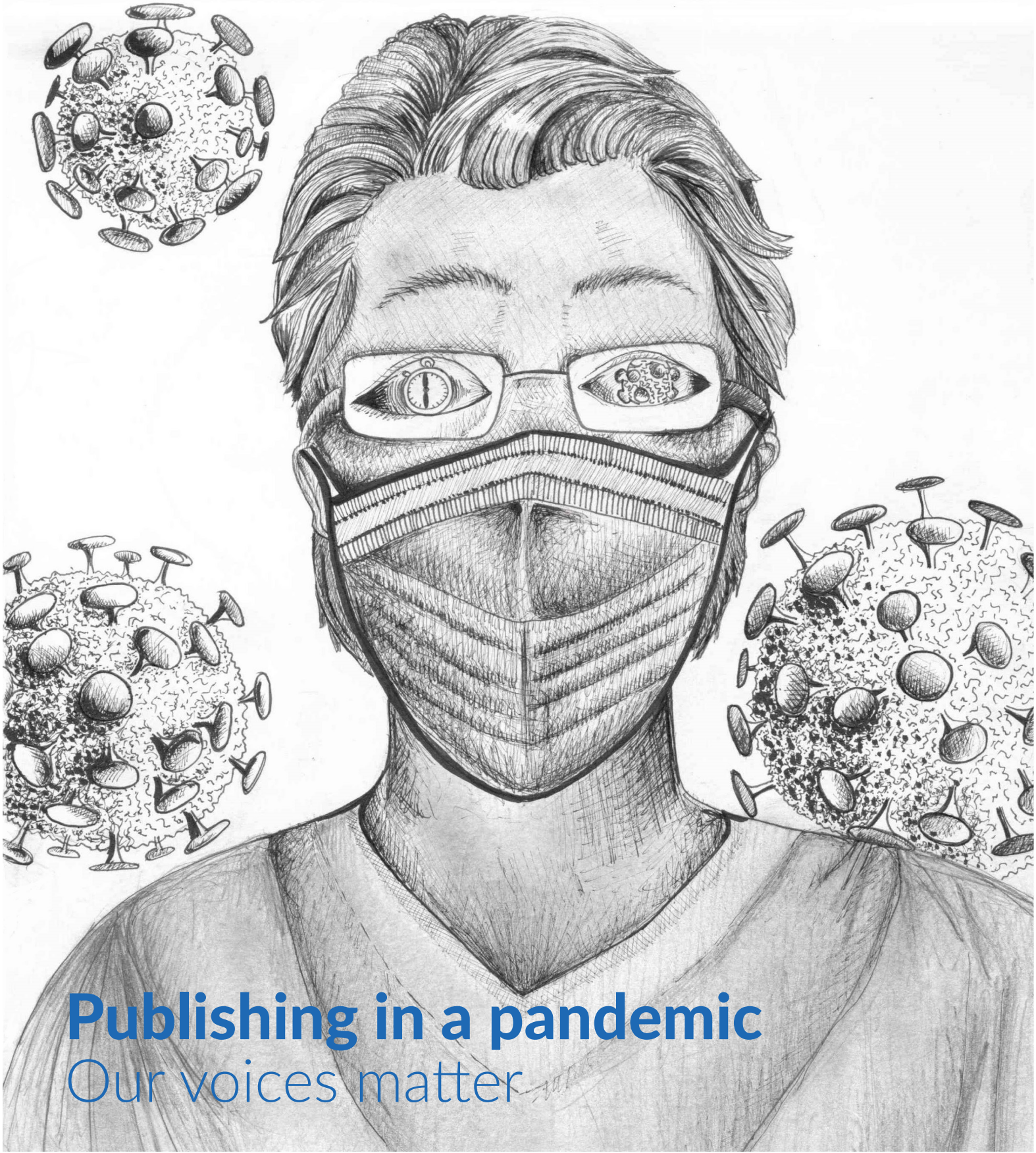
The British Student Doctor Journal

BSDJ

VOLUME 4, No.2
30 June 2020
ISSN 2514-3174
bsdj.org.uk



Publishing in a pandemic

Our voices matter

bsdj.org.uk

 /thebsdj

 @thebsdj

 @thebsdj

Journal DOI
10.18573/issn.2514-3174

Issue DOI
10.18573/bsdj.v4i2

The **British Student Doctor** is published by **The Foundation for Medical Publishing**, a charitable incorporated organisation registered in England and Wales (Charity No. 1189006), and a subsidary of **The Academy of Medical Educators.**

Cardiff University Press
Gwasg Prifysgol Caerdydd

The British Student Doctor is an imprint of Cardiff University Press, an innovative open-access publisher of academic research, where 'open-access' means free for both readers and writers.

cardiffuniversitypress.org

Contents

The British Student Doctor, 2020;4(2):1-2
doi: 10.18573/bsdj.209
Editorial

Editorial

Dr Isabel Schulz
Southampton Medical School

Dr Eleni Panagoulas
Humboldt University of Berlin

Dr Shivali Fulchand
British Medical Journal

Dr James M. Kilgour
Stanford University

Address for Correspondence:
Isabel Schulz
The British Student Doctor
Cardiff University Press
PO Box 430
1st Floor, 30-36 Newport Road
Cardiff, CF24 0DE
United Kingdom

Email: editorinchief@bsdj.org.uk

ORCID: 0000-0001-8067-2306 (JK)
ORCID: 0000-0003-2918-3931 (SF)

No conflicts of interest to declare

Accepted for publication: 01.07.20

Medicine is celebrated as a career that offers lifelong learning. We have been reminded of how true this is since a previously unknown virus transformed every aspect of our personal and working lives. It has been a time of great loss and we acknowledge and honor all those working in the front line who personally sacrifice themselves by risking their lives daily. Our thoughts and condolences go out to the families and friends of all those affected by the pandemic.

Covid-19 has also highlighted the underlying structural inequalities in our society. When we founded The British Student Doctor, we established our policy on diversity and inclusion, with equality and equity in publishing being a vital aspect of our mission. We cannot be any clearer: Black lives matter. Black medical students matter. Black voices matter. In her editorial, Olamide Dada, a medical student from Cardiff University and Founder of Melanin Medics, voices that our current medical school curriculum does not equip medical students to provide optimum care for all. As medical students and doctors, we have the responsibility to ensure our curriculum is inclusive and provides us with the knowledge to care for all patients regardless of their ethnicity.

Obesity, like ethnicity, has been shown to be another risk factor of covid-19. In our last issue, we published Biyyam Meghna Rao's article on "Should obesity be considered a disability?". In response to this article, Dr Sagar Sharma and Pippa Oakeshott from St.George's University of London, share that ethnic minority groups often lack awareness that obesity is a risk factor for diabetes and argue that we must prioritize educating patients of this.

The pandemic has also highlighted the psychological demands of clinical practice. Dr Emma Salter explores the concept of Balint groups, a reflective group to explore patient-doctor relationships, and the potential benefits of such groups.

