BMJ Open

What medical students think about measurement of their well-being: cross-sectional survey and qualitative interviews

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To cite: Simons G, Effah R, Baldwin DS. What medical students think about measurement of their well-being: cross-sectional survey and qualitative interviews. *BMJ Open* 2022;**12**:e056749. doi:10.1136/bmjopen-2021-056749

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2021-056749).

Received 26 August 2021
Accepted 24 February 2022

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ABSTRACT

Objectives To find out how medical students think well-being should be measured.

Design A mixed-methods study comprising a cross-sectional online survey (November 2020–March 2021) and semi-structured online interviews. Views on the frequency of availability for measurement, the format, type and purpose of measurement, and with whom well-being should be discussed were measured. When an outcome was scored 7–9 on a 9-point Likert scale of agreement by ≥75% of participants it was considered critical. Inductive thematic analysis was undertaken on the interview transcripts.

Setting All medicine programmes at University of Southampton.

Participants Medical students from all years took part in the survey (n=118) and interviews (n=16).

Results Most participants (94%) felt able to give 5 min to measure their well-being at least once per month. Research, governance and individual feedback were all considered critically important. Only subjective assessments undertaken by the individual in real-time were rated critically important (78.1%) measurement tools. Students selected that they would discuss their well-being with other medical students (n=87) nearly as often as they selected a member of the faculty (n=104). Five interview themes further explained these findings: (1) well-being is mental well-being; (2) exercise and support from friends and family are most important; (3) isolation and the design of the medicine programme are detrimental to well-being; (4) there are advantages to surveys, and conversations; (5) personal academic tutors and medical students in later years are the best to discuss well-being with.

Conclusions Medical students thought that measurement of their well-being was critically important for governance showing their support for quality assurance of well-being and peer support. They wanted to be able to choose surveys, or conversations, to measure their well-being, as well as the person they discussed well-being with. Four recommendations are discussed in light of these findings.

Strengths and limitations of this study

- This methodological study explored what medical students think about the measurement of their well-being for the first time.
- A mixed-methods approach allowed the reasons behind the survey answers to be captured in ensuing interviews.
- Using the ≥75% a priori cut-off for critical importance from Core Outcome Measures in Effectiveness Trials (COMET) and Grading of Recommendations, Assessment,Development and Evaluations (GRADE) allowed evidence-based recommendations for well-being measurement for medical students.
- It was not possible to recruit the number of students needed to make national inferences, and 50% (14/28) of participant demographic variables were statistically significantly different to national medical student demographics.
- Students more engaged in well-being may have been more likely to participate in the research, leaving those most in need under-represented.

INTRODUCTION

Mental health problems are the most commonly declared diagnoses on medical student provisional registration applications to the General Medical Council (GMC) in the UK.[1] This is not surprising as 75% of mental health diagnoses are established by the age of 24 years.[2] Addressing well-being at medical school could help reduce the significantly higher levels of depression and anxiety seen in doctors, when compared with the general UK population.[3–7] The GMC has recognised this in its promoting well-being guidance within 'Supporting medical students with mental health conditions'.[8] However, it does not recommend how educational strategies for well-being should be evaluated.

Medicine challenges student well-being more than most courses for several reasons. Recruitment policy inclusivity,[9] in the form of graduate entry and widening participation programmes, has not yet been matched by equally accessible, diverse and inclusive content and support. The transition from college to university[10 11] is harsh for often perfectionist medical students,[12] as they move from being the highest-achieving big fish in a small pond to an average fish in a large

shoal.[13] 'Imposter syndrome'[14] and the culture of competition, rather than collaboration, can detrimentally impact the well-being of medical students[15] and future team culture in the National Health Service (NHS) in the UK. The length of the course leads to more students facing financial stressors, especially in the context of widening participation, where students may come from lower-income families, and through graduate entry where students already have significant debt.[16] This places further pressure on educational achievement. Medicine has the highest total workload hours of all degree courses,[17] leaving less time for part-time work and well-being activities.

