Confusion among doctors regarding sports and exercise medicine as a specialty: an Australian multidisciplinary, cross-sectional survey

James Jian Yun Ooi, Robin Hutchinson, Gregory A Harris

ABSTRACT
Objectives This cross-sectional study aims to characterise the understanding and attitudes of medical practitioners with regards to sports and exercise medicine (SEM). By identifying knowledge gaps, misunderstandings and barriers to SEM referral, interventions may be suggested to improve the integration of SEM within a multidisciplinary approach to healthcare.

Design A survey was constructed with a multidisciplinary expert panel. Refinement and consensus were achieved through a modified Delphi method. Both quantitative and qualitative data were analysed and intergroup comparisons made using $\chi^2$ test of independence and post-hoc paired comparisons.

Setting The questionnaire was distributed across Australian public and private health sectors, in community and hospital-based settings.

Participants Australian medical doctors practising in specialties likely to intersect with SEM were invited; including general practice, orthopaedics, emergency, rheumatology and anaesthetics/pain. Invitation was unencapped with no reportable response rate. A total of 120 complete responses were collected.

Results The minority (42.5%) of respondents understood the role and scope of sports and exercise physicians. SEM was poorly recognised and comprehended, with the most common misconception being that SEM is solely for elite athletes and performance. Few (20%) doctors were familiar with referral pathways to SEM services. Lack of awareness, clear scope and public presence were seen as major barriers. There was near unanimous (92.5%) agreement that ‘exercise is medicine’. A strong majority felt SEM would be valuable to the role of SEM and its optimal integration. Interdisciplinary education and addressing misconceptions may improve the contribution of SEM to community healthcare.

STRENGTHS AND LIMITATIONS OF THIS STUDY
- Multi-domain analysis of doctors’ interaction with and opinions on the sports and exercise medicine specialty.
- Simultaneous linked quantitative and qualitative data.
- Subgroup comparisons between medical specialties, level of training and regionality.
- Limited sample size may affect extrapolation of findings.
- Barriers to incorporating sports and exercise medicine into community healthcare identified, but solutions undetermined.

INTRODUCTION
Exercise has long been a cornerstone for health and it is well recognised that physical function relates strongly to quality-of-life.1–3 Yet, less than half of Australians and under one-third of adults in the UK currently meet recommended physical activity guidelines.4,5 Inactivity is thus a more pervasive risk factor than either smoking or obesity, associated with one in six deaths.6,7 Globally, rising rates of inactivity, climbing prevalence of lifestyle-related morbidities and ageing populations only make the application of exercise medicine all the more pertinent today.8,9

However, the establishment of sports and exercise medicine (SEM) as a distinct medical specialty is relatively recent and under-recognised.8,9 Despite the wealth of evidence affirming the value of SEM in the primary and secondary prevention of non-communicable diseases and reduction of public health burden,10–12 medical practitioners in peer-specialties have expressed confusion regarding the role of SEM physicians.13,14 This is unfortunate, but not necessarily unexpected, given the ambiguity even within SEM professional circles.15,16 Uncertainty has been expressed regarding training pathways, scope of practice and intended patient population.14 Further, there is no consensus on the most appropriate setting for SEM services, let alone whether they ought to
be incorporated into the National Health Service (NHS) or other public healthcare systems.\textsuperscript{17} Thompson \textit{et al} sought to define unique qualities and roles of SEM physicians in the UK, but was met with criticism for imprecision and further confusion.\textsuperscript{18,19}

The Australasian College of Sport and Exercise Physicians (ACSEP) is the pre-eminent professional body in its region. Consistent with international colleges, the ACSEP describes the practice of SEM as entailing expert diagnosis and management of musculoskeletal conditions (acute and chronic), medical leadership with elite sportspersons and organisations, as well as the primary and secondary prevention of non-communicable disease in the general population.\textsuperscript{15,20,21} Proficiency is required in biomechanics, exercise physiology, sports psychology, nutrition and rehabilitation specific to patient demographic and activity goals.\textsuperscript{15,21}

SEM is not included in core curricula for university medical degrees, nor is there scope for involvement during medical residency or typical public training models.\textsuperscript{22–24} Lack of awareness, inadequate familiarity and inaccessibility are known barriers to exercise prescription and allied health referral.\textsuperscript{14,23,25} Yet, minimal studies to date have specifically described (non-SEM) medical doctors’ perceptions towards and collaboration with SEM physicians.

This study aims to address the paucity of data; by characterising non-SEM medical practitioners’ understanding of, attitudes regarding and collaboration with SEM as a specialty. Pertaining to the integration of SEM into the Australian healthcare system, specific knowledge gaps, misconceptions and logistical barriers perceived by non-SEM doctors were identified. This paper explores subgroup trends between different medical specialties, level of training and regionality. Though principally a quantitative study, qualitative responses were used to improve contextual interpretation and real world applicability.