Whilst, we can be critical of our health system, the celebration of the NHS has been possibly the only uniting factor of political parties, media pundits and the general public. Commentators say it has "replaced the Church of England as Britain's national religion." Wafaa Binti Mowlabaccus is a student at the University of Mauritius, and through her reflection on spending an elective placement in a UK hospital she reminds us of the value of our health service.

Medical students have been taking up healthcare assistant positions within hospitals or graduating early to join the medical workforce. We have published some of their stories in our short blog series, 'Coronavirus: Stories from the Frontline', which has received wide interest from local and national media. One author, Dr Natalie Farmer, a Foundation Doctor and editor at The BSDJ, shares her experience of the privilege of providing care to the most vulnerable in our society.

Although we are allowing students to join the workforce early, are they well prepared? In this issue, Dr Emma Poynton-Smith and colleagues from the University of Nottingham explored the question of student preparedness on the ward and they share that more support is required.

And what about digital literacy? Virtual GP consultations have become the new normal, almost overnight, and this is just the beginning. Mark Khurana, a student from the University of Copenhagen, calls medical schools to not forget to press the update button.

It has been difficult to consider anything else outside of covid-19 in the past few months. Yet, as lockdown measures ease, doctors and students are slowly resuming work in their usual areas. In this issue we share a systematic review and meta-analysis on corticosteroid use in cardiac surgery, a discussion on the impact of poor sleep quality on patient outcomes and

the contentious and highly topical issue of androgens in female elite athletes.

Jessica Leighton from the University of Newcastle and her colleagues at St Benedict's Hospice in Sunderland share an important education article on the physical and psychological impact of Lymphoedema.

Although the challenges ahead are plenty, we are also pleased to take a moment to celebrate a new milestone for The BSDJ of attaining a charitable status under *'The Foundation for Medical Publishing*'. Dr James Kilgour, Dr Shivali Fulchand and Dr Eleni Panagoulas will be stepping down from the senior editorial team and will be taking an executive role within the newly formed foundation. Dr Isabel Schulz, formerly Deputy Editor-in-Chief of the journal, will take over the Editor-in-Chief position, and Dr Natalie Farmer will be our new Deputy Editor-in-Chief. We would also like to introduce and welcome three new members to our editorial team. Senior Editors, Thomas Franchi from Sheffield University and Daniel Newport from Warwick University, and Original Research Section Editor Helena Brezovjakova from Imperial College, and Design Editor Rubab Abdi from Cardiff University.

Whether you are working and learning from home or fighting against the pandemic on the frontline, we hope that this June 2020 issue of The BSDJ finds you well. Please keep safe during these uncertain times. If you feel inspired and you would like to have your voice heard, you can submit your work for our next issue in January. See our website for the author guidelines.

Thank you to Dr Emma Rachel Rengasamy, a Foundation Doctor at the Princess of Wales Hospital, for sharing her artwork for our issue cover. She was inspired by the theme of time and how health professionals can be on the frontline fighting the virus, yet equally vulnerable: *"Time has been a recurring theme throughout the COVID-19 pandemic. Whether this has been the incubation period of the virus, counting down the days of lockdown or the uncertain progress of those affected."*

We would like to extend our gratitude to our dedicated editorial team, peer reviewers, faculty advisory board, our publisher, Cardiff University Press, and above all you, our readers. Our success as a journal is due to the hard work that our community has invested during these unprecedented times.

The British Student Doctor, 2020;4(2):3-6
doi: 10.18573/bsdj.189
Editorial

Guest Editorial: Race and the medical school curriculum

Olamide Dada
Cardiff University School of Medicine

Address for Correspondence:
Olamide Dada
School of Medicine
Cardiff University
The Cochrane Building
Heath Park, Cardiff, CF14 4YU

Email: dadao@cardiff.ac.uk

Conflicts of interest:
Olamide Dada is the founder of Melanin Medics, a charity that promotes diversity in Medicine.

Accepted for publication: 26.06.20

The Black Lives Matter movement has taken the world by storm. This movement has been reignited after the death of George Floyd in the US and quickly led to a global uproar. Despite social distancing rules still in place, across the world, people took to the streets in their thousands to protest against anti-Black racism and police brutality. But this is not the only battle the Black community are fighting. It has come to light that those from the BAME community are disproportionately affected by COVID-19 with Black males and females four times more likely to die with COVID-19 than White ethnicity males and females. (1) This has emphasised the existence of institutional racism, racial inequality in medicine and its negative effects on health. It is clear that this lockdown period has forced the world to take notice of the injustices faced by the Black and minority ethnic (BAME) community, and the many ways that they are being failed by the systems that are meant to protect them.

In 2001, BAME groups made up 5.1% of the UK population, which rose to 14% in 2011. (2) It is clear that the UK is diversifying at an exponential rate, but medical culture is yet to catch up with this increase in diversity. (3) Doctors have a duty to deliver optimum care to all patients; but the current medical school curriculum does not adequately prepare medical students to do so effectively.

Race is a critical component of our patients' social identity. (4) When you meet someone, their race is often the first thing you notice. Differences in race represent differences in culture, experiences and ethnic backgrounds which result in differences in health needs. There has been a global outcry within medicine to diversify the medical school curriculum. Students need to be exposed to more diverse patient groups during their training and gain a greater understanding of health inequalities and how racism contributes to health outcomes.

Currently, the majority of teaching resources and clinical images being used only represent white patients. Even though students may be exposed to patients from diverse backgrounds whilst on clinical placements, it is not a guarantee that students will see specific clinical signs on these patients. (5) Additionally, the absence of appropriate terminology makes it difficult to identify and describe certain clinical signs in patients from BAME backgrounds. One example of this being erythema, meaning redness of skin or mucous membranes. This ineptitude can lead to delayed diagnoses and sub-optimum delivery of care to all patients. (6)

As future doctors, cultural competence is crucial. This can be defined as the process of understanding, communicating with and effectively interacting with people from different cultures. (7) Cultural norms influence patient health-related behaviours, by understanding this it heightens the ability to deliver patient-centred care. (8) This area is currently neglected within medical education and is demonstrated by the lack of patients from different ethnic backgrounds within medical examinations, communication skills training and exam questions that perpetuate stereotypes of ethnic minority groups. (9-11) Cultural competence must be a continuous and career-long process focused on understanding the patient as an individual and how their culture influences their decisions. (12)

Furthermore, the specific needs of BAME patients have been marginalised. Health inequalities are caused by a combination of many factors. Although the direction of cause and effect are yet to be determined, health inequalities are further exacerbated by the inaction of institutions to tackle these specific issues. (13) BAME patients have poorer mental health outcomes. (14) Black women are five times more likely to die during childbirth. (15) In a study conducted in America, Black patients were 50% less

likely to be prescribed pain medication. (16) Medical students perceived that Black patients felt less pain. (17) These erroneous ideas are detrimental to patient care and demonstrate how individual racial bias may contribute to differential patient care.

