

Sport and Exercise Medicine: a Misunderstood Specialty Among Medical Students and Foundation Doctors

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Abstract

Objectives: To assess medical students' and foundation doctors' understanding of Sport and Exercise Medicine (SEM) and SEM careers; to gauge this cohort's physical activity (PA) level and awareness of PA guidelines. **Design and Methods:** An anonymised online survey was distributed to medical students and foundation trainees between 28th October 2022 and 20th January 2024. **Results:** 144 respondents completed the survey. 72.2% were students. 87.5% were aware of SEM. While 98.6% knew that SEM doctors worked with sports teams, only 45.8% knew that they served the general population. Fewer than half of respondents (43.7%) knew that SEM specialty training existed. 22.2% were considering pursuing SEM careers, but only one respondent expressed an interest in exercise medicine. Only 29.2% knew that there were SEM posts in the NHS, and 11.1% believed that SEM was an entirely independent-sector specialty. Most respondents (62.5%) achieved the recommended minimum weekly aerobic PA target, with similar rates among students (62.7%) and foundation doctors (61.5%). 83.3% indicated that their PA level was limited by study or work commitments. Respondents performed no better than chance at identifying the minimum weekly aerobic exercise target recommended in the UK guidelines (26.4% vs 20%, $p=0.055$). **Conclusions:** Although there is interest in SEM among medical students and foundation doctors, there is a lack of understanding of the role of SEM doctors and of the availability of SEM specialty training. This cohort was unfamiliar with PA guidelines and was slightly less physically active than the national average.

Introduction

Sport and exercise medicine (SEM) is a specialty that encompasses three main areas: musculoskeletal (MSK) medicine, exercise medicine and athlete/team care.^{1,2} SEM doctors can have diverse roles, from promoting physical activity (PA) among the general population to providing emergency care for elite sportspeople. Although the British Association of SEM (BASEM) was founded in 1952, it was only officially recognised as a specialty in the UK in 2005 and is smaller and less well understood than other specialties. In 2023, there were nine specialty training places and over 140 SEM Consultant posts within the National Health Service (NHS).^{3,4}

Insufficient education on SEM is a key barrier to its development as a specialty and its integration in the NHS.⁵ The role of SEM doctors is poorly understood, even among doctors working in specialties that intersect with SEM, such as GPs and orthopaedic

surgeons.^{6,7} As a result, NHS SEM services are underutilised, and referral pathways may be unnecessarily prolonged.^{6,8} PA reduces the risk of developing many common chronic disorders and is a relatively safe and inexpensive therapeutic tool.^{9, 10, 11} The NHS Long Term Plan,¹² published in 2019, proposed that the demand for NHS services could be reduced by 'improving upstream prevention of avoidable illness and its exacerbations.' The subsequent Covid-19 pandemic underlined the importance of preventative medicine: obesity and chronic medical comorbidities conferred a higher risk of severe disease and mortality.^{13, 14} However, doctors face a number of barriers to delivering PA advice to patients, including a lack of education on PA and unfamiliarity with PA guidelines.^{15, 16} Moreover, physically active doctors feel more confident 'prescribing' PA to patients.^{17, 18} If PA is to be used as a preventative measure, it is critical that medical students and junior doctors are aware of national PA guidelines, and are supported to achieve the recommended PA targets themselves.

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Saravanan, Amna Zaheer, Pauras Mhatre.
Copyeditor: Sohaib Haseeb
Proofreader: Laeeqa Manji
Layout Editor: Daniela Collazos

Submission: Apr 4, 2024
Revisions: Aug 4, Oct 18, 2024
Responses: Aug 8, Oct 28, 2024
Acceptance: Nov 11, 2024
Publication: Nov 19, 2024
Process: Peer-reviewed

The primary aim of this project was to assess medical students' and foundation doctors' understanding of SEM as a specialty, and of how to pursue SEM careers. Secondary aims were to evaluate trainees' PA level and familiarity with national PA recommendations.