Medical students face a second transition from preclinical to clinical education.[18] Keeping students' clinical exposure at the desired level of difficulty[19] and not allowing it to tip into an unsafe experience for them, or patients, is challenging. The need to provide not only enabling services[20] that support students with learning difficulties and disabilities, but also occupational health,[21] which promotes and ensures fitness to work, for example, is unique to healthcare students. Generic university well-being support provisions are often not medicine assessment literate,[22] nor equipped to cope with issues that might occur on placements with NHS partners. The role models who teach clinically are typically not formally trained educators,[23] whereas formally trained university staff are often not doctors and may therefore lack insight into common clinical situations, such as exposure to traumatic events.

All students require a safe learning environment[19] that is open,[24] but these most basic needs have been hard to meet at medical school in the context of a pandemic. Necessary, abrupt, changes such as the move to online learning were shown to be anxiety-provoking[25] for practical content such as anatomy. There was uncertainty about the 'loading' of practical skills into periods when lockdowns were lifted, and concerns about whether online assessment would allow progression and graduation.[26] The loss of face to face interaction lead to a reduction in peer support on how to deal with uncertainty.[27] Final year medical students still needed to attend placements that brought them into direct contact with the COVID-19 virus.[28] In these ways the well-being of medical students was particularly impacted by the pandemic.

In medical education, it is not yet standard practice for well-being support to be evaluated and quality assured. The focus tends to be on pathology, when problems have already occurred, such as failed assessments, or mental health diagnoses,[29 30] but this inhibits evidence about which contexts allow students to thrive. There is no international consensus definition of well-being[31] and many different outcomes are measured to capture well-being in the general population with differing tools,[32] making it hard to compare studies, or know how to evaluate educational interventions for well-being. To address this gap in knowledge about how to measure medical student well-being and the impact of university well-being support, it is key to involve medical students in all aspects of the development of the measurement and evaluation process.[22] This study, therefore, aims to establish, through medical student survey and interview:

1. How often medical students could give time for well-being measurement?
2. What format medical students want their well-being measured in?
3. For what purposes should medical student well-being be measured?
4. What type of well-being data should be measured for medical students?
5. Who do medical students feel comfortable speaking to about their well-being?
6. What determinants of well-being should be measured for medical students?

METHODOLOGY

A mixed-methods study comprising a cross-sectional survey and subsequent semi-structured interviews.

Cross-sectional surveys

Reported using the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.[33] Survey questions were adapted from cross-sectional surveys undertaken in doctors nationally in the UK as part of the development of a Core Outcome Set for well-being (ISRCTN20867558 https://doi.org/10.1186/ISRCTN20867558). The full survey can be found in online supplemental information.

Sample

Medical students attending the University of Southampton (UOS) were recruited between November 2020 and March 2021. Students enrolled on any medical degree programme in any year were eligible to participate (n=1245).

Data collection

Students were recruited using social media posts (Twitter, Instagram and Facebook), and 'shout outs' prior to the start of lectures. Students were provided with a link to the survey hosted on the online survey platform 'I-survey'.[34]

Outcomes

- Frequency of availability to spend 5 min measuring well-being.
- Format of well-being measurement (eg, survey, conversation).
- Purpose of well-being measurement (eg, research, governance).
- Type of well-being measurement (eg, evaluative, experienced, subjective, objective, quantitative or qualitative).
- Who to talk with about well-being at a 30 min conversation.
- Determinants of well-being that should be measured

Measurement

Office for National Statistics 2011 census questions were used for eliciting personal demographic characteristics, (age, sex, ethnicity, religion) and educational

demographics about year and programme were sought. Increasing increments of time were offered as response options, and one answer allowed for frequency of measurement. To assess agreement about the format, purpose and type of well-being measurement, Likert scales were used. On a 9-point Likert scale the boundaries were categorised as follows: limited importance=1–3; important=4–6; critically important=7–9. Different roles and services were offered, and students were able to select as many as they liked, when asked about who they would feel comfortable talking to. A list of 47 determinants of well-being was offered, and multiple answers were allowed, students being asked to consider the survey burden. No assumptions were made about student preferences, so free text answer options were available for all questions.

Bias

Selection bias was mitigated as students were recruited through digital and non-digital routes. A definition of well-being was deliberately not provided, to allow individual interpretation and prevent bias.