It is important to make clear that something can be done about this. It starts by thoroughly examining the origins of certain decisions and challenging the status quo. Changes to the current medical school curriculum are key to unlocking a future in which racism is not tolerated or perpetuated through systems and the actions of individuals. Medical schools are a training ground for the next generation of doctors; a place to identify, unlearn and challenge maladaptive behaviours and learn new behaviours in a safe environment. Patient-centred care means that diversity must be incorporated within the medical curriculum and medical education in order to better serve patients.

REFERENCES

1. Chris White and Vahé Nafilyan. Office for National Statistics. Coronavirus (COVID-19) related deaths by ethnic group, England and Wales: 2 March 2020 to 10 April 2020 [accessed 20 June 2020]. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/coronavirusrelateddeathsbyethnicgroupenglandandwales/2march2020to10april2020

2. Emma White. Office for National Statistics. Ethnicity and National Identity in England and Wales: 2011 [accessed 20 June 2020]. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/articles/ethnicityandnationalidentityinenglandandwales/2012-12-11.

3. Nazar M, Kendall K, Day L, Nazar H. Decolonising medical curricula through diversity education: lessons from students. Med Teach. 2015;37(4):385-393.

https://doi.org/10.3109/0142159X.2014.947938 PMid:25156358

4. Williams DR, Sternthal M. Understanding racial-ethnic disparities in health: sociological contributions. J Health Soc Behav. 2010;51 Suppl:S15-S27.

https://doi.org/10.1177/0022146510383838 PMid:20943580

PMCid:PMC3468327

5. Gishen, F. and Lokugamage, A., 2019. Diversifying the medical curriculum. BMJ, 364, p.l300.

https://doi.org/10.1136/bmj.l300 PMid:30674468

6. Egede LE. Race, ethnicity, culture, and disparities in health care. J Gen Intern Med. 2006;21(6):667-669.

https://doi.org/10.1111/j.1525-1497.2006.0512.x

PMid:16808759 PMCid:PMC1924616

7. Saha S, Beach MC, Cooper LA. Patient centeredness, cultural competence and healthcare quality. J Natl Med Assoc. 2008;100(11):1275-1285.

https://doi.org/10.1016/S0027-9684(15)31505-4

8. Knipper, M., Seeleman, I. & Essink, M. How should ethnic diversity be represented in medical curricula? A plea for systematic training in cultural competence. TS MEDISCH ONDERWIJS 29, 54–60 (2010)

https://doi.org/10.1007/s12507-010-0010-8

9. Burgess, D.J., Burke, S.E., Cunningham, B.A. et al. Medical students' learning orientation regarding interracial interactions affects preparedness to care for minority patients: a report from Medical Student CHANGES. BMC Med Educ 16, 254 (2016).

https://doi.org/10.1186/s12909-016-0769-z

PMid:27681538 PMCid:PMC5041316

10. Rosen J, Spatz ES, Gaaserud AM, et al. A new approach to developing cross-cultural communication skills. Med Teach. 2004;26(2):126132.

https://doi.org/10.1080/01421590310001653946

PMid:15203521

11. Kai J, Bridgewater R, Spencer J. " 'Just think of TB and Asians', that's all I ever hear": medical learners' views about training to work in an ethnically diverse society. Med Educ. 2001;35(3):250-256. https://doi.org/10.1046/j.1365-2923.2001.00871.x

https://doi.org/10.1111/j.1365-2923.2001.00871.x

PMid:11260448

12. Betancourt JR. Cultural competence and medical education: many names, many perspectives, one goal. Acad Med. 2006;81(6):499-501.

https://doi.org/10.1097/01.ACM.0000225211.77088.cb

PMid:16728795

13. Salway S, Mir G, Turner D, Ellison GT, Carter L, Gerrish K. Obstacles to "race equality" in the English National Health Service: Insights from the healthcare commissioning arena. Soc Sci Med. 2016;152:102-110.

https://doi.org/10.1016/j.socscimed.2016.01.031

PMid:26851409 PMCid:PMC4774476

14. Bignall T, Jeraj S, Helsby E, Butt J. Racial disparities in mental health: literature and evidence review. 2019. https://raceequalityfoundation.org.uk/wp-content/uploads/2020/ 03/mental-health-report-v5-2.pdf.

15. Knight, M., 2018. MMBRACE-UK. Lessons Learned To Inform Maternity Care From The UK And Ireland Confidential Enquiries Into Maternal Deaths And Morbidity 2014–16.. Available at: <https://www.npeu.ox.ac.uk/mbrrace-uk/reports> [Accessed 20 June 2020].

16. Singhal A, Tien YY, Hsia RY (2016) Racial-Ethnic Disparities in Opioid Prescriptions at Emergency Department Visits for Conditions Commonly Associated with Prescription Drug Abuse. PLOS ONE 11(8): e0159224.

https://doi.org/10.1371/journal.pone.0159224

PMid:27501459 PMCid:PMC4976905

17. Kelly M. Hoffman, Sophie Trawalter, Jordan R. Axt, M. Norman Oliver (2016) Racial bias in pain assessment. Proceedings of the National Academy of Sciences, 201516047.

The British Student Doctor, 2020;4(2):7-17
doi: 10.18573/bsdj.148
Original Research

Corticosteroid use in cardiac surgery: a systematic review and meta-analysis

ORIGINAL RESEARCH

AUTHORS

Oliver Darwin
University of Nottingham

Address for Correspondence:
Oliver Darwin
University of Nottingham
Medical School
Nottingham, NG7 2UH

Email: mzyod2@nottingham.ac.uk

ORCID: 0000-0001-5548-9198

No conflicts of interest to declare.

Accepted for publication: 09.06.20

ABSTRACT

Background: This systematic review and meta-analysis seeks to determine whether corticosteroids are of beneficial use in cardiac surgery.

Methods: A database search was conducted using PubMed and EMBASE for randomised controlled trials (RCTs) comparing steroid use with a placebo in adults undergoing cardiac surgery, between 1990-2018. The quality of each study was assessed using the Jadad scoring system, and only double-blind studies with a score ≥3 were included. 53 RCTs were identified, and 14 were considered suitable for analysis.

Results: The corticosteroids used in the studies were methylprednisolone (57.1%), dexamethasone (35.7%), and hydrocortisone (7.1%). Steroid use significantly reduced incidence of infection [relative risk (RR) 0.83; 95% confidence interval (CI) 0.84-1.06; P<0.0001; I2=75%] and length of hospital stay [mean difference -0.36; 95% CI -0.5 – -0.21; P<0.00001; I2=88%]. Incidence of new atrial fibrillation was significantly reduced [RR 0.94; 95% CI 0.89-1.06; P=0.03; I2=0%], but this outcome was no longer significant when only large studies were included [RR 0.96; 95% CI 0.90-1.01; P=0.13; I2=0%]. Myocardial infarction was more frequent with steroid administration [RR 1.17; 95% CI 1.07-1.38; P=0.008; I2=0%], and there was no significant difference in mortality [RR 0.87; 95% CI 0.70-1.07; P=0.14; I2=0%].