Methods

A STROBE checklist for observational studies was completed to ensure that all relevant items were included.

Participants: Medical students and foundation doctors of any grade were invited to complete an anonymized online survey between 28th October 2022 and 20th January 2024. No restrictions were placed on age, sex, or geographical location. Only medical students and foundation trainees were invited because more senior doctors are likely to have already begun specialty training programmes, which would have invalidated responses to questions about SEM training and careers. The survey was distributed to individuals by word-of-mouth and personal messages, and to larger groups via email. Because it was not possible to accurately determine how many invitations were received, a formal response rate was not calculated. Only one response per participant was allowed.

Questionnaire: An online questionnaire (available online as Supplementary material) was produced using Google Forms (Google Forms web application, Google, California, USA), consisting of four sections:

- 1) Awareness and interest in SEM (Questions 1-5)
- 2) Planning a career in SEM (Questions 6-9)
- 3) The role for SEM in the NHS (Questions 10-13)
- 4) PA among medical students and junior doctors (Questions 14-19)

At the start of the survey, participants were reminded that their responses would be anonymized. Section 2 only became accessible to respondents if they expressed an interest in pursuing a career in SEM, by answering 'yes' or 'maybe' to Question 5 in Section 1

Question 14, which assessed respondents' PA level, was updated on 19th November 2023, to enable comparison with the 2019 Chief Medical Officers' (CMO) PA guidelines.¹⁹ Categorical response options were changed from '0-1', '1-2', '2-3', '3-4', and '4+', to '0-0.5', '0.5-1.5', '1.5-2.5', '2.5-3.5', and '3.5+'. Respondents that selected '2.5-3.5' or '3.5+' were deemed to be meeting the weekly aerobic PA target.

The survey was closed to further responses once sufficient data had been collected for meaningful conclusions to be drawn, based on sample sizes used in related questionnaire-based studies.^{6, 7, 20, 21} A survey response could not be submitted until all mandatory questions had been completed.

Statistical analysis: Raw data automatically populated a live online spreadsheet linked to the survey (Google Sheets web application, Google, California, USA). Data were manually reviewed by the authors once the survey had been closed. Duplicate responses were highlighted and removed before descriptive statistical analysis was performed. Chi-squared tests for statistically significant differences in frequency of categorical variables were performed where appropriate, using an α -significance level of $p < 0.05$.

Results

Respondents: After removing one duplicate response, there were 144 responses to the survey. Table 1 shows the number of respondents from each grade of training. The majority (72.2%) were medical students, with Year 3 students comprising the largest subgroup (24.3%). Foundation Year 3-5 doctors were the smallest subgroup (4.2%).

Table 1. Number of Responses by Stage of Training.

Year group	Total	% Total
Year 1 Student	8	5.6
Year 2 Student	9	6.3
Year 3 Student	35	24.3
Year 4 Student	34	23.6
Year 5 Student	18	12.5
Student total	104	72.2
Foundation Year 1	24	16.7
Foundation Year 2	10	6.9
Foundation Year 3/4/5	6	4.2
Foundation total	40	27.8
Total	144	100.0

Awareness and interest in SEM: Most respondents (87.5%) had heard of SEM. When asked which groups worked with SEM doctors, the most popular responses were 'sports teams' (98.6%) and 'elite athletes' (95.1%); the least selected responses were 'people without musculoskeletal injuries' (41.7%) and 'general population' (45.8%, [Figure 1](#)).