**METHODS**

**Survey development**

This paper is a cross-sectional questionnaire-based study. A questionnaire to elicit doctors’ knowledge and attitudes towards SEM was developed using an extended Delphi method. This structured, multistage communication technique provides a formal means of achieving consensus from an expert panel. It has been previously cation technique provides a formal means of achieving consensus from an expert panel. It has been previously

In phase one of Delphi method, the expert panel were asked to independently rank each question by ‘relevance’ (integer scale of 1–5). The results were collated and the questions subsequently ranked by median relevance score (in the event of ties; then by mode, then by mean). In phase two, the question list was re-presented to the expert panel with corresponding rankings and median/mode/mean values. After round two, the top four unique quantitative questions and top qualitative question were selected for the final questionnaire. The final questionnaire thus comprised 15 questions (excluding demographics) (online supplemental document 1). Every question included in the final questionnaire had a median and mode relevance score ≥4 and was distinct in content from any other included question. Within the body of the final questionnaire, information on SEM training, services, roles and referral logistics were provided for contemporaneous context.

**Measurements**

Questionnaire items were predominantly statements in 5-point Likert scale form; from ‘strongly disagree’ to ‘strongly agree’. Complimentary qualitative questions were in free-text, short-answer format. This allowed for collection of both quantitative and expositional data.

Primary findings of interest were the descriptive statistics pertaining to doctors’ knowledge of, practice with and opinions regarding SEM as a specialty and SEM physicians. Secondary findings of interest included; (1) identification of pervasive themes in respondents’ misconceptions and perceived barriers to optimal SEM healthcare and (2) subgroup trends dependent on respondent demographic (ie, medical seniority or area of specialty).

**Participants**

Respondents were clinically practising medical practitioners, registered with the Australian Health Practitioner Regulation Authority. Doctors were invited to
complete the online questionnaire during a 3-month period, from August to October 2021. A ‘Participant Information and Consent’ form detailing the purpose of the study, anonymity of responses, use of data collected and research group contact information was provided. Participants were required to agree and consent to data collection in order to access the survey. Invitations were distributed through direct contact with public and private hospital faculties, private clinics, college websites and newsletters (including The Royal Australian College of General Practitioners, Australian Orthopaedic Association and Australian Rheumatology Association) and Victorian doctor-in-training groups. Invitation letters (online supplemental document 2) were tailored to each group summarising the present evidence and relevance of this study to each specialty practice.

Within the data collection period, there was no limit to the number of potential participants across Australia. Response rate was incalculable, as the number of doctors who read the invitation could not be monitored.

Recruitment was targeted to practitioners within medical specialties likely to have interaction with SEM or to see similar patient presentations, such as musculoskeletal conditions or minor trauma. These specialties include general practice, orthopaedic surgery, emergency medicine, anaesthetics/pain medicine, ‘other (physician)’ and ‘other (surgery)’. As only two rheumatologists responded, their responses were collated under the ‘other (physician)’ group.

Data collection and statistical analysis
Participants’ responses were collected through an online server (Google Forms). Demographic data was de-identified. All data analyses were performed using Microsoft Excel (V.2209). Categorical Likert scale responses were converted to discrete, evenly-spaced numerical data to reflect level of agreement (1=strongly disagree, 5=strongly agree). Descriptive statistics were obtained for each Likert scale questionnaire item.

Responses were then converted into dichotomous data by combining ‘strongly agree’ and ‘agree’ responses, to form ‘overall agreement’. Reciprocally, ‘neutral’, ‘disagree’ and ‘strongly disagree’ responses were grouped. This conversion is functionally meaningful as only ‘agree’ or ‘strongly agree’ responses imply respondent confidence. This technique is mathematically valid with precedence in the literature.26 The combined responses were analysed with \( \chi^2 \) goodness-of-fit test. If the frequency of observed responses in the dichotomous data differed significantly from what would be expected due to chance, then the result was considered significant.

For each of the quantitative questionnaire items, specialty subgroup responses were compared with \( \chi^2 \) test of independence and post-hoc paired comparisons. Where a \( \chi^2 \) test of independence was positive, implying a difference between one or more groups, post-hoc test was used to determine which group was statistically significantly different. This process was repeated to compare subgroup responses based on level of medical training and regionality.

All free-text responses were individually reviewed and categorised by main contention. Responses with similar keywords or contention were sorted into themes. For example, when asked to ‘describe your understanding of sport and exercise medicine as a medical specialty’, a response focusing on ‘professional sportspersons’ was grouped with ‘optimising performance’ and other like responses under the theme of ‘elite athletes’.

RESULTS
Demographics
A total of 121 medical practitioners participated in this study. One participant did not complete all questions and so was excluded from analysis.

Among the remaining 120 respondents, 27 (23%) practised emergency medicine, 21 (18%) general practice, 16 (13%) orthopaedics, 13 (11%) anaesthetics, 9 (8%) other surgery and 34 (28%) other physician (including 2 rheumatology) or undifferentiated specialties. Stratified by level of medical training, there were 25 (21%) consultants/specialists, 57 (48%) registrars, 22 (18%) residents, 13 (11%) interns and 2 (2%) medical students. Due to low power, medical students were excluded from ‘level of training’ subgroup statistical comparisons, leaving n=118. Primary location of practice for 85 (71%) was metropolitan, 35 (29%) regional.