Study size

The split of opinion among 37 500 medical students nationally[35] on the questions asked is unknown, so to account for anything between a 50/50 split to an 80/20 split, with a 95% CI and ±5% sample error, between 245 and 381 surveys needed to be completed to allow national inferences.[36]

Quantitative variables

Where a 9-point Likert scale was used, and an outcome was scored 7–9 by 75% of participants it was considered critical. This was based on the use of ≥75%, as an acceptable cut-off by a number of published studies looking to reach a consensus on outcome measurement,[37–40] and accords with Core Outcome Measures in Effectivenes Trials (COMET)[41 42] and Grading of Recommendations, Assessment, Development and Evaluations (GRADE)[43] processes for rating recommendations.

Statistical methods

The difference between the demographics of this sample and the closest available national comparable population was assessed for significance, through calculating the SE and CIs for the difference. To account for where data were missing the n was reported for each question individually. The numbers of participants that selected an option are reported as percentages of those that responded to the question, where a single answer was permitted.

Semi-structured interviews

Reported using Standards for Reporting Qualitative Research recommendations.[44]

Qualitative approach

Constructivist epistemology, based on the concept that knowledge is built from experiences and social interactions was used in this project. Constructivism does not require knowledge to be deduced using one method, and several methods may be used to demonstrate something is 'true'. Constructivism allows for more than just measurable evidence, as required in positivism, to represent external reality, and therefore allows the use of interviews[45] and thematic analysis that values triangulation and discussion of personal engagement with the latent themes, rather than treating it as noise to be eliminated.[46]

Researcher characteristics

A fourth year MMedSci student was trained to conduct the semi-structured interviews. As their relationship with participants was that of a peer, rather than senior, a greater level of trust was anticipated.

Context

The interviews took place online in line with Public Health England guidance in the COVID-19 pandemic. During this period, students in the final year attended clinical placements, while all other years had a period in which all training was delivered online only.

Sampling strategy

Any participants that consented to be invited to interview in the online survey were approached. Sampling was stopped when thematic and meaning saturation were reached. Saturation was defined as when no new themes, or meanings, were identified, only repeated and further interviews would represent research waste.[47]

Data collection methods

The interviewer followed a semi-structured interview schedule. The interviews were recorded on 'Microsoft Teams',[48] transcribed using 'Microsoft Stream'[49] and time-stamps cleaned with 'VTT Cleaner'.[50]

Data processing

Interview recordings were stored in a limited access folder on the secure university network, available only to the research team. Transcripts were labelled with a participant number and any personal identifiers were removed.

Data analysis

Inductive constant comparison analysis was used to allow the participants to generate the themes rather than impose an existing framework. As part of this 'open coding' technique,[51] where possible, participants' own words were for code names and the themes and meanings were constructed after all the data was collected using 'convergent thematic analysis'.[52]

Techniques to enhance trustworthiness

Themes were identified independently by two researchers (GS, RE)[53] using 'NVivo'[54] qualitative analysis software. Triangulation of themes and meanings between reviewers, with the survey data and existing literature was undertaken.[55 56] Quote selection was influenced by whether the quote strongly reflected the theme, whether the reader could accurately infer the meaning, how succinct the

quote was and that quotes were distributed across participants, as described in a review of quotation use in qualitative research.[57]

Patient and public involvement

The research questions, study design and recruitment processes were designed with a medical student. Patient and public involvement is at the heart of this study as its aim is to find out when, how, why, what and by who, medical students think well-being should be measured. Dissemination of the results was undertaken collaboratively with a medical student.

RESULTS

Surveys

A total of 118 medical students participated and were included, a 9.5% response rate from the total medical student population (n=1245). All survey data is available from the UOS data repository.[58] The demographics of the 118 participants are shown in table 1 alongside national UK medical and dental student, or general student demographics, to show the level of representation of the sample.

When asked how often they could give 5 min to measure their well-being, 49.1% of answering participants (n=116) chose an option that was at least once a day, 78.4% an option that was at least once a week and 94% an option that was at least once a month. This left 14.7% of participants who could not give 5 min more often than once a month.

No format of measurement was rated as critically important (n=116). Surveys as downloaded apps, or online, were the only two formats with <15% rating them of limited importance. Some core outcome set studies use ≥15% ratings of limited importance as a cut-off to exclude options.[59] Using this method face-to-face, phone or video call conversations, as well as paper surveys, would have been excluded as formats for well-being measurement.