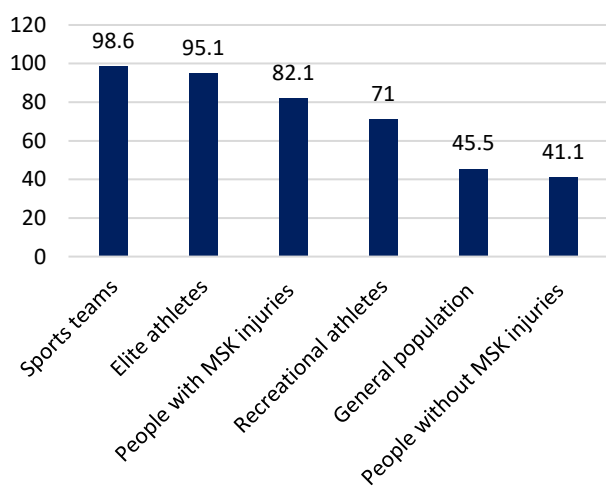
Fewer than half of respondents (43.7%) knew that there was a SEM specialty training programme. When asked if they were considering pursuing a career in SEM, 22.2% of respondents answered 'yes', 45.1% no', and 32.6% 'maybe'.

Planning a career in SEM: Of the 79 participants that expressed interest in pursuing a career in SEM, 13.9% were considering applying for SEM specialty training, 27.8% were not, and 58.2% were unsure. Among the 49 participants considering SEM specialty training, the most popular route was through GP training (46.9%), followed by Internal Medical Training (42.9%), then Acute Care Common Stem (30.6%).

Of the 30 respondents interested in careers in SEM, but not via SEM specialty training, 43.3% planned to train in orthopaedic surgery, and 16.7% intended to become GPs with a special interest in SEM.

Of the 24 respondents expressing an interest in a specific area within SEM, 20 (83.3%) wanted to work with sportspeople (amateur or professional), eight (33.3%) mentioned MSK medicine or rehabilitation, and only one mentioned PA promotion or exercise medicine (Figure 2).

Figure 1. Responses to 'To your Knowledge, Which of the Following Groups do SEM doctors Work With?.'



Legend: (Please tick all that apply). MSK, musculoskeletal.

The role for SEM in the NHS: Only 29.2% of respondents were aware that there are SEM posts in the NHS; 59.7% of respondents were unsure, and 11.1% thought that SEM was practised solely in the independent sector.

Most respondents (54.2%) thought that SEM should be provided by the NHS. The most commonly cited reason was to encourage PA among the general population to prevent chronic disease. Other reasons included: to reduce the number of patients with MSK problems presenting to GPs; to ensure access to care for those who cannot afford to use the independent sector; to provide specialised care for MSK injuries that do not require orthopaedics input.

12.5% of respondents did not think that SEM should be provided by the NHS. Two broad reasons were given: 1) that SEM should be reserved for well-funded elite athletes and professional sports teams; 2) that other specialties already cover MSK and other sport/exercise-related conditions. (Table 2) shows a selection of these reasons.

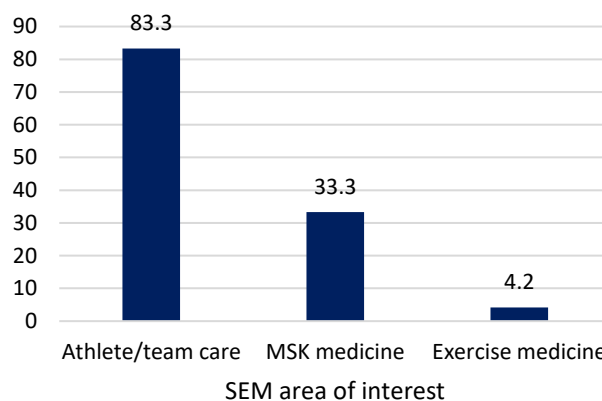
PA among respondents: 62.5% of respondents met the recommended minimum weekly aerobic PA target (150 minutes of moderate-intensity activity). There was no significant

difference in the proportion of medical students (62.7%) and foundation doctors (61.5%) achieving the target (χ^2 (1, n = 80) = 0.006, p = 0.94).

83.3% of respondents felt that their PA level was limited by their study or work commitments. Suggested ways to increase PA among doctors included: provision of on-site gym facilities; organised group exercise classes; longer breaks within shifts to allow doctors to exercise during the working day; protected time allocated to PA within rotas; subsidised exercise equipment and gym/sports club memberships; improved shower/changing facilities on site to encourage cycling/running to work; and standing desks.