Results below are first reported with all responses combined, before making subgroup distinctions.

Overall agreement
Each quantitative questionnaire item is listed in table 1, with respondents’ combined responses demonstrating overall agreement and accompanying \( p \) values of significance.

Sports and exercise medicine as a specialty
Respondents were evenly divided on whether they felt they understood the role of SEM physicians, or could distinguish SEM from other medical or allied health practices. A lesser number of respondents, 30.8%, were aware of the ACSEP.

When asked to characterise, in their own words, SEM and its services; 31.7% thought the main purpose was care of elite athletes or performance, 30.8% thought only acute or sporting injuries and 12.5% described no understanding at all. Just 13.3% acknowledged SEM physicians’ diagnostic role and none mentioned prevention or management of non-communicable disease, besides musculoskeletal.

Clinical practice
Only 15% of medical practitioners felt capable of prescribing exercise. Few, 20%, knew how to access SEM services. A substantial majority, 80%, had professional confidence in SEM physicians. In free-text response, the
most commonly cited barriers to SEM involvement with patient care were; uncertainty of SEM scope and contribution (40.9%), lack of availability and access (27.5%) and absence of public or hospital presence (20.9%).

**Current opinions**

Almost all doctors, 92.5%, agreed with the concept of exercise as medicine. Conversely, respondents were equivocal on whether SEM physicians were valuable for the general population, or in management of non-musculoskeletal but activity-related conditions, Most, 63.3%, saw collaboration with SEM physicians as beneficial to their current clinical practice. The vast proportion, 82.5%, felt Australia’s public healthcare would be improved with greater SEM involvement.

**Subgroup comparison**

Aside from a few notable exceptions, there was largely concordance between subgroups.

Between specialties, orthopaedic doctors were significantly more likely to be familiar with SEM referral pathways (see figure 1), $\chi^2$ (5, N=120)=12.48, p=0.03. General practitioners were significantly more likely to rate SEM physicians as useful for general people, $\chi^2$ (5, N=120)=12.88, p=0.02.

Respondents in regional areas were significantly more likely to view collaboration with SEM as valuable in their current practice (see figure 2), $\chi^2$ (1, N=120)=8.11, p<0.01, and public healthcare system, $\chi^2$ (1, N=120)=4.75, p=0.03.

There were some significant differences between responses compared against the level of medical training. Consultants/specialists were much more confident in their understanding of the roles of SEM physicians (see figure 3), $\chi^2$ (3, N=118)=18.42, p<0.01, differentiating them from other healthcare providers, $\chi^2$ (3, N=118)=11.5, p=0.01, and referring, $\chi^2$ (3, N=118)=8.22, p=0.04. Junior doctors (interns and residents), on the other hand, understood less about the scope of SEM, $\chi^2$ (3, N=118)=18.42, p<0.01, and were less able to describe its distinction from other healthcare, $\chi^2$ (3, N=118)=11.5, p=0.01.

**DISCUSSION**

This study is the first in Australasia to investigate medical practitioners’ understanding and views on sports and exercise medicine as a specialty. This paper expands on existing literature by not only analysing doctors’ awareness of SEM services, but also interactions in current clinical practice, and subjective opinions on the specialty’s scope and value. This is the first study to make comparison between doctor demographic subgroups; specialty, seniority and regionality.

<table>
<thead>
<tr>
<th>Question</th>
<th>Agreement n (%)</th>
<th>Disagreement n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports and exercise medicine as a specialty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am aware of the Australasian College of Sport and Exercise Physicians</td>
<td>37 (30.8)</td>
<td>83 (69.2)</td>
<td>$\chi^2$ (1, N=120)=17.63, p&lt;0.01</td>
</tr>
<tr>
<td>I understand what sports and exercise physicians do</td>
<td>51 (42.5)</td>
<td>69 (57.5)</td>
<td>$\chi^2$ (1, N=120)=2.7, p=0.10</td>
</tr>
<tr>
<td>I can describe the distinction between sports and exercise physicians and other medical specialties/allied health providers</td>
<td>56 (46.7)</td>
<td>64 (53.3)</td>
<td>$\chi^2$ (1, N=120)=0.53, p=0.47</td>
</tr>
<tr>
<td>Clinical practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in providing patients an exercise prescription</td>
<td>18 (15)</td>
<td>102 (85)</td>
<td>$\chi^2$ (1, N=120)=58.8, p&lt;0.01</td>
</tr>
<tr>
<td>I am familiar with the referral pathways to see an SEM physician/ registrar</td>
<td>24 (20)</td>
<td>96 (80)</td>
<td>$\chi^2$ (1, N=120)=43.2, p&lt;0.01</td>
</tr>
<tr>
<td>I trust the advice of SEM physicians/registrars</td>
<td>96 (80)</td>
<td>24 (20)</td>
<td>$\chi^2$ (1, N=120)=43.2, p&lt;0.01</td>
</tr>
<tr>
<td>Opinions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe in exercise/physical activity as medicine</td>
<td>111 (92.5)</td>
<td>9 (7.5)</td>
<td>$\chi^2$ (1, N=120)=86.7, p&lt;0.01</td>
</tr>
<tr>
<td>For most people, sport and exercise medicine physicians are useful medical providers</td>
<td>65 (54.2)</td>
<td>55 (45.8)</td>
<td>$\chi^2$ (1, N=120)=0.83, p=0.36</td>
</tr>
<tr>
<td>I would refer to an SEM physician for management of non-musculoskeletal, activity-related conditions</td>
<td>61 (50.8)</td>
<td>59 (49.2)</td>
<td>$\chi^2$ (1, N=120)=0.03, p=0.86</td>
</tr>
<tr>
<td>Collaborating more with SEM physicians would be valuable in my current clinical practice</td>
<td>76 (63.3)</td>
<td>44 (36.7)</td>
<td>$\chi^2$ (1, N=120)=8.53, p&lt;0.01</td>
</tr>
<tr>
<td>Sport and exercise medicine would be beneficial as part of the public healthcare system</td>
<td>99 (82.5)</td>
<td>21 (17.5)</td>
<td>$\chi^2$ (1, N=120)=50.7, p&lt;0.01</td>
</tr>
</tbody>
</table>