When asked who they would feel comfortable discussing their well-being with at a 30 min conversation, 42 participants of those that responded (n=95) selected that they would prefer to use a website or an app, with 6 participants saying they would not want to discuss well-being at all. Students could select more than one option and selected an individual chosen by them (n=55), personal academic tutors (PAT) (n=50) and other medical students (n=87): more than generic university services (n=33), clinical supervisors (n=32) and the British Medical Association (the UK doctor trade union) (n=27).

Research, governance and individual feedback all reached the ≥75% threshold for the purpose of well-being measurement being considered critically important (table 2). Only subjective measures taken by the individual in real-time, such as the 12-item General Health Questionnaire were rated critically important (78.1%) as a feasible, valid and reliable type of measure of well-being (table 3).

The top four determinants of well-being that should be measured which were chosen by participants (n=95) were: energy and fatigue (94.7%); the ability to do activities of daily living (92.6%); negative feelings (84.2%); and sleep and rest (81.1%).

Interviews

Fifty-five participants provided consent to be contacted, and 16 interviews were undertaken.

These identified the following themes and meanings.

Well-being is mental well-being

Everyone thought of mental well-being, when asked to define well-being, with fewer thinking of physical, social or financial aspects, even in the context of a global pandemic.

> So, when people talk about wellbeing, I guess the first thing that I think about is mental wellbeing. (Participant 2)

> I mean we're at uni and people love spouting on about mental health because it's obviously a big issue. The mental health comes into mind for me, probably because I've always been healthy, like I've never had any serious illness. (Participant 13)

Exercise and support from friends and family are most important for well-being

When asked about what positively impacted well-being the top two themes were exercise, particularly outside, and support from friends and family.

> You know, I'm a believer, like, the world is your kind of gym, so I like going to the Common when working out. (Participant 5)

> So, talking to my friends and my boyfriend helps with my wellbeing quite a lot and just like checking in with my family. (Participant 9)

Isolation and the design of the medicine programme are detrimental to well-being

Students could not access their usual support networks during lockdown periods, including the 2020 summer and winter holidays if they were international students. Due to clinical placements, students were afraid of infecting others even where social interactions were allowed.

> Normally, living alone is fine because I see my friends, but … I didn't want to have a support bubble because again, cross contamination. So, I spent the majority of my final year alone. In hospital, you know, you shouldn't be like seeing friends. You shouldn't be eating lunch together. So, I spent the majority of the year completely by myself. (Participant 3)

Structural aspects of the medicine degree (such as examination timetabling, revision timetabling, who can 'sign off' clinical skills, competitive assessment, the length

Table 1 Demographics of the medical students in this survey compared with national comparators

Demographics	This survey	National comparator	Significant difference
Gender			
n	118	70 370 *	
Male (%)	18.6	39.4	p=0.000† (CI 13.7 to 27.8)
Female (%)	79.7	60.6	p=0.000† (CI −11.8 to 26.4)
Prefer not to say (%)	1.7	0	p=0.000† (CI −0.63 to 4.03)
Age			
n	118	70 370 *	
18–20 (%)	24.6	31	p=0.13 (CI −1.3 to 14.1)
21–24 (%)	63.6	37.6	p=0.000† (CI 17.3 to 34.7)
25–29 (%)	11.8	15.4	p=0.31 (CI −2.2 to 9.4)
30 and over (%)	0	16	p=0.000† (CI 15.7 to 16.3)
Ethnicity			
n	118	43 605 ‡	
White/other white background (%)	61.9	56.9	p=0.27 (CI −3.8 to 13.8)
Mixed/multiple ethnic groups (%)	5.9	5.2	p=0.76 (CI −3.5 to 4.9)
Asian/Asian British Indian (%)	5.1	11.9	p=0.001† (CI 2.8 to 10.8)
Asian/Asian British Pakistani (%)	3.4	7.7	p=0.08 (CI 1.0 to 7.6)
Asian or Asian British Bangladeshi (%)	0.8	2.1	p=0.37 (CI −0.31 to 2.91)
Chinese (%)	2.5	2.2	p=0.84 (CI −2.5 to 3.1)
Other Asian background (%)	11.9	5.4	p=0.001† (CI 0.65 to 12.3)
Black or black British-African (%)	6.8	4.6	p=0.27 (CI −2.3 to 6.7)
Black or black British-Caribbean (%)	0	0.4	p=0.5 (CI 0.34 to 0.46)
Other black background (%)	0	0.1	p=0.76 (CI 0.07 to 0.13)
Other ethnic groups (%)	0	3.4	p=0.04† (CI 3.2 to 3.6)
Did not state (%)	1.7	0	p=0.001† (CI −0.6 to 4.0)
Religion			
n	118	2 532 385 ‡	
No religion (%)	39	49	p=0.03† (CI 1.2 to 18.8)
Buddhist (%)	0.8	1	p=0.84 (CI −1.4 to 1.8)
Christian (%)	30.5	32	p=0.76 (CI −6.8 to 9.8)
Hindu (%)	7.6	3	p=0.01† (CI −0.2 to 9.4)
Jewish (%)	0.8	0	p=0.000† (CI −0.8 to 2.4)
Muslim (%)	10.2	10	p=0.92 (CI −5.3 to 5.7)
Shinto (%)	0.8	0	p=0.000† (CI −0.8 to 2.4)
Sikh (%)	1.7	1	p=0.48 (CI −1.6 to 3.0)
Prefer not to say/not known (%)	8.5	4	p=0.012† (CI −0.5 to 9.5)