Awareness of PA guidelines: Only 26.4% of respondents correctly identified the minimum weekly aerobic PA target recommended in the 2019 CMO guidelines (Table 3). The proportion of correct answers was no better than would be expected by chance, given that this was a multiple-choice question (MCQ) with five options (χ^2 (1, n = 144) = 3.67, p = 0.055). There was no significant difference in the proportion of correct responses made by medical students (26.0%) versus foundation doctors (27.5%) (χ^2 (1, n = 144) = 0.04, p = 0.85).

Figure 2. Responses to 'Which area(s) of SEM are you Most Interested in?.'



Legend: (optional). MSK, musculoskeletal. SEM, Sport and exercise medicine.

A significantly higher proportion of respondents correctly identified the recommended minimum weekly target for strengthening exercise (twice per week) (56.3%) than for moderate-intensity aerobic exercise (26.4%) (χ^2 = 66.1 (1, n = 144), p < 0.0001). A greater proportion of medical students (59.6%) selected the correct response for the strengthening exercise target than foundation doctors (47.5%), but this difference was not significant (χ^2 = 1.72 (1, n = 144), p = 0.19).

Discussion

Understanding of SEM: Our key finding was that while most medical students and foundation doctors were aware of SEM as

a specialty, they did not fully understand the role of SEM doctors. Respondents generally misperceived SEM as a resource for elite sportspeople with MSK injuries, with fewer than half knowing that SEM doctors worked with the general population. The responses shown in (Table 2) further illustrate common misperceptions about the role of SEM doctors.

Table 2. Responses to the Question, 'Do you think SEM Should be Provided by the NHS (Funded by Taxpayers)? If not, Why?.'

<i>'...I don't think right now it would be acceptable to have taxpayers paying for the higher levels with elite athletes for example, considering the income they generate morally...'</i>
<i>'If its provided for athletes as a programme that doesn't benefit the general population I don't see why it should be non-private, unless it's like young athletes with disadvantageous backgrounds'</i>
<i>'Very specialised - is there a requirement for within the general population'</i>
<i>'I imagine the majority of the field focuses on high level sport / athletes rather than members of the general population with severe or debilitating illnesses'</i>
<i>'... SEM seems like a specialty reserved for only high level athletes...'</i>
<i>'It's for sports teams surely'</i>
<i>'Much of the injury treatment/rehab could be provided by a PT'</i>
<i>'Hard to tell usefulness to public in general and overlap with orthopaedics'</i>
<i>'What's space foes SEM fill that orthopaedics, physiotherapy and Endocrine not cover?'</i>

SEM, Sport and Exercise Medicine; PT, physiotherapist.

Table 3. Responses to 'According to the UK CMO Physical Activity Guidelines for Adults, What is the Minimum Amount of Moderate-Intensity Activity One Should Engage in Per Week?.'

Year Group	60 mins	90 mins	120 mins	150 mins	180 mins	Total	% Correct *
Medical students	10	22	39	27	6	104	26.0
Foundation doctors	3	12	11	11	3	40	27.5
Total	13	34	50	38	9	144	26.4 **

CMO, Chief Medical Officer
 * correct answer is 150 minutes
 ** not significantly higher than would be expected by chance

It is important that all doctors understand SEM if NHS SEM services are to be utilised effectively. However, a limited understanding of SEM has previously been observed even among doctors working in roles that intersect with SEM, such as GPs and orthopaedic surgeons.^{6,7} This may explain why NHS SEM services are underutilised, with unnecessarily delayed referrals.^{6,8} For example, GPs are more likely to refer younger patients or those with sport-related injuries to SEM clinics than sedentary patients with chronic conditions.⁶