Bold values are those demonstrating statistical significance (i.e. p<0.05)
The questionnaire-based study offered several advantages over alternative study designs such as interviews. Questionnaires allowed for larger sample size, increasing representativeness of data and ensured standardised data collection enhancing reliability of findings. Questionnaire anonymity potentially encouraged more honest and unbiased responses.

The results of this study demonstrate a foremost lack of understanding among doctors of what SEM comprises. Respondents struggled to distinguish SEM from other allied health services, let alone as a distinct medical specialty. Consistent with previous research internationally, the most pervasive misconceptions were that SEM was reserved for elite athletes, sporting performance or acute on-field injuries.14 27  Concerningly, this overlooks the important role SEM has in managing the general public and secondary prevention of lifestyle-associated non-communicable illnesses.29-32

Misunderstanding may be due in part to the historical but reductive title of ‘sports medicine’ and ambiguity during the establishment of the specialty.9 15 33 Earlier academic attempts to define SEM concluded non-unique characteristics generalisable to most doctors, leading to criticism and confusion.16 19 Perhaps unsurprisingly then, respondents of this study too cited uncertainty of SEM scope as the main barrier to referral. Familiarity is crucial to facilitating interdisciplinary healthcare.25 34 General practitioners with previous SEM exposure are significantly more likely to refer to SEM services.27  Similarly, in this study, the orthopaedic subgroup, whom would most intersect with SEM physicians in practice, were statistically significantly more confident in both identifying and accessing SEM services.
These findings highlight the need for increased SEM education and training for medical doctors. Junior doctors in this study, particularly, understood significantly less about the scope of SEM and lacked confidence with exercise prescription. There is a conspicuous absence of SEM in medical school curricula and basic medical training, in spite of medical student and junior doctor interest.\(^1\)\(^2\)\(^3\)\(^4\) It is only in recent years that concerted efforts have been made to develop robust SEM syllabuses.\(^2\)\(^6\)\(^7\) Further development of educational programmes may better equip future doctors with the knowledge and skills necessary to recognise when SEM would be of value and to integrate physical activity as part of standard medical practice.

This study and others indicate that a significant minority of doctors currently feel confident prescribing exercise.\(^1\)\(^2\)\(^7\)\(^8\) This is despite near unanimous agreement from respondents that physical activity is medicine. There is a wealth of literature supporting the beneficial application of exercise to broad-ranging health conditions; including but not limited to musculoskeletal conditions, obesity, heart disease, diabetes, hypertension, mental illness and cancer.\(^2\)\(^3\)\(^2\)\(^8\)\(^9\)\(^9\) Exercise may, in fact, be serially underused, due to limitations in expertise or resourcing.\(^27\)\(^4\)\(^9\) Indeed, respondents had poor recognition of indications for SEM referral, let alone pathways to access SEM services. Moreover, general practitioners and regionally based doctors, in this study, were significantly more likely to view SEM services as useful to the general public. This potentially reflects recognition of the benefit SEM could have towards primary and secondary preventative healthcare in lower-resourced areas.

Respondents were very strongly in favour of incorporating SEM into the Australian public health system, echoing similar calls for inclusion in the NHS.\(^4\)\(^5\) With scarce exception in Australia, SEM is currently restricted to private clinics with out-of-pocket costs. Within Australian public emergency departments, musculoskeletal injury is the most common problem category accounting for over a quarter of presentations.\(^4\) Rates and severity of non-communicable disease are highest among populations of lower socioeconomic brackets.\(^4\) Therefore, those who would benefit most from exercise prescription and musculoskeletal expertise may not have access to SEM services, without a public presence.\(^4\) Doctors in this study agreed, describing lack of access and absence of public health service as major barriers to involving SEM in patient care.

A conceptual framework illustrating the issues affecting doctors’ understanding of and consequent usage of SEM is seen in figure 4.