Conclusions: After analysing the data from RCTs of 12,999 patients, perioperative corticosteroid administration was found to significantly reduce the risk of postoperative infection and length of hospital stay but increased the risk of myocardial infarction. More large trials need to be conducted in order to adequately assess the potential benefits of corticosteroid use in cardiac surgery.

INTRODUCTION

Cardiac surgery is a common surgical procedure, with an average of 49 coronary artery bypass grafts alone per 100,000 people in the EU each year, (1) and cardiopulmonary bypass (CPB) is utilised in most cardiac surgery procedures. CPB use producing a systemic inflammatory response has been thoroughly reported in the literature, and the mechanism has been linked to the exposure of blood to hypothermia, non-physiological flow, and foreign surfaces, (2) resulting in the activation of platelets, neutrophils, and cytokine cascades. (3) This inflammatory reaction is exacerbated by ischaemia-reperfusion injury when removing the patient from CPB. (3) This systemic inflammatory response may contribute to postoperative complications of cardiac surgery including atrial fibrillation, (3) myocardial dysfunction, (4) multiple organ dysfunction, (5) and mortality. This is because inflammatory mediators are known to have cardiodepressive effects. (6)

Steroids have been shown to reduce the body's inflammatory response to CPB, (2,7) but their effect on clinical outcomes is not yet clear. The 2017 EACTS guidelines (32) on the use of steroids indicate that a previous 2008 meta-analysis has shown that steroids reduced postoperative atrial fibrillation, postoperative bleeding, and duration of hospital stay, but produced an increased rate of myocardial infarction. More recently, two larger trials have been carried out, the Steroids In caRdiac Surgery (SIRS) trial (7) and the Dexamethasone in Cardiac Surgery (DECS) study, (8) and thus the author thought it relevant to the field, and a good exercise as a medical student, to revisit the data.

As such, this systematic review and meta-analysis aims to determine whether prophylactic corticosteroid administration is effective in reducing morbidity and mortality in patients undergoing on-pump cardiac surgery.

METHODS

RCT identification

A database search was conducted for published randomised controlled trials (RCTs) comparing corticosteroid use with a placebo in adults undergoing cardiac surgery involving CPB, between 1990-2018. PubMed and EMBASE databases were searched. The search terms included: 'cardiac surgery, open heart surgery, coronary artery bypass graft, CABG, valve surgery, aortic valve, mitral valve, heart valve, CPB, cardiopulmonary bypass, pre-operative, intraoperative, and prophylactic', in combination with 'steroid, corticosteroid, glucocorticoid, hydrocortisone, dexamethasone, and methylprednisolone'. The references of included studies were then reviewed for other potentially relevant studies.

RCT selection

Exclusion criteria were then applied to the identified RCTs, and trials were excluded if: 1) there was a lack of a randomised double-blind trial design, 2) there was a lack of data regarding clinical outcomes, 3) there was a lack of a placebo group, or 4) if there were other treatments confounding the corticosteroids. This meant that 53 RCTs were selected from those initially identified.

The quality of each study was then assessed using the Jadad scoring system, (9) mainly focussing on patient randomisation and adequacy of follow-up. As previously advised in the literature, (10) only studies with a score of at least 3 were included. Following this, 14 studies fulfilled the criteria and were included in this meta-analysis. The search strategy is shown in Figure 1.

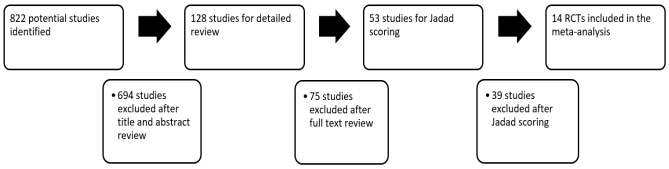


Figure 1
Flow diagram of trial selection

Study Design

Summary characteristics of the RCTs that were included in this meta-analysis are shown in Table 1.

	Number of RCTs (%)	Number of patients (%)
Total	14	12,999
Decades		
1990-1999	1 (7.1)	60 (0.4)
2000-2009	9 (64.2)	661 (5.1)
2010-2018	4 (28.5)	12,278 (94.5)
Jadad score		
3	7 (50.0)	336 (2.6)
4	2 (14.3)	272 (2.1)
5	5 (35.7)	12,391 (95.3)
Sample size		
<60	5 (35.7)	159 (1.2)
60-100	5 (35.7)	361 (2.8)
>100	4 (28.5)	12,479 (96.0)

Table 1
Summary characteristics of included RCTs

Ten trials included patients undergoing isolated coronary artery bypass graft, (8,11-17,19,21) and four trials included all patients undergoing CPB. (7,18,20,22) The vast majority (96.0%) of patients belonged to four trials. (13,19,20,22) All trials involved steroids being administered preoperatively or intraoperatively, and the steroids used in the trials were methylprednisolone, (7,8,11,12,14,15,17,22) dexamethasone, (13,16,19-21) or hydrocortisone (18) (Table 2). Differing doses of corticosteroids were given in each trial, as there is no effective guideline for dosage in preoperative or intraoperative steroid administration, and these are outlined below.

Included study	N (patients)	Steroid used	Steroid dosage	Administration (intra/pre-op)
Chaney 1998	88	Methylprednisolone	60 mg.kg^{-1}	Intra-op
Chaney 2001	295	Methylprednisolone	60 mg.kg^{-1}	Intra-op
Fillinger 2002	30	Methylprednisolone	15 mg.kg^{-1}	Pre-op
Halvorsen 2003	294	Dexamethasone	8 mg	Intra-op
Celik 2004	60	Methylprednisolone	60 mg.kg^{-1}	Intra-op
McBride 2004	35	Methylprednisolone	30 mg.kg^{-1}	Pre-op
Whitlock 2006	60	Methylprednisolone	500 mg	Intra-op
Sobieski 2008	28	Dexamethasone	100 mg	Intra-op
Demir 2009	30	Methylprednisolone	1 g	Pre-op
Weis 2009	36	Hydrocortisone	100 mg	Pre-op
Abbaszaleh 2012	185	Dexamethasone	12 mg	Intra-op
Dieleman 2012	4494	Dexamethasone	1 mg.kg^{-1}	Intra-op
Mardani 2013	93	Dexamethasone	8 mg	Pre-op
Whitlock 2015	7507	Methylprednisolone	500 mg	Intra-op

Table 2
Comparison of steroids and dosages in included RCTs

Eleven studies looked at mortality, (7,8,11,13,14,16-20,22) nine at the incidence of myocardial infarction (MI), (7,8,11,13,14,19-22) twelve at the hospital length of stay, (7,8,11,12,14-18,20-22) ten at the incidence of new-onset AF, (7,8,11,14,16,18-22) and seven at the incidence of infection. (7,16,17,19-22)

Definitions

Mortality was considered as all-cause mortality occurring before hospital discharge, or up to thirty days postoperatively. Infection was considered as relevant if it occurred before hospital discharge, or up to thirty days postoperatively. MI or new-onset AF were considered if it occurred before hospital discharge, or up to thirty days postoperatively. Length of hospital stay was measured in days.

