–5 times per year ($n = 16$; 8%).

How do musculoskeletal physiotherapists perceive clinical anatomy resources?

Three quarters of respondents ($n = 146$; 76%) perceived textbooks to be the most reliable information source, as opposed to journals ($n = 26$; 13%), online resources ($n = 17$; 9%), or other sources ($n = 2$; 1%). Most respondents ($n = 134$; 69%) indicated that online access could be improved to meet their clinical anatomy resource needs, and 90 (47%) said that printed resources could be improved; 71 respondents (37%) reported that improve-

ments in both online and printed resource access would be welcomed.

Do demographic factors influence the attitudes and behaviours of musculoskeletal physiotherapists regarding clinical anatomy resource use?

We found a significant relationship between years in practice and frequency of use of any clinical anatomy resource ($[OR] = 1.35$; 95% CI, 1.17–1.57), including online resources ($[OR] = 1.34$; 95% CI, 1.16–1.55) and printed resources ($[OR] = 1.34$; 95% CI, 1.16–1.55), which indicates that less experienced physiotherapists used resources more. For the purposes of this analysis, an OR of 1.35 means that a decrease of one level in years in practice (based on the categorical groupings in Table 1) was associated with a 35% increase in the odds of reporting a higher frequency of clinical anatomy resource use.

The high correlation between age and experience meant that we obtained similar results using age as a predictor instead of experience (data not shown). We found no significant associations between sex, years in practice, highest qualification, or any combination of predictors and the type of clinical anatomy resource most frequently used (online vs. printed).

Among less experienced physiotherapists, commonly perceived barriers to the use of online clinical anatomy resources included poor or no online access; however, more than 50% of more experienced physiotherapists, on average, identified lack of time as a barrier to accessing online resources (see Figure 1). A high proportion said that lack of resource reliability or relevance was not a barrier to use of online resources (see Figure 1). A higher proportion of less experienced physiotherapists suggested obtaining some online access or improving current online facilities as possible ways to improve access to resources (see Figure 2). This proportion declined with increasing years in practice.

Open-ended responses

A total of 40 participants (21%) responded to the open-ended question at the end of the survey. Of these responses, 21 were coded as expressing a desire for improved access to online or electronic resources (e.g., “Give us internet access. First year grads would benefit as they are the ones usually finding themselves in situations where they need to look something up at work and can’t”; “Internet access would be extremely useful”). Three felt that their access to clinical anatomy resources was sufficient (e.g., “It is fine”; “I am lucky at work to have access to lots of resources”); two reported time constraints as a significant barrier to resource access (e.g., “Time, time, time—I work in public health”); and four said that anatomy resources with strong clinical relevance were especially desired (e.g., “Linking anatomy to musculoskeletal pathology would be excellent”). The remainder reported concerns about the reliability of information provided on Web sites (e.g., Wikipedia), identified limited awareness of resources available, expressed

a preference for textbook resources, identified ease of use as a strength of online resources, highlighted the importance of resources for a sole clinician in a rural hospital, suggested a physiotherapy educator role (a physiotherapist employed to deliver continuing education to other clinicians as a major component of his or her duties—similar to the clinical nurse educator model) or mentioned the usefulness of clinical anatomy resources in patient education.

DISCUSSION

This is the first study to explore musculoskeletal physiotherapists' interactions with clinical anatomy resources in public hospital outpatient clinics; our results highlight patterns in the use and perception of these resources. In agreement with previous studies of general clinical resource use in the medical and allied health professions, physiotherapists primarily used clinical anatomy resources for current patient management.^{1–4,9} More than half of respondents (55%) used clinical anatomy resources at least once per week; the majority (66%) used printed resources more frequently than online resources. However, 85% of physiotherapists in our study used online clinical anatomy resources, a figure higher than that found in a previous study investigating physiotherapists' use of an online clinical resource portal in general hospital practice in New South Wales in 2004 (55%)² but similar to rates of use of general clinical resources online by physiotherapists in the United Kingdom in 2013 (85%).⁹ This is possibly a result of the 9-year time difference between the studies, given the developments in online technology and resources that occurred during this period. Respondents considered printed clinical anatomy more reliable than online resources, yet nevertheless approximately 50% more respondents expressed a preference for improved access to online resources rather than textbook resources (70% vs. 47%; see Figure 2). This may suggest that, in a clinical context, access to online search engines that provide a wide range of information may be considered more informative or useful than textbooks.