Interpretation of this study is tempered by some limitations. Sample size was relatively small. However, the questionnaire has face and content validity, and was developed through a precedented Delphi method. Non-randomised (open invitation) participation may not have produced a representative sample of the overall medical doctor population. However, if anything, responder bias would have skewed results towards more interest and familiarity with SEM. This study may thus, in fact, be underestimating the depth of SEM misunderstanding.

Despite these limitations, this study provides contemporaneous insight into the attitudes of medical doctors towards the young SEM specialty. The findings of this study emphasise widespread lack of understanding and underusage of SEM. On the other hand, there is common sentiment among doctors, that SEM is of value in multidisciplinary healthcare, particularly if able to be incorporated into the public sector.

Further research is needed to identify the optimal methods of improving doctors’ education of and integration with SEM services, noting that specific misconceptions may vary by demographic as demonstrated in this paper. Accordingly, the ongoing development of SEM medical school and junior doctor curricula should
Conceptual Framework - Factors affecting doctors' understanding and utilisation of SEM

Each node in the model represents a factor that generates confusion for doctors regarding SEM. Arrows indicate that one factor led or may lead to another (in some cases, reciprocally). The presence of any or multiple of these factors ultimately contributes to underutilisation of SEM.

Figure 4  Conceptual framework—factors affecting doctors’ understanding and usage of SEM. SEM, sports and exercise medicine.
be encouraged. Given the overwhelming support of medical peers for public SEM services, public health networks may strongly consider introducing and incorporating SEM specialists in their departments and patient care programmes.

CONCLUSION
This study sheds light on the prevailing lack of understanding and misconceptions surrounding SEM among medical practitioners. The findings highlight the need for increased education and integration within the medical field to fully realise the potential of SEM in improving patient care and population health. Junior doctors, in particular, require targeted training to enhance their knowledge and confidence in prescribing exercise and recognising the broader scope of SEM beyond elite athletes.

This study emphasises the importance of incorporating SEM into the public healthcare system. Currently, SEM services are predominantly limited to private clinics, creating barriers for those who would benefit most from exercise prescription and musculoskeletal expertise. By expanding SEM services within the public sector, accessibility can be improved, particularly in underserved areas, as well as primary and secondary preventive healthcare settings.

Further research is needed to identify effective strategies for enhancing doctors’ education and collaboration with SEM specialists. The ongoing development of SEM curricula for medical schools and junior doctors should be encouraged to address knowledge gaps and promote interdisciplinary cooperation. By embracing SEM as a distinct medical specialty and integrating it into the public healthcare system, a proactive and holistic approach to healthcare can be fostered that promotes physical activity and enhances the well-being of individuals and communities.

Contributors JJOY was responsible for project conception, background and literature review, study methodology, design of collection tools, recruitment of participants, data acquisition, data analysis and interpretation, manuscript write-up and revisions. RH wrote the statistical analysis plan, cleaned and analysed the data, provided interpretation of data for the work, drafted and revised the work for important intellectual content. GAH conceived the project and was involved in study design, questionnaire development, recruitment of expert panel participants, interpretation of results, direction of manuscript content and proofing. All authors provided final approval of the version to be published and are accountable for the accuracy and integrity of the work. JJYO is the author acting as guarantor.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Ethics approval was granted by Ballarat Health Services Healthcare Human Research Ethics Committee (Project ID 68342). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Data are available upon reasonable request. Please contact corresponding author.

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Doctors' understanding and views on Sports & Exercise Medicine (SEM) as a specialty

Research project - Dr James Ooi (ACSEP registrar)

* Required
Participant Information and Consent Form

Invitation
You are invited to take part in research study about Doctors’ understanding of sports and exercise medicine as a specialty. This Participant Information and Consent Form (PICF) tells you about the study, what information we are collecting and what we are asking of you. This information is to help you decide if you want to take part in the study or not. Please read this information carefully. Ask questions about anything you don’t understand, or you want to know more about. Before deciding whether or not to take part, feel free to talk about it with someone.

What is the purpose of this study?
1. Characterise non-SEM medical practitioners’ understanding of, attitudes regarding and collaboration with SEM as a specialty
2. Identify knowledge gaps and logistical barriers limiting collaboration between peer specialties and SEM

Why am I invited to participate in this study?
As a registered medical doctor, you fall into the target participant demographic for this study. We are interested in and value your opinions on sports and exercise medicine as a specialty.

What does this study involve?
This study involves completing a short online questionnaire, that takes around 5 minutes. Response data will be analysed to detect prevailing opinions and notable trends.

What are the possible benefits?
We cannot promise any benefits from this research, however we hope that based on the results we will be able to make suggestions for a distinct definition of SEM as a specialty, ways to address misconceptions and optimise delivery of SEM-related healthcare in the community.

What are the possible risks?
It is highly unlikely that there will be any risk to you if you decide to take part in this study. Other than the time it takes complete you will not be inconvenienced as a result of this project. It is not anticipated that you will experience any level of physical or emotional discomfort as a result of being part of this study. If you do get distressed as a result of being a part of this research, contact Dr James Ooi (contact details listed below). The researcher will be able to arrange for counselling or other appropriate support.

