Arthritis New Zealand Summer Scholarships Reporting Template

Name of Student

Ollie McCullough

Primary Supervisor's Name

Tehmina Gladman and Rebecca Grainger

Primary Supervisor's Institution (including address)

University of Otago, Wellington
PO Box 7343
Newtown
Wellington 6242
New Zealand

Development of a framework to inform the creation of a mobile app to support students learning musculoskeletal (MSK) examination

Statement Regarding Arthritis New Zealand Sponsorship

I would like to thank Arthritis New Zealand for the sponsorship of this research. This funding has allowed me to learn new research techniques, expand my knowledge in a medical field of interest and provide a framework to hopefully improve medical student musculoskeletal education and therefore improve patient outcomes in the future.

Student's Personal Comment About Study/Experience (maximum 250 words)

With my interest in musculoskeletal (MSK) medicine, technology and medical education, this was an appropriate project to expand on my previous research experience. This was my first experience doing qualitative research, and so it was a great opportunity to develop skills in literature review, thematic analysis and designing a focus group. Undertaking this research project has made me reflect on how medical education is currently taught and the direction of medical education in the future. As medical education continues to change due to COVID-19, I wonder how this might impact medical students' competency as health professionals. It would be very difficult to find a medical student that does not have a smart phone or device, therefore an emphasis on the utility of mobile app technology for medical education could be a good way to bridge the gap created by disruptions to teaching. Before doing this project, I thought that the best step forward with medical education would be to go back to how we were taught before with in person classes and tutorials. What I have realised after doing this project is though that is desirable, I think our focus should be how can we provide the best medical education in a constantly changing world due to COVID-19; and I think mobile apps and technology should be a part of the solution.

Summary of the Project

Musculoskeletal (MSK) conditions are a common reason for people to seek medical care. Arthritis is a common musculoskeletal disorder (MSD), with an estimated 16.7% prevalence among New Zealand adults in 2020 (1). People with MSK symptoms present in a variety of contexts, including primary and secondary care. Therefore, it is critical that medical students graduate with solid competency in the MSK physical examination. Previous literature suggests that this may not be consistently achieved (2, 3), in part due to inadequate MSK-focused teaching in primary medical degree programmes. Mobile apps harness significant potential to provide widely and immediately available learning they may be useful in enhancing MSK education for medical students. This study aimed to identify and describe currently available mobile apps dedicated to MSK examination skills and inform a framework for a MSK examination skills mobile app using input of medical students.

Method and Results

We used fifteen key search terms to systematically search into Google Play and Apple App Store for MSK educational apps. Of the 4897 mobile apps we found in the primary search, sixteen met the initial screening criteria by title and description. Ultimately four apps met the inclusion criteria and were assessed using the MARuL assessment tool. The MARuL is a validated measure of educational app quality which assesses items considered integral to a quality educational app using a 5-point Likert scale (4). These apps were *pGALS, Musculoskeletal Pro Consult, Physiopedia and Orthopedic Examination & Special Tests*. The mobile app scoring highest on the MARuL was Physiopedia (77/100). The lowest scoring app was Musculoskeletal Pro Consult (41/100).

Our focus group included seven year five and six University of Otago medical students (6 female, 1 male). Analysis of the focus group identified five key ideas: the need for interactive usability, the app would be most useful for just-in-time-learning, clear and concise layout, anatomy and pathology (disease-based) sections were of equal importance, and the importance of reinforcing cultural competency through reminders or 'don't forget' prompts.

Discussion

With the current prevalence of arthritis in New Zealand, an aging population and a significant number of doctors expected to retire in the coming years (5), it is vital for medical students to be competent at musculoskeletal physical examination. Mobile apps are poised to potentially positively enhance medical education. Together with only four apps of varying quality identified in the app stores that could support student learning of MSK examination, and the highest scoring app designed for physiotherapy students; there is a clear need for quality musculoskeletal examination apps. Our focus group identified key considerations that could inform future development of a new MSK examination app, specifically for Australasian medical students. In conclusion, based on our results we recommend the development of a medical student informed musculoskeletal examination app that includes key elements of interactive usability, anatomy and pathology-based sections, cultural competency and a clear and consistent interface.

References

1. MOH. Indicator: Arthritis (diagnosis) 2020/21 MOH: Ministry of Health 2021 [Available from:
2. Al-Nammari SS, Pengas I, Asopa V, Jawad A, Rafferty M, Ramachandran M. The inadequacy of musculoskeletal knowledge in graduating medical students in the United Kingdom. JBJS. 2015;97(7):e36.
3. Martins DE, Roncati ACKP, Rocha RO, Freire MP. Inadequacies of musculoskeletal medicine curriculum for undergraduate medical students: a cross-sectional study. Sao Paulo Medical Journal. 2020;138:229-34.
4. Gladman T, Tylee G, Gallagher S, Mair J, Rennie SC, Grainger R. A tool for rating the value of health education mobile apps to enhance student learning (MARuL): development and usability study. JMIR mHealth and uHealth. 2020;8(7):e18015.
5. Jones H. Working in New Zealand. BMJ. 2020;368.