Statistical analysis

Clinical outcome data were extracted from each trial, and the outcomes for the patients receiving steroids were compared with patients in the control groups. Discrete outcomes, i.e. mortality, infection, AF and MI, were reported as relative risks (RRs) with a 95% CI. Continuous outcomes, i.e. length of hospital stay, were reported as a mean difference (MD) with a 95% CI. The outcomes were compared using the fixed-effects model. The software used to perform the statistical calculations was RevMan (version 5.3, Cochrane Collaboration, Oxford). The I2 test was used to assess statistical heterogeneity, and a I2 >25 was considered as significant heterogeneity. A sensitivity analysis was conducted using only large trials (>1000 patients), to assess the validity of the results.

RESULTS

Outcomes

Mortality in the steroid group was 189 out of 6425 patients (2.9%) compared to 218 out of 6404 patients (3.4%) in the control group, which indicates no significant difference [RR 0.87; 95% CI 0.70-1.07; p=0.14; I2=0%] (Figure 2).

Myocardial infarction incidence in the steroid group was 532 out of 6421 patients (8.3%) compared to 452 out of 6407 patients (7%) in the control group, which is a significant increase in the steroid group [RR 1.17; 95% CI 1.07-1.38; p=0.008; I2=0%] (Figure 3).

New-onset atrial fibrillation incidence in the steroid group was 1671 out of 6451 patients (25.9%) compared to 1778 out of 6439 patients (27.6%) in the control group, which represents a significant reduction in the steroid group [RR 0.94; 95% CI 0.89-1.06; p=0.03; I2=0%] (Figure 4).

The incidence of infection in the steroid group was 686 out of 6183 patients (11.1%) compared to 832 out of 6201 patients (13.4%) in the control group, which represents a significant reduction with steroid use [RR 0.83; 95% CI 0.84-1.06; p<0.0001; I2=75%] (Figure 5).

There was statistically significant decrease in length of hospital stay in the steroid group compared with the control group of 0.36 days [MD -0.36; 95% CI -0.5 – -0.21; p<0.00001; I2=88%] (Figure 6).

Sensitivity analysis

When the sensitivity analysis was carried out, including only large trials (>1000 patients), only the outcome of new-onset atrial fibrillation was changed, with the effect of steroids becoming non-significant when compared to the control group [RR 0.96; 95% CI 0.90-1.01; p=0.13; I2=0%] (Figure 7). All statistical analysis of the outcomes was heavily influenced by the largest trial in the analysis (21), with the weighting ranging from 47.6% for new-onset AF to 88.0% for MI.

Heterogeneity analysis

Significant heterogeneity (I2 >25) was encountered for length of hospital stay and incidence of infection. Surgery type did not affect the outcomes.

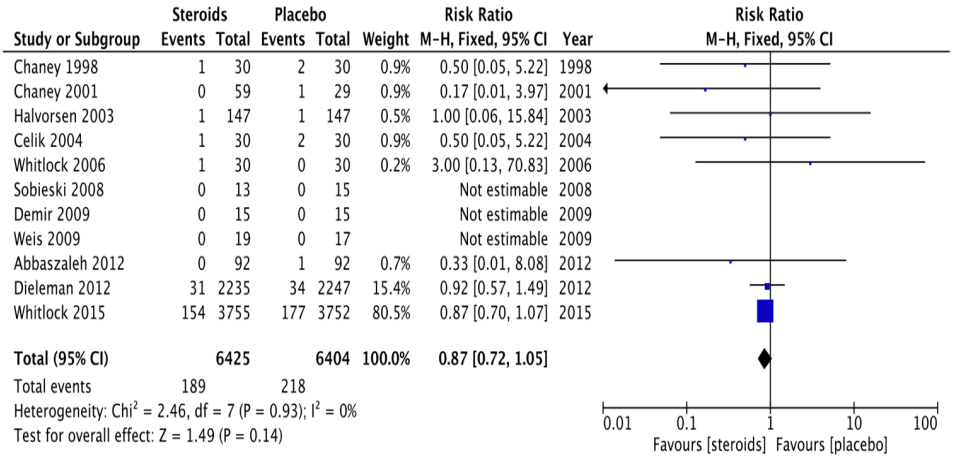


Figure 2
Forest plot for mortality – the size of the box correlates with the weight of the study estimate

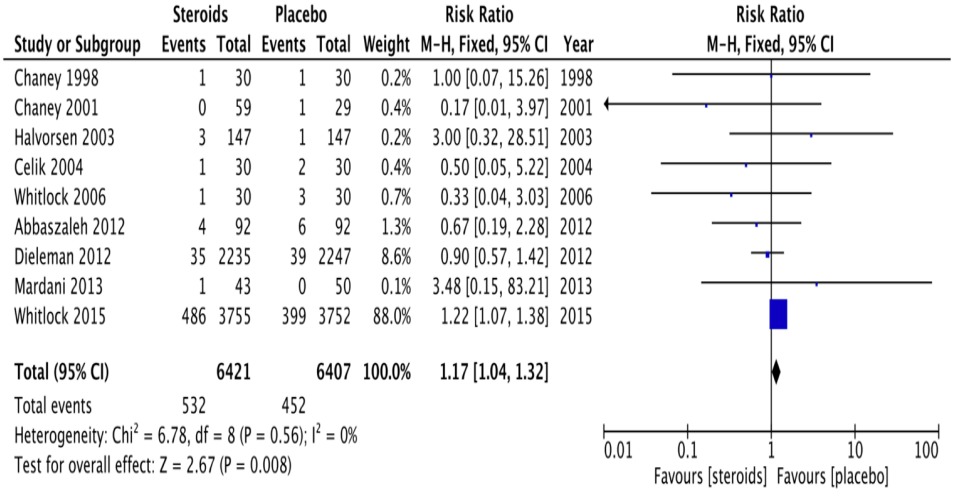


Figure 3
Forest plot for myocardial infarction – the size of the box correlates with the weight of the study estimate

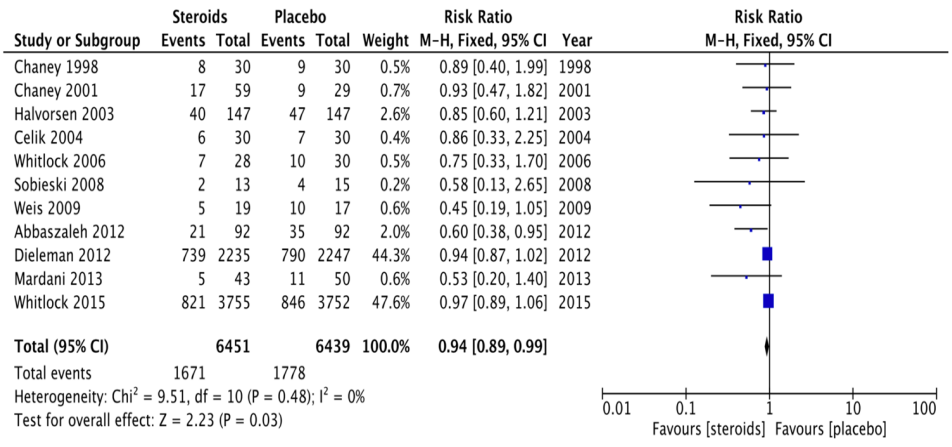


Figure 4
Forest plot for atrial fibrillation – the size of the box correlates with the weight of the study estimate