Do I have to take part in this study?
Taking part in any activity requires your consent. By signing a consent form, you agree to the research team collecting and using data that you provide. Consent means you (a) understand the information in this PICF, (b) have had opportunity to ask questions and are satisfied with answers you received, (c) understand the purpose, procedures and risks of the study as described in this document, and (d) freely agree to participate in this study as described and understand that you are free to withdraw at any time without this affecting your future relationship with your health service.

What will happen to information that I provide?
By saying you agree to being part of the study, you consent to the research team collecting and using the information you tell us. This information will only be available to the research team. Any information collected in connection to this study that could identify you, will remain confidential. Information will be kept at Ballarat Orthopaedics & Sports Medicine in a password protected electronic format. After 7 years, the information will be destroyed. Results from this study will be published and presented in a variety of forums. Information will be presented in a way that you cannot be identified. The information you share with us may be used to develop other research projects, provided they have ethical approval.

What if I change my mind and want to withdraw from the study?
If you decide to take part and later change your mind, you are free to withdraw from the study. If you decide to withdraw, please notify Dr James Ooi as soon as possible (contact details below). If you decide to take part and later change your mind, you can withdraw at any stage before completing the questionnaire. If you decide to withdraw after completing the questionnaire, your responses will not be able to be withdrawn as they will be recorded anonymously.

Who is doing this study?
Dr James Ooi is conducting this study. The Australasian College of Sport and Exercise Medicine (ACSEP) has approved this study. The study is supported by Ballarat Orthopaedics & Sports Medicine and the NOVAR Musculoskeletal Research Institute (NMRI).

How will I be informed of the study results?
Study results will not be routinely distributed to participants, but will be publicly available upon publication. If you would specifically like a copy of the article after publication, please contact Dr James Ooi.

Is this an approved study?
Yes, the Human Research Ethics Committee of Ballarat Health Services and St John of God has approved the ethical aspects of this study. This study will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

https://docs.google.com/forms/d/1zD7tcVyrU9PBXgmJk1QzODt9WBwyplkIZRWJksp5J-o/edit

14/08/2021

Doctors' understanding and views on Sports & Exercise Medicine (SEM) as a specialty

How can I know more about this study?
For more information on this study, please contact:
Researcher Dr James Ooi
Position Sports & Exercise Medicine Registrar
Telephone (03) 5332 2969
Email jamesooi.sports@gmail.com

Complaints
If you have any complaints about any aspect of the study, the way it is being conducted or questions about being involved in
a study in general, please contact:
Reviewing HREC name Ballarat Health Services
HREC Executive Officer Diane Clingin Manager, Research Ethics & Governance
Telephone 03 5320 8661
Email researchethics@bhs.org.au

Thank you for considering being a part of this study.

This information sheet is printable for you to keep.

1. I have read and understand the above Participant Information and Consent Form. I consent
to my anonymous participation in this study. *

   Mark only one oval.

   [ ] Yes
   [ ] No

Demographics

All responses are anonymous and confidential, used for the purpose of academic study only.
Collated results may be analysed and published in medical journal.

2. Specialty *

   Mark only one oval.

   [ ] General Practice
   [ ] Emergency Medicine
   [ ] Orthopaedics
   [ ] Rheumatology
   [ ] Other (Physician)
   [ ] Other (Surgery)

3. If you answered ‘Other’ above, please state your specialty

https://docs.google.com/forms/d/1zD7icVyrU9PBXgmJK1QzODt9iWBwypktZRWjKp5J-o/edit
Doctors' understanding and views on Sports & Exercise Medicine (SEM) as a specialty

4. Level of Training *

*Mark only one oval.*

- Consultant/Specialist
- Registrar
- Resident/HMO
- Intern
- Medical Student

5. Postcode of primary practice *

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**SEM as a specialty**

The ACSEP is the pre-eminent professional body representing Sport and Exercise Physicians and Sport and Exercise Medicine in Australia and New Zealand. ACSEP fellows are medical doctors who have completed a minimum four-year registrar training program.

Prospective registrars must be minimum PGY4 and pass the entry examination. Completion of the training program requires experience across community medicine, internal medicine as it relates to sport and exercise, orthopaedic surgery and elite sport. Academic and clinical examinations must be passed prior to award of fellowship.

Sports & Exercise Physicians are diagnosticians and treat a range of medical and orthopaedic conditions utilising exercise prescription, medication and procedural skills.

The ACSEP gained specialist recognition from the Australian Medical Council in 2005, and has recently been reaccredited for six years.

6. I am aware that Sports and Exercise Medicine is a recognised medical specialty *

*Mark only one oval.*

- Yes
- No
- Unsure

7. I am aware of the Australasian College of Sport and Exercise Physicians (ACSEP) *

*Mark only one oval.*

- Yes
- No
- Unsure
8. I understand what Sports & Exercise Physicians do (i.e. conditions managed, treatments offered) *

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

9. I can describe the distinction between Sports & Exercise Physicians and other medical specialties/Allied Health providers *

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

10. Please describe your understanding of sport and exercise medicine as a medical specialty (30 words or less) *

_________________________________________

_________________________________________

_________________________________________

Sports & Exercise Physicians are readily accessible community doctors.