Physiotherapists at all levels of experience were most likely to identify time constraints as a barrier to accessing online clinical anatomy resources (see Figure 1). This may indicate that the volume of clinical caseloads and administrative responsibilities limits the time available to physiotherapists to access clinical resources and develop their knowledge and skills. Experienced physiotherapists were more likely to identify time constraints as a barrier, which suggests that they may have greater clinical or administrative duties than their junior colleagues. Given the range of factors that could contribute to a perceived lack of time, such as time allocation for professional development, poorly distributed workload, or poor access to clinical anatomy resources, resource access should be investigated on a case-by-case basis to

identify effective solutions when lack of time is reported as a barrier to the use of clinical anatomy resources.

Less experienced physiotherapists were significantly more likely to use clinical anatomy resources and were more likely to identify lack of online access as a barrier to their use of clinical anatomy resources (Figure 1), as well as to identify obtaining or improving Internet access as a means of improving their access to such resources (Figure 2). Providing online access is particularly important for less experienced physiotherapists: Overall Internet use is higher among younger generations,^{9,21} and the online resources available to the physiotherapy profession have increased in recent years.^{22,23} Comments from less experienced physiotherapists highlight the importance of online access for this demographic in the hospital outpatient setting:

Give us internet access. First year grads would benefit as they are the ones usually finding themselves in situations where they need to look something up at work and can't.

Internet access recently withdrawn in (our local health district). Textbooks are great, but it is good to see clips, even YouTube to see techniques.

Our findings indicate that less experienced physiotherapists are concerned about a lack of resource availability in the outpatient setting and particularly about access to online resources; responses suggest that online resources are highly relevant, despite many physiotherapists perceiving lack of time as a barrier to their use. Improving clinicians' access to online clinical anatomy resources, in terms of both time and facilities, may benefit physiotherapists in the outpatient setting. Such access is important because it may affect clinical practice and patient management, particularly for physiotherapists new to this work setting with little appropriate clinical experience. Many publications have commented on the usefulness and variety of online resources for use in clinical practice,^{2,9,24,25} continuing professional development,²⁶ and student education.^{8,27–29} Such resources include the use of social media in the workplace, with recent publications highlighting the potential clinical and professional value of these Internet networks as resources.^{22,30}

LIMITATIONS

Our study has several limitations. First, there is a possibility of responder bias, although the response rate (75% response rate, 85% site response rate) was acceptable for a postal survey, according to Bowling,³¹ and included a higher proportion of outpatient physiotherapist respondents than previous similar work.² Second, the sample was limited to public-sector physiotherapists in one Australian state; therefore, it is not clear whether our results can be generalized to other Australian states, other countries, or the private musculoskeletal physio-

therapist population. Nevertheless, our findings do highlight comparable trends in resource use between our New South Wales sample and hospital-based physiotherapists in the United Kingdom and suggest that aspects of these results can be translated to locations in which print and online resources are available to physiotherapists in an outpatient setting.

CONCLUSION

This novel investigation of physiotherapists' use of clinical anatomy resources in public hospital musculoskeletal outpatient clinics highlights trends in resource use. The majority of physiotherapists access clinical anatomy resources as much as five times per week, mostly for current patient management; less experienced physiotherapists use these resources more frequently. Although physiotherapists would like to see improvements to both printed and online resources currently available, a larger proportion indicated that online access requires improvement, despite considering online material less reliable than printed resources. The desire for online resources is particularly prevalent among less experienced physiotherapists. Additional investigations are required to determine whether providing different types of clinical anatomy resources leads to changes in resource use; possible benefits include facilitation of evidence-based practice and informed clinical reasoning, implementation of support networks for outpatient practice, and potentially improved patient outcomes.

KEY MESSAGES

What is already known on this topic

Knowledge of clinical anatomy is of paramount importance to musculoskeletal physiotherapy practice, and clinical anatomy resources can equip physiotherapists with information to guide their clinical decision making. Physiotherapists use a mixture of online and textbook resources to access clinical information, but musculoskeletal physiotherapists' behaviours and attitudes toward clinical anatomy resources have not previously been explored.

What this study adds

This study is the first to examine the use of clinical anatomy resources in public hospital musculoskeletal physiotherapy outpatient services. Respondents identified time constraints and lack of Internet access as barriers to accessing clinical anatomy resources. Less experienced physiotherapists use clinical anatomy resources most frequently and are more likely to report lack of Internet access as limiting their use of resources in the workplace. Findings suggest that improving Internet facilities for junior physiotherapists, as well as allowing time for clinical resource access, could support physiotherapists in using anatomy resources that contribute to the development of their clinical reasoning.

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