Interest and careers in SEM: Respondents showed limited awareness of SEM specialty training, and of how SEM has been integrated into the NHS. Fewer than half of our sample knew that there was a SEM specialty training programme, and fewer than a

third knew that there were SEM posts in the NHS. Addressing this lack of awareness may increase the number of doctors working in SEM, and thus the number best equipped to engage in PA promotion. Encouragingly, more than half of respondents expressed some enthusiasm (either 'yes' or 'maybe') for pursuing a career in SEM. When asked for specific areas of interest within SEM, only one of 24 respondents mentioned exercise medicine or PA promotion, while 20 mentioned working with sportspeople. This suggests either a lack of awareness that SEM involves the use of PA as a therapeutic tool, or that our sample strongly preferred the other two branches of SEM (MSK medicine and athlete/team care).

Knowledge of PA guidelines: A striking finding was that most medical students and foundation trainees did not know the minimum amount of moderate-intensity aerobic activity recommended in the most recent UK CMO PA Guidelines. When asked to identify the correct amount in an MCQ with five options, they performed no better than chance ($p = 0.062$). Moreover, our survey is more likely to have been distributed to, and completed by, those interested in SEM, with an above-average interest in this area.

In 2016, 20% of GPs self-reported at least a broad awareness of the national PA guidelines;²² in 2020, a much higher proportion (61.3%) of Emergency Medicine (EM) doctors reported an awareness of the World Health Organisation's (WHO) recommended weekly PA level.²⁰ These studies evaluated awareness of PA guidelines using a categorical subjective scale of awareness²² and 'yes/no' answers to the question, 'Are you aware of the... guidelines...?',²⁰ respectively. In our study, participants were required to select the minimum recommended PA time in minutes, which provided a more rigorous test of their knowledge.

A 2012 survey of final year medical students in Scotland found that even among the 60% of participants that reported no awareness of the PA guidelines, 57% correctly identified the recommended weekly minimum PA in a five-option MCQ.²¹ In our survey, 56.3% of respondents correctly identified the recommended weekly strengthening exercise target - a significantly higher proportion than the 26.4% that identified the moderate-intensity aerobic exercise target ($p < 0.0001$). In both cases, the high proportion of correct answers indicates that the MCQ was too easy to guess using common sense alone. To eliminate the confounding effect of guesswork, we suggest that future studies examine awareness of PA guidelines using free-text responses. For example, please state (in minutes) the minimum weekly amount of moderate-intensity PA recommended in the 2019 CMO guidelines.'

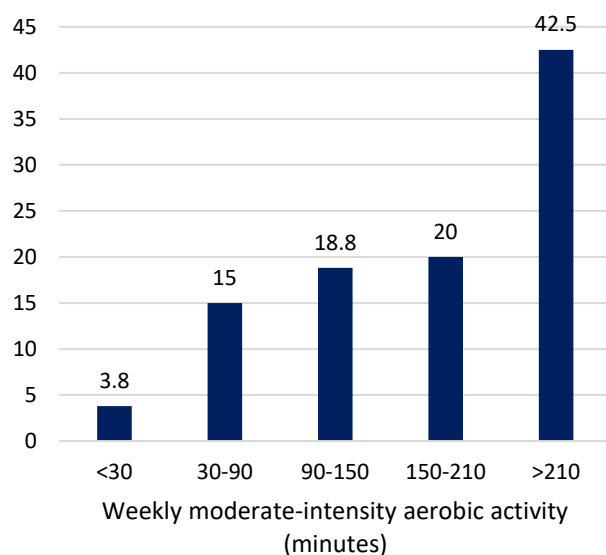
A limited awareness of PA guidance is perhaps unsurprising given that only 15 of 31 UK medical schools include the CMO PA guidelines in their curricula and five do not include any specific PA teaching.¹⁵ Time spent teaching PA science and promotion during UK medical school education is minimal (4.2 hours) compared with that spent on teaching pharmacology (mean 109 hours; range 18 to 336 hours).¹⁵ Aside from specific teaching on