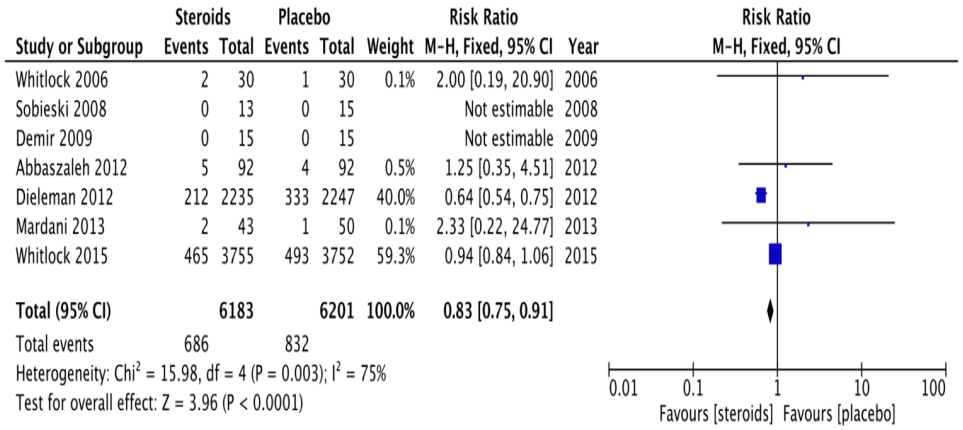


Figure 5

Forest plot for incidence of infection – the size of the box correlates with the weight of the study estimate

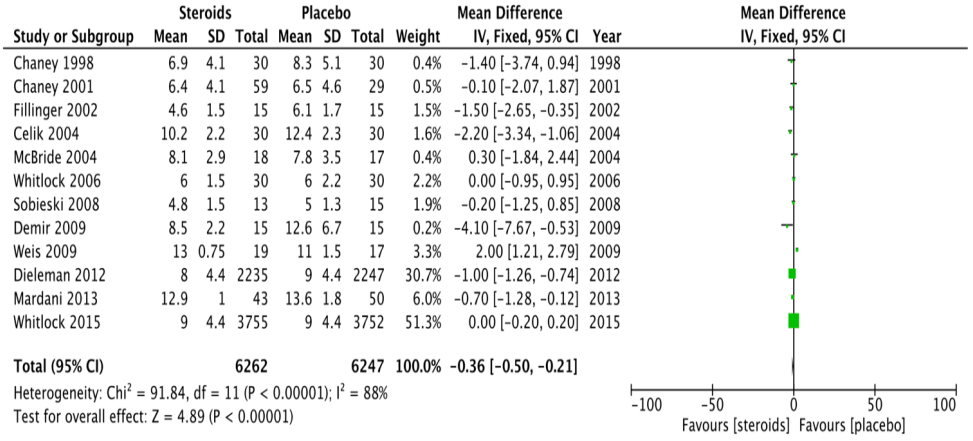


Figure 6

Forest plot for length of hospital stay – the size of the box correlates with the weight of the study estimate

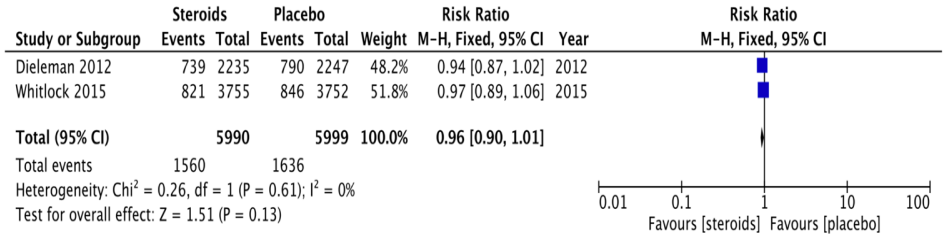


Figure 7

Forest plot for atrial fibrillation: only including large trials (>1000 patients) – the size of the box correlates with the weight of the study estimate

DISCUSSION

This systematic review and meta-analysis suggests that preoperative or intraoperative administration of corticosteroids results in a significant reduction in the incidence of infection and the length of hospital stay after cardiac surgery, although these results were associated with significant heterogeneity. The reduced incidence of infection following corticosteroid administration is counter-intuitive, as steroid-induced immune suppression is widely considered to potentially increase the risk of postoperative infection. Thus, this outcome may be a result of spurious diagnosis of systemic inflammatory response as opposed to infection, or vice versa. However, several studies have noted a correlation between preoperative C-reactive protein concentration (and thus inflammatory status) and incidence of postoperative infection, (23,24) with a possible mechanism being that rate of bacterial growth has been shown to increase in the presence of proinflammatory cytokines in vitro. (25)

Although length of hospital stay was significantly decreased in the steroid group, this author questions whether a reduction in length of stay of 0.36 days is of clinical significance.

These data also suggest that prophylactic steroid administration does not significantly affect mortality when compared to control groups but is associated with an increased incidence of myocardial infarction. This increase in myocardial infarction may possibly be due to the effect of increased insulin resistance afforded by corticosteroids, blocking glucose from entering cardiac myocytes and furthering ischaemic injury.

The increase in rates of myocardial infarction is difficult to align with no increase in mortality, as this is a patient population in which myocardial injury is associated with poorer clinical outcomes. This discrepancy may be due to the difficulty in defining myocardial injury after cardiac surgery, as all patients experience release of cardiac biomarkers. Evidence for the thresholds of clinically significant cardiac biomarkers following cardiac surgery is not available, and therefore a robust and well-defined approach needs to be taken. Whitlock et al (22) used systematic monitoring of CK-MB to diagnose myocardial injury, and consequently found an increase in both myocardial infarction and associated mortality, suggesting that the discrepancy in these rates may be due to study design.

The data show a statistically significant decrease in new-onset atrial fibrillation, but this significance disappears when only larger trials are included in the analysis, suggesting that the smaller studies are producing this result. Inflammation of myocardial tissue following CPB and cardiac surgery has been theorised to be the cause of new-onset AF postoperatively, (26,27) hence the rationale for the inclusion of new-onset AF in the RCTs in this analysis. However, when only large trials were included, this meta-analysis demonstrated that prophylactic steroid administration has no effect on the incidence of new-onset AF, suggesting that the pathogenesis of AF following CPB is more complex than a result of myocardial inflammation.

Strengths and weaknesses

Previous meta-analyses have been conducted on the use of steroids in cardiac surgery, (28,29) but this is the first to include only high quality RCTs (as demonstrated by the Jadad scoring system). As a result, this meta-analysis had a reduced number of RCTs included, but the quality of the analysis and resulting outcomes was higher with a mean Jadad score of 3.9.