CI for the difference between the demographic for this study and the national comparator.
*National data set from the Higher Education Statistics Agency, Medicine and Dentistry 2019/2020 enrolment.[79]
†Denotes a p value that would suggest the percentages with a demographic in the sample and the national comparator are statistically significantly different (p<0.05).
‡National data set from the Higher Education Statistics Agency, all students enrolled 2019/2020.[79]

of the course) were all cited by participants as things that negatively impacted their well-being.

> I guess, like, the course being so long makes you feel like you've invested so much of your life into this, that you just actually have to pass like. (Participant 15)

Students reported having to stop the exercise they found so positive for their well-being for deadlines and exams.

> I stopped exercising to help revise for finals (Participant 1)

There are advantages to surveys, and conversations to measure well-being

Surveys were perceived as quicker but less pressured, allowing reflection and flexibility around when they are undertaken. Conversations were valued for the empathy

Table 2 Medical student ratings for the purpose of well-being measurement in medical students

Purpose	Limited importance (%)	Important (%)	Critically important (%)
Research (n=101)	0	13.9	86.1
Governance nationally (n=101)	3	7.9	89.1
Governance locally (n=101)	3	3.9	93.1
Individual feedback (n=100)	0	16	84
Patient safety (n=101)	30.7	28.7	40.6
Introduction to exploring well-being (n=99)	1	27.3	72.7

On the 9-point Likert scale the boundaries were categorised as follows: limited importance=1–3; important=4–6; critically important=7–9.

the other person might show, the opportunity for the other person to pick up on non-verbal cues and ask more.

> A survey, I can do it anytime and I could choose to do it like waiting for the bus … If they were talking to me, they would probably get more information out of me than if I was to do a survey (Participant 1)

PAT and medical students in later years are best to discuss well-being with

Participants valued the rapport established with PAT and where there was rapport, felt comfortable discussing their well-being with them. Some participants had to change PAT to achieve this.

> Me personally, I've had the same personal academic tutor since year one. We get on really well. I, surprisingly, I'm very open about my wellbeing issues with him. I feel like there's no like hierarchy between us. He's been very, like, non-judgmental, and open and kind and generous with me … And, and, I feel comfortable speaking to him. (Participant 3)

Participants valued the fact that students in later years would have recently experienced the same things but were concerned that medical students might not be equipped to discuss well-being.

> Just someone on a similar level to me, or in a higher year and has gotten through it. I just think I'd value their advice because I've just got that knowledge that they're going through a similar experience that I'm going through. (Participant 8)

DISCUSSION

The results of the cross-sectional survey and interviews have been synthesised, using a solution-focused approach, underpinned by educational theory and policy, into four recommendations. These recommendations take into account the problems experienced in engaging students in well-being research and activities.