Patients may self-refer to an ACSEP registrar or physician (consultant). Medicare rebates are available for patients seeing an ACSEP physician, when referred by a GP or other medical doctor.

In Australia currently, physiotherapists frequently refer to ACSEP physicians, but these referrals are not eligible for Medicare rebates.

11. I am confident in providing patients an exercise prescription *

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree
12. I am familiar with the referral pathways to see an SEM physician/registrar *

Mark only one oval.

1  2  3  4  5

Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

13. I trust the advice of SEM physicians/registrars *

Mark only one oval.

1  2  3  4  5

Strongly Disagree  ○  ○  ○  ○  ○  Strongly Agree

14. If not referring to SEM doctors for exercise or musculoskeletal issues, to whom do you refer (can select multiple)?

Check all that apply.

☐ Orthopaedic Surgeon
☐ Rheumatologist
☐ Physiotherapist
☐ Exercise Physiologist
☐ Occupational Therapist or Hand Therapist
☐ Osteopath
☐ Myotherapist
☐ Chiropractor
☐ Psychologist
☐ Complementary Medicine (incl. acupuncturist, naturopath)
☐ No Referral

Other: ☐

15. What barriers do you perceive in connecting patients with an SEM physician/registrar (30 words or less)? *

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Doctors' understanding and views on Sports & Exercise Medicine (SEM) as a specialty

Opinions

There are many beliefs regarding the role of Sports & Exercise Physicians and SEM as a specialty. Please answer candidly below.

16. I believe in exercise/physical activity as medicine *

Mark only one oval.

1 2 3 4 5

Strongly Disagree   Strongly Agree

17. Please briefly explain your response (30 words or less)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

18. For most people, Sport and Exercise Medicine physicians are useful medical providers *

Mark only one oval.

1 2 3 4 5

Strongly Disagree   Strongly Agree

19. Please briefly explain your response (30 words or less)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

https://docs.google.com/forms/d/1zD71cVyrU9PBXgmJK1QzODt9iWBwypkiZRWjKp53J-o/edit
20. I would refer to a SEM physician for management of non-musculoskeletal, activity-related conditions (e.g. concussion, pre-participation screening, environmental/expedition medicine, sports nutrition, exercise prescription for health in the setting of medical comorbidities) *

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

21. Please briefly explain your response (30 words or less)


22. Collaborating more with SEM physicians would be valuable in my current clinical practice *

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

23. Please briefly explain your response (30 words or less)


24. Sport and Exercise Medicine would be beneficial as part of the public healthcare system *

*Mark only one oval.

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<tr>
<td>Strongly Disagree</td>
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25. Please briefly explain your response (30 words or less)

________________________________________________________________________
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Have your say! – Doctors’ understanding of sports and exercise medicine

We would like to invite you to participate in a new research project, ‘Doctors’ Understanding of Sports and Exercise Medicine (SEM) as a Specialty.’

This cross-sectional study aims to characterise non-SEM medical practitioners’ understanding of and attitudes towards SEM. By identifying knowledge gaps and logistical barriers, we hope to make suggestions on how SEM may be made more accessible and better contribute to community healthcare.

To participate, please fill out this 5-minute online questionnaire: https://bit.ly/under-SEM

This study is led by Dr James Ooi (Sports & Exercise Medicine Registrar) with support from the Australasian College of Sport & Exercise Physicians (ACSEP).
Subject: Request for distribution of electronic research survey

'Doctors' understanding and views on Sports and Exercise Medicine (SEM) as a specialty'

Research Question:

What are doctors' current understandings of Sports and Exercise Medicine as a medical specialty and views on its utility in community healthcare?

Background:

Sports and exercise medicine (SEM) has long been a cornerstone for health and wellbeing. However, establishment as a distinct medical specialty is relatively recent and under-recognised. Despite a wealth of evidence to support the value of SEM in the treatment of non-communicable disease and prevention of public health burden, medical practitioners in peer specialties have expressed confusion or criticism regarding the role of SEM physicians. This is unfortunate but unsurprising, given the ambiguity even within SEM professional circles.

Inadequate familiarity and unawareness of availability are known barriers to exercise prescription and specialist Allied Health referral. Yet, no studies, to date, have described non-SEM medical doctors’ perceptions towards and collaboration with SEM physicians. By characterising gaps in understanding and referral opportunity, this study hopes to identify areas that may be addressed for improved interdisciplinary care.

References:

4. Cullen M. Crossroads or threshold? Sport and exercise medicine as a specialty in the UK. In: British Association of Sport and Excercise Medicine; 2009.
Relevance to Emergency Medicine:

Within Australian emergency departments, musculoskeletal/injury is the most common problem category, accounting for over a quarter of total presentations.\(^{15}\) Despite emphasis on primary care, 45% of presentations continue to be for low acuity; again, most commonly associated with musculoskeletal issues.\(^{16}\) At least a third of these patients would prefer to see their general practitioner, but often have already seen a healthcare provider who actually referred them to emergency.\(^{17}\) This situation may overload the emergency department with non-urgent patients, risking delays to care, bed availability and vulnerability to surges (patient influxes).