An additional strength of this systematic review and meta-analysis is the diligent methodology of trial identification, data extraction, and outcome analysis, resulting in a high degree of confidence in the results. The search was comprehensive, utilising two large trial databases for published data, and the vast majority of patient groups included in the RCTs represented all CPB procedures (93.1%), leading to a high degree of generalisability of outcomes.

This systematic review and meta-analysis does, however, have several limitations. The majority of the data came from four individual RCTs, meaning they had a very significant effect weighting on the outcomes measured. A greater number of large trials to draw data from would improve the reliability of these results. Furthermore, there was significant heterogeneity and variability between trials regarding the steroids and dosages used, meaning that clinical and methodological variability was introduced into the results. A subgroup analysis was conducted that found there was no statistical significance in results between different types of steroid ($p=0.16$), and thus a fixed-effects model was suitable for the analysis. A random-effects model could have been used to address the heterogeneity in dosage between studies, but as all dosages were within therapeutic range, the author felt that this was not suitable. Were a benefit to be found in corticosteroid administration during this review, a random-effects model could have been used to determine if steroid dosage affected the clinical outcomes.

Additionally, this meta-analysis was carried out by a medical student and began as a training review before being adapted into a full systematic review. As such, this work was not able to be prospectively registered with the PROSPERO register of systematic reviews, (30) and did not benefit from the presence of additional reviewers, against standard PRISMA-P guidelines. (31) The author acknowledges the possibility of introducing methodological errors, unnecessary bias, and a reduction in transparency that these decisions afford this work. However, the author believes that the robustness of the protocols and validity of the analysis warrant consideration of the results. Were similar work to be repeated, the author would ensure the PRISMA-P protocols for systematic review were adhered to.

CONCLUSION

This systematic review represents a thorough and comprehensive assessment of the safety and efficacy of prophylactic corticosteroid use in cardiac surgery. This review suggests that steroid use decreases the incidence of postoperative infection, reduces the length of hospital stay, increases the risk of myocardial infarction, has no statistically significant effect on postoperative mortality, and significantly reduces the incidence of new-onset AF (although this result should be taken with caution, as analysis of large trials showed no significant difference). Two large RCTs accounted for the majority weighting of these results, and further large trials are needed in order to confirm or refute these findings with greater certainty.

Given the increased risk of myocardial infarction, the dubious result of reduction in postoperative infection, and the trivial reduction in length of hospital stay, this meta-analysis has found that the EACTS guidance that routine use of prophylactic steroids is not indicated for patients undergoing cardiac surgery remains true and prudent advice.

REFERENCES

1. Lafortune G, Balestat G Durand A. Comparing activities and performance of the hospital sector in Europe: how many surgical procedures performed as inpatient and day cases? OECD Health Division. 2012;1:4-51

2. Vincent JL, Wan S, Yim AP. Steroids in cardiopulmonary bypass. Crit Care Med. 2000;28:3373-4

https://doi.org/10.1097/00003246-200009000-00060

PMid:11009018

3. Paparella D, Yau TM, Young E. Cardiopulmonary bypass induced inflammation: pathophysiology and treatment: An update. Eur J Cardiothorac Surg. 2002;21:232-44

https://doi.org/10.1016/S1010-7940(01)01099-5

4. Gaudino M, Andreotti F, Zamparelli R, Di Castwelnuovo A, Nasso G, Burzotta F, et al. The -174G/C interleukin-6 polymorphism influences postoperative interleukin-6 levels and postoperative atrial fibrillation: Is atrial fibrillation an inflammatory complication? Circulation. 2003;108:195-9

https://doi.org/10.1161/01.cir.0000087441.48566.0d

PMid:12970232

5. Raja SG, Benedettol LL. Off-pump coronary artery bypass grafting: misperceptions and misconceptions. World J Methodol. 2014;4:6-10.

https://doi.org/10.5662/wjm.v4.i1.6

PMid:25237626 PMCid: PMC4145576

6. Kristeller JL, Jankowski A, Reinaker T. Role of corticosteroids during cardiopulmonary bypass. Hosp Pharm. 2014;49:232-6 https://doi.org/10.1310/hpj4903-232

PMid:24715740 PMCid:PMC3971106

7. Whitlock RP, Young E, Noora J, Farrokhyar F, Blackall M, Teoh KH. Pulse low dose steroids attenuate post-cardiopulmonary bypass SIRS. J Surg Res. 2006;132:188-94

8. Chaney MA, Nikolov MP, Blakeman B, Bakhos M, Slogoff S. Pulmonary effects of methylprednisolone in patients undergoing coronary artery bypass grafting and early tracheal extubation. Anesth Analg. 1998;87:27-33

https://doi.org/10.1016/j.jss.2005.11.075

PMid:16566943

9. Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ, et al. Assessing the quality of reports of randomized clinical trials: Is blinding necessary? Controlled Clinical Trials. 1996;17:1-12

https://doi.org/10.1016/0197-2456(95)00134-4

10. Simon SD. Statistical Evidence in Medical Trials: What Do the Data Really Tell Us? United Kingdom. Oxford University Press; 2006.

11. Chaney MA, Durazo-Arvizu RA, Nikolov MP, Blakeman BP, Bakhos M. Methylprednisolone does not benefit patients undergoing coronary artery bypass grafting and early tracheal extubation. J Thorac Cardiovasc Surg. 2001;121:561-9

https://doi.org/10.1067/mtc.2001.112343

PMid:11241092

12. Fillinger MP, Rassias AJ, Guyre PM, Sanders JH, Beach M, Pahl J, et al. Glucocorticoid effects on the inflammatory and clinical responses to cardiac surgery. J Cardiothorac Vasc Anesth. 2002;16:63-9

https://doi.org/10.1053/jcan.2002.31057

PMid:11957164

13. Halvorsen P, Raeder J, White PF, Almdahl S. Norstrand K, Saatvedt K, et al. The effect of dexamethasone on side effects after coronary revascularisation procedures. Anesth Analg. 2003;96:1578-83

https://doi.org/10.1213/01.ANE.0000063922.90966.3A

PMid:12760978

14. Celik JB, Gormus N, Okesli S, Gormus ZI, Solak H. Methylprednisolone prevents inflammatory reaction occurring during cardiopulmonary bypass: effects on TNF-Alpha, IL-6, IL-8, IL-10. Perfusion. 2004;19:185-91

https://doi.org/10.1191/0267659104pf733oa

PMid:15298427

15. McBride WT, Allen S, Gormley SMC, Young IS, McClean E, MacGowan SW, et al. Methylprednisolone favourable alters plasma and urinary cytokine homeostasis and subclinical renal injury at cardiac surgery. Cytokine. 2004;27:81-9

https://doi.org/10.1016/j.cyto.2004.03.018

PMid:15242697

16. Sobieski MA, Graham JD, Pappas PS, Tatooles AJ, Slaughter MS. Reducing the effects of the systemic inflammatory response to cardiopulmonary bypass: can single dose steroids blunt systemic inflammatory response syndrome? ASAIO J. 2008;54:203-6