Table 3 Medical student ratings of whether the types of measure of well-being might be feasible, valid and reliable in medical students

Type of measurement (n=96)	Limited importance (%)	Important (%)	Critically important (%)
A biomarker (eg, hair cortisol levels)	36.5	35.4	28.1
A measure taken by someone else (eg, sickness absence days)	37.5	37.5	24
A measure taken by you (eg, public health surveillance well-being scale)	5.2	24	70.8
A descriptive measure taken by you (eg, reflective writing about your well-being over the last 12 months)	16.8	30.6	52.6
A measure taken by someone else in real-time (joined a teams teaching session that day)	25	36.5	38.5
A measure taken by you in real-time* (eg, 12 item General Health Questionnaire GHQ12)	5.2	16.7	78.1
A descriptive measure taken by you in real-time (eg, a daily blog)	10.4	29.2	60.4

On the 9-point Likert scale the boundaries were categorised as follows: limited importance=1–3; important=4–6; critically important=7–9.

Self-care needs to be integrated into the curriculum and assessed

The GMC 'Outcomes for graduates 2018' recommends that curriculums include how to 'self-monitor, self-care and seek appropriate advice and support'.[60] The finding that 14.7% students reported they could not give 5 min to record their well-being any more frequently than once a month and that the top determinants of well-being picked were basic needs according to Maslow's hierarchy[61] would suggest self-care needs to be taught.

Exercise was the most common activity used to help mental well-being in a national study of medical students during the pandemic[62] and the same was found in interviews in this study. It has been shown to reduce stress, anxiety and depression in medical students.[63] However, the students interviewed reported stopping exercise ahead of exams and deadlines, as reported in another UK survey of medical students.[64] To meet WHO recommendations for physical activity and reduce symptoms of anxiety and depression and improve cognitive health and sleep,[65] students need to be taught that they will have deadlines and pressures throughout their careers and how to prioritise self-care, to allow them to work into their 70s.[66]

A connected programme design[67] that introduces and builds on self-care using a constructivist approach and spiral learning[68] could be employed. This model allows interleaving and spacing, which assists learners in differentiating new, difficult concepts[69] such as 'moral injury'.[70] Teaching based on cases created by students, would allow reverse mentoring, through staff being made aware of the new challenges which students face. For strategic learners like medical students, assessment would not only drive effort,[22 71 72] but is diagnostic and dialogical allowing 'correct as you go' feedback[73] and dynamic tailoring of programme design in response to what students say in their assessments.[11] This could prevent the negative impact of programme design on well-being reported in the interviews.

Suggested self care assessment

Objective Structured Clinical Examinations that allow medical students to be the person running a Health Education England recommended well-being check-in,[74] or attending one, with learning outcomes around communication skills, signposting and boundary setting, or self-monitoring and self-care, respectively. These would facilitate the culture of peer support students found in this study, as well as meet the UK recommendation for 'well-being check-ins' 2 weeks into every placement.[74] These could be undertaken with other health and social care students.

Well-being support should be quality assured by students for students

Participants wanted to pick who they interacted with about their subjective real-time well-being (table 3) and no single format to do this was critically important, suggesting the need for choice. Participants felt it was critically important for well-being to be measured for governance as well as research and individual feedback (table 2). Well-being support has not traditionally been subject to governance, but with the emphasis on quality assurance in education[22] this seems like an oversight. This need not be work intensive or behaviourist,[68] as the responsibility for establishing, measuring and upholding the expected standards for pastoral support could lie with students. Reflection on their self-care, interaction with PATs, and other services, and feedback on those interactions could form part of the previously suggested self-care assessments. Collation and analysis of this feedback could be part of an andragogic process,[75] an annual student research project.[67] This would allow a process model in which the students have choice about how well-being support is delivered[76] and an influence over content to ensure it is inclusive.[77]

Medical student peer support should be formalised and quality assured

Participants selected another medical student to discuss their well-being with more than PATs, generic university services, or national well-being services. Interviews revealed that isolation negatively impacted well-being, but students did have concerns about how equipped other students would be to deal with well-being discussions, raising the need for quality assured peer support, with clear boundaries. The GMC recommends that 'where medical schools want to put a formal peer support programme in place, they must make sure that those who provide the service are properly trained for and supported in this role'.[8] It should be noted that there is an appetite among a group of the students at the UOS to deliver a peer support programme, with recruitment and training underway.