Moreover, management of these patients is unideal in the emergency setting. Due, at least in part, to the aforementioned pressures, there is discordance between recommended high-quality care and actual practices.\(^{18}\) These include, but are not limited to, relatively high rates of imaging and opioid use.\(^{19}\) In contrast, there is abundant evidence that utilising a musculoskeletal healthcare provider is safe, reduces wait times, length of stay and admission rates.\(^{20-22}\) Musculoskeletal specialists improve patient flow, patient satisfaction and are perceived positively by clinical staff.\(^{21-23}\)

The advantages of utilising sport and exercise medicine (SEM) physicians include but exceed their musculoskeletal expertise. SEM physicians are independently able to enact non-operative orthopaedic management, whilst having high familiarity with thresholds for surgery. Being doctors first, they are capable with pharmaceutical prescription, wound management and other procedural skills. SEM physicians are experts in concussion assessment and all aspects of return-to-sport/work planning. They are trained in exercise prescription to prevent recurrence (falls, tendinopathies, etc.), thereby reducing re-presentation rates.\(^{20}\) Junior medical officers report poor confidence with musculoskeletal patients and SEM physicians may fill an educational role.\(^{24}\)

24. Boulter EL, Rogers JR, Borland ML. Improving junior doctors' confidence in paediatric musculoskeletal
Project Details:

Plain Language Statement

The establishment of sports and exercise medicine (SEM) as a distinct medical specialty is relatively recent and under-recognised. Despite a wealth of evidence to support the value of SEM in the management of musculoskeletal conditions and prevention of chronic disease, medical practitioners in peer specialties have expressed confusion or criticism regarding the role of SEM physicians.

This study will be the first to characterise non-SEM medical practitioners’ understanding of and attitudes towards SEM. By identifying knowledge gaps and logistical barriers, we hope to make suggestions on how SEM may be made more accessible and better contribute to community healthcare.

Target population:

Doctors in clinical practice who manage patients with musculoskeletal conditions and/or lifestyle-related illnesses. This includes both emergency physicians and trainees. Respondents should not be sports and exercise medicine specialists, i.e. fellows or registrars with the Australasian College of Sport and Exercise Physicians (ACSEP).

Purpose and proposed use of the study findings:

1) Characterise non-SEM medical practitioners’ understanding of, attitudes regarding and collaboration with SEM as a specialty
2) Identify knowledge gaps, misconceptions and logistical barriers limiting collaboration between peer specialties and SEM
3) Based on the above, make suggestions for a concise statement to help clarify the roles and contributions of SEM as a specialty

Expected benefits:

1) Proposals on how SEM physicians may best collaborate in the non-operative management of musculoskeletal conditions and non-communicable disease
2) Suggestions on how SEM services may be most effectively made more accessible
3) Suggestions on how SEM may be effectively integrated into the emergency setting

Length of the survey:

25 questions (some optional); estimated 5 minutes to complete.

Survey medium:


Survey questions:

Please see attached file: ‘Final Questionnaire – Doctors’ understanding of SEM – printable form’.

Methodology:
For full details of proposed methodology, including data analysis, please refer to the study protocol file: ‘ERM Protocol Plan_v4 (25.05.21) – clean’.

Planned research outputs:

1) Poster presentation/s at sports medicine and/or emergency medicine conferences
   a. Quantitative data (Likert scale statistical analyses and internal comparisons between groups)
   b. Qualitative data (inferences from prominent trends and themes)
2) Publication in journal of at least quartile 2 in Scimago ranking

Ethics approval:

Ethics approval has been granted by Ballarat Health Services and St John of God Healthcare Human Research Ethics Committee (HREC). Please see attached copy of the approval: ‘Ethics LNR Approval letter 12-12-2020’.

Time Period:

The survey is expected to be open for responses for 3 months. Presentation/s and publication timelines will depend on complexity of data analyses and manuscript process.

Other application details:

- A Plain Language Statement is included in this letter.
- The survey is prefixed with a printable consent form outlining the purpose of the survey and affirming anonymity (see attached file: ‘Final Questionnaire – Doctors’ understanding of SEM – printable form’).
- A risk management strategy is described in the consent form, included complaints pathway.
- For suggested wording to be used to promote the survey to members, please see the attached file: ‘Understanding SEM - Invitation to participants’.
- The study does not request any personal details from respondents

ACEM support:

This survey is supported by ACEM member, Dr Peter Fritz, who was also a part of the expert panel which helped develop and validate the questionnaire.

Thank you again for considering our research survey,

Kind Regards,

Dr James Ooi
Sports and Exercise Medicine Registrar
Ballarat Orthopaedics and Sports Medicine
109 Webster St
Lake Wendouree, VIC 3350