PA, SEM-related topics are generally under-represented in undergraduate curricula.^{23, 24} A lack of knowledge of PA guidelines and PA being an 'afterthought' are major barriers to doctors delivering PA advice.¹⁶

By comparison, integration of formal teaching on substance misuse into UK undergraduate curricula has been relatively extensive.²⁵ 97% of Scottish final year medical students correctly identified the maximum recommended weekly alcohol intake,²¹ indicating that knowledge of guidelines related to health promotion can be improved by education. Promisingly, a Delphi SEM curriculum for undergraduates has recently been published, but has yet to be implemented.²⁴

PA levels among respondents: 62.5% of respondents met the CMO's minimum weekly PA target ([Figure 3](#)), with no significant difference in PA levels between medical students and foundation doctors. This rate was slightly below the national average for adults in England (67.3%).²⁶ 77.3% of EM doctors in London achieve the minimum WHO-recommended aerobic PA target.²⁰ This difference might be because PA levels differ across medical and surgical specialties: 28% of EM respondents in Koch et al²⁰ considered their typical daily work to involve moderate-intensity PA, which was clearly defined in the questionnaire. By contrast, in 2008, Gupta and Fan²⁷ found that only 21% of doctors surveyed met the recommended minimum PA level, and that 64% of this cohort had met the target while at medical school. The most likely explanation for the discrepancy in results across these studies is that Gupta and Fan²⁷ assessed PA levels against the Department of Health (DH) target, which may be more difficult to achieve than the CMO target because it specifies a frequency (at least 5 times per week) as well as a duration of activity ('at least 30 minutes').

Figure 3. Respondents' self-Reported Weekly Moderate-intensity Aerobic PA Level. 62.5% of Respondents Achieved at least 150 Minutes per Week of Moderate-intensity Aerobic Activity, the Minimum Target Recommended in the 2019 CMO PA Guidelines.



Alarming, 83.3% of respondents felt that their PA levels were limited by study or work commitments. Similarly, shift patterns and lack of time were highlighted as the two commonest barriers to EM doctors achieving PA guidelines.²⁰ Doctors that achieve recommended PA targets themselves feel more confident prescribing PA to patients.^{17, 18} Thus, work- or study-related barriers to PA for medical students and doctors should be addressed to facilitate PA promotion. 59 of our respondents proposed solutions to increase doctors' PA at work. The most frequent were allocating time in rotas specifically for exercise (47.5%), subsidising gym memberships and fitness equipment (30.5%), providing on-site gym facilities (27.1%), and organising group activities (27.1%). Although there was overlap, these differed in order of popularity from the suggestions of EM doctors, among whom the second commonest suggestion (52.1%) was to improve changing room facilities to encourage 'active transport' to and from hospital.²⁰

Limitations: One limitation of this study is that the majority of the respondents were from London-based universities or hospitals, so it is unclear whether the results can be generalised to other parts of the UK. The survey is more likely to have been (1) distributed to and (2) completed by those with an interest in SEM. However, this potential selection bias only makes the lack of awareness of SEM and PA more surprising. To reduce the length of the survey, we did not assess participants' weekly vigorous-intensity PA or muscle strengthening activity levels; it is possible that the proportion of this population achieving these PA targets differs from that meeting the moderate-intensity PA target. Finally, because PA levels in our survey were self-reported, these are likely an overestimate of this population's true PA level.^{28, 29}

Conclusion: Most medical students and foundation trainees do not fully understand the role of SEM doctors, and typically perceive SEM as an independent-sector specialty that caters for elite sportspeople. There is considerable interest in pursuing SEM careers, but a lack of awareness of SEM specialty training. SEM representatives and organisations may wish to prioritise education focused on SEM training and jobs, with an emphasis on SEM's exercise medicine component. This group is unfamiliar with national PA recommendations, suggesting that they receive insufficient teaching on PA. We recommend an increase in PA-related undergraduate and foundation education to empower doctors to engage in PA promotion. Respondents were less physically active than the general population. The majority felt that their PA levels were limited by work or study commitments. Employers should address work-related barriers to PA to maintain a healthy workforce and to facilitate PA promotion.