Demographics beyond gender and ethnicity must be captured

Demographic variables should be captured to understand the population that will be accessing the pastoral support. For example, being aware that 50% of participants had religious beliefs makes signposting students to placement partner chaplaincy services very relevant. Not only because they provide safe spaces for prayer and reflection for all, but also because they are very experienced in offering counselling, spiritual and religious care after traumatic clinical and personal life events and are free.[78] This might help mitigate the increased risk of burnout seen with an increasing number of negative life events in medical students.[29]

In future studies disability data should also be captured, as nationally in the UK 11.8% of medical students declare a disability on entry[79] and this has implications for workforce and service planning. Widening participation data should also be captured in future work using the Higher Education Statistics Agency questions to plan adequate provision of enablement and financial services.[79]

Limitations

The response rate for the survey was low (9.5%), reflecting the level of engagement seen with a well-being workshop (4%), offered during the UK's second lockdown, to the same population and response rates of <10% which are commonly seen for online surveys.[80] The lack of engagement in well-being research introduces the risk of selection bias, with those students more engaged in well-being activities perhaps being more likely to respond, leaving those more in need under-represented. The study was undertaken at a single medical school and lacked the power to enable national inferences, although the demographic characteristics of this sample were representative of 50% of the national medical student demographic variables. As in most survey research fewer participants identifying as male responded,[81] again highlighting the need for assessment to engage male medical students in well-being measurement.

In a systematic review of interview studies (n=53) the mean number of interviews in studies published in the *British Journal of Health Psychology* was 18.[46] A methodological interview study that used inductive and deductive coding in a randomised order found 9 interviews were required to achieve thematic saturation and 16 to achieve meaning saturation.[47] Therefore, the number of interviews required to meet theme and meaning saturation was in line with formerly published work.

Unique contribution and future research

Future studies will need to be multi-centre, use purposive sampling and financial incentives, to ensure adequately powered and nationally representative samples. Unlike other investigations of medical student well-being before,[21] and during[64] the pandemic, this study made no assumptions about how well-being should be measured, allowing student preference to be captured. This study provides evidence to inform a Core Outcome Set for medical student well-being, an agreed minimum sets of outcomes that will allow research study results to be compared and synthesised.[82] This study ensured that what stakeholders value was captured[42 83] a key part of Core Outcome Set development.

CONCLUSIONS

Medical students thought that measurement of their well-being was critically important for research, governance and individual feedback, showing their support for quality assurance of well-being and peer support. They wanted to be able to choose surveys, or conversations, to measure their well-being, as well as the person with whom they discussed their well-being. The type of measurement viewed as critically important was subjective, experienced, quantitative questionnaires, supporting their comfort with frequent well-being measurement. The determinants of well-being rated the most important, and the insights from interviews, together highlight the need for self-care to be an integrated and assessed part of the medical curriculum. Solutions to deliver this have been recommended that are medical student-centred and make use of existing resources. This work may be transferable across health and social care degree programmes.

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Acknowledgements We thank Ms Aimee O'Neill and Professor Julia Sinclair for their contributions to discussions of notions of wellbeing and their connotations.

Contributors GS: designed the study, collected, analysed and interpreted the data and wrote the article. RE: contributed to study design, collected, analysed and interpreted data and approved the final version of the article. DB: funding acquisition, overseeing design of the study, data collection and analysis. Edited and approved the article, acted as guarantor.

Funding Health Education England (HEE) South has provided financial support for a postgraduate student fellowship for 3 years.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Ethics Research Governance Office University of Southampton (study number 55730). All participants accessed a Participant Information Sheet and gave consent prior to taking part in the survey, and interviews. It was identified as a risk that students might be distressed by thinking about their well-being, and to mitigate this risk participants were given details of the BMA 24/7 confidential counselling and peer support service, the Samaritans, and advised to contact their GP if they were concerned about their mental health. Following the interview, a £10 voucher was emailed to each participant to compensate them for their time.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available in a public, open access repository. All data supporting this study are openly available from the University of Southampton repository at https://doi.org/10.5258/SOTON/D1933 after thesis submission in May 2022, as the work forms part of a PhD.

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