Summary – Accelerating Translation

Main problem to solve: Sport and Exercise Medicine (SEM) is a relatively new medical specialty, having only been officially recognised as such in 2005. SEM doctors can work in a range of roles, including injury prevention and rehabilitation, care of athletes of all levels, and physical activity (PA) promotion. However, previous research has shown that SEM services, which are available through the NHS, are underutilised because the role

of SEM doctors is poorly understood by other types of doctor (e.g., GPs). No previous study has assessed medical students' and foundation doctors' (those who have just graduated from university) understanding of SEM.

While PA is known to prevent many chronic conditions, doctors often struggle to discuss PA with patients due to a lack of education on PA and unfamiliarity with PA guidelines. Moreover, physically active doctors feel more confident 'prescribing' PA to patients. It is therefore crucial that medical students and junior doctors are aware of national PA guidelines and are supported to achieve the recommended PA targets themselves. No previous study has assessed foundation doctors' familiarity with national PA guidelines.

Aim of study:

- 1) To assess medical students' and foundation doctors' understanding of SEM as a specialty, and of how to pursue SEM careers.
- 2) To evaluate trainees' PA levels and familiarity with national PA recommendations.

Methodology: We distributed an anonymised online survey to medical students and foundation trainees between 28th October 2022 and 20th January 2024.

Results: 144 respondents completed the survey. 72.2% were students. 87.5% were already aware of SEM. While 98.6% knew that SEM doctors worked with sports teams, only 45.8% knew that they served the general population. Fewer than half of respondents (43.7%) knew that junior doctors could choose to complete specialty training in SEM. 22.2% were considering pursuing SEM careers, but only one respondent expressed an interest in promoting physical activity. Only 29.2% knew that there were

jobs available for SEM doctors in the NHS, and 11.1% believed that SEM was an entirely independent-sector (private) specialty.

Most respondents (62.5%) achieved the national recommended weekly PA target (150 minutes of moderate-intensity activity per week), with similar rates among students (62.7%) and foundation doctors (61.5%). 83.3% felt that their PA level was limited by study or work commitments. Respondents performed no better than chance at identifying the minimum weekly PA target.

Conclusion: Medical students and foundation doctors demonstrated a limited understanding of the role of SEM doctors, and typically perceive SEM as an independent-sector specialty for elite athletes. Although respondents to our survey showed considerable interest in pursuing SEM careers, fewer than half were aware that SEM specialty training was available. Respondents were also unfamiliar with national recommendations on PA and were slightly less physically active than the general population. Most attributed their below-average activity levels to study and/or work commitments.

Our findings highlight the need to increase undergraduate and foundation education on training and careers in SEM, with an emphasis on roles involving PA promotion. Our results also suggest that medical students and foundation doctors require more teaching on PA, including discussion of national PA guidelines. Finally, employers may wish to address work-related barriers to PA to maintain a healthy workforce and to facilitate PA promotion.

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Acknowledgments

Not applicable.

Conflict of Interest Statement & Funding

The Authors have no funding, financial relationships or conflicts of interest to disclose.

Author Contributions

Conceptualization: BM, EA. Data Curation: BM, HM, EA. Formal Analysis: BM. Investigation: BM, EA. Methodology: BM, EA. Project Administration: BM. Supervision: HL. Visualization: BM, HM, HL, EA. Writing - Original Draft: BM, EA. Writing - Review Editing: BM, HM, HL, EA.

Cite as

McGuire B, . Mahfouz H, Lorenz H, Archer E. Sport and Exercise Medicine: a Misunderstood Specialty Among Medical Students and Foundation Doctors. *Int J Med Stud*. 2025 Jan-Mar;13(1):40-46.

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ISSN 2076-6327

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