https://doi.org/10.1097/MAT.0b013e3181640331

PMid:18356656

17. Demir T, Demir H, Tansel T. Influence of methylprednisolone on levels of neuron-specific enolase in cardiac surgery: a corticosteroid derivative to decrease possible neuronal damage. J Card Surg. 2009;24:397-403

https://doi.org/10.1111/j.1540-8191.2009.00842.x

PMid:19583607

18. Weis F, Beiras-Fernandez A, Schelling G, Briegel J, Lang P, Hauer D, et al. Stress doses of hydrocortisone in high-risk patients undergoing cardiac surgery: effects on interleukin-6 to interleukin-10 ratio and early outcome. Crit Care Med. 2009;37:1685-90

https://doi.org/10.1097/CCM.0b013e31819fca77

PMid:19325469

19. Abbaszadeh M, Khan ZH, Mehrani F, Jahanmehr H. Peri-operative intravenous corticosteroids reduce incidence of atrial fibrillation following cardiac surgery: a randomised study. Rev Bras Cir Cardiovasc. 2012;27:18-23

https://doi.org/10.5935/1678-9741.20120005

PMid:22729297

20. Dieleman JM, Nierich AP, Rosseel PM, van der Maaten JM, Hofland J, Diephius JC, et al. Intraoperative high-dose dexamethasone for cardiac surgery: a randomised controlled trial. JAMA. 2012;308:1761-7

https://doi.org/10.1001/jama.2012.14144

PMid:23117776

21. Mardani D, Bigdelian H, Prophylaxis if dexamethasone protects patients from further post-operative delirium after cardiac surgery: a randomised trial. J Res Med Sci. 2013;18:37-43

22. Whitlock RP, Devereaux PJ, Teoh KH, Lamy A, Vincent J, Pogue J, et al. Methylprednisolone in patients undergoing cardiopulmonary bypass (SIRS): a randomised, double-blind, placebo-controlled trial. Lancet. 2015; 386:1243-53

https://doi.org/10.1016/S0140-6736(15)00273-1

23. Fransen EJ, Maessen JG, Elenbaas TW, van Aarnhem EEHL, van Diejen-Visser MP. Increased preoperative C-reactive protein plasma levels as risk factor for post-operative infections. Ann Thorac Surg. 1999;67:134-8

https://doi.org/10.1016/S0003-4975(98)00973-4

24. Cappabianca G, Paparella D, Visicchio G, Capone G, Lionetti G, Numis F, et al. Preoperative C-reactive protein predicts mid-term outcome after cardiac surgery. Ann Thorac Surg. 2006;82:2170-8

https://doi.org/10.1016/j.athoracsur.2006.06.039

PMid:17126130

25. Meduri GU, Kaganat S, Stefan J, Tolley E, Schaberg D. Cytokines IL-1beta, IL-6 and TNF-alpha enhance in vitro growth of bacteria. Am J Respir Crit Care Med. 1999;160:961-7

https://doi.org/10.1164/ajrccm.160.3.9807080

PMid:10471625

26. Kirklin JK, McGiffin DC. Early complications following cardiac surgery. Cardiovasc Clin. 1987;17:321-43

https://doi.org/10.1164/ajrccm.160.3.9807080

PMid:10471625

27. Teoh KH, Bradely CA, Gauldie J, Burrows H. Steroid inhibition of cytokine-mediated vasodilation after warm heart surgery. Circulation. 1995;92:347-53

https://doi.org/10.1161/01.CIR.92.9.347

PMid:7586436

28. Dvirnik N, Belley-Cote EP, Hanif H, Devereaux PJ, Lamy A, Dieleman JM, et al. Steroids in cardiac surgery: a systematic review and meta-analysis. Brit J Anaesth. 2018;120:657-67

https://doi.org/10.1016/j.bja.2017.10.025

PMid:29576107

29. Cappabianca G, Rotunno C, Schinosa LLT, Ranieri VM, Paparella D. Protective effects of steroids in cardiac surgery: a meta-analysis of randomised double-blind trials. J Cardiothorac and Vasc Anesth. 2011;25:156-65

https://doi.org/10.1053/j.jvca.2010.03.015

PMid:20537923

30. PROSPERO: International prospective register of systematic reviews. National Institute for Health Research. https://www.crd.york.ac.uk/PROSPERO/

31. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015;349:g7647

https://doi.org/10.1136/bmj.g7647

PMid:25555855

32. Sousa-Uva M, Head SJ, Milojevic M, Collet JP, Landoni G, Castella M, et al. 2017 EACTS Guidelines on perioperative medication in adult cardiac surgery. European J Cardiothoracic Surg. 2017;53(1):5-33

https://doi.org/10.1093/ejcts/ezx314

PMid:29029110

The British Student Doctor, 2020;4(2):18-29
doi: 10.18573/bsdj.140
Original Research

Understanding the ward environment: factors determining medical students' 'ward smarts'

ORIGINAL RESEARCH

AUTHORS

Dr Emma Poynton-Smith
University of Nottingham

Dr Erica Colwill
University of Nottingham

Professor Opinder Sahota
University of Nottingham

Address for Correspondence:
Dr Emma Poynton-Smith
University of Nottingham
Derby Road
Lenton, Nottingham NG7 2UH

Email: emma.poynton-smith@nhs.net

No conflicts of interest to declare.

Accepted for publication: 19.05.20

ABSTRACT

Background: Medical students are expected to know how to function on hospital wards and to be at ease within the ward environment. Such ward-based knowledge indicates that a student is 'ward smart'. However, formal teaching in this area seems to be somewhat neglected, with students being left to gather this knowledge through experience.

Methods: Data were collected via an online questionnaire comprising both closed and open questions designed to assess students' ward smarts, focusing on knowledge of the ward environment (routines, equipment, and terminology used), relevant clinical knowledge, and communication/roles of other members of the multi-disciplinary team.
Multiple regression was used to identify factors influencing students' scores (i.e. demographics, work experience). Thematic analysis was used to explore medical students' opinions on how their ward understanding could be improved.

Results: In our sample of 53 medical students, 96% did not know how to turn on a hearing aid and only 30% knew what a Waterlow score was. Furthermore, 89% did not know how to read an oxygen flowmeter, and only 55% knew where the CPR lever on the bed was situated.
Multiple regression showed that ward smarts can be predicted by previous hospital-based work and year group, both of which may represent time spent on wards.
Thematic analysis suggested that students felt they would benefit from more ward time and shadowing healthcare professionals on the wards.

Discussion: This suggests that students may not be prepared to work in a ward environment. We propose, based on training implemented in other medical schools, that a specific ward-based interprofessional learning placement or experience should be added to the medical curriculum. As an initial step, specific teaching and/or practical sessions for students centred around patient communication and understanding the ward environment would be beneficial.

BACKGROUND

The General Medical Council (GMC) requires that all medical school graduates have an understanding of the multidisciplinary team and are able to work efficiently within a secondary care setting. (1) These requirements should be met through 'clinical phase' education, whereby students learn whilst being in the clinical environment alongside qualified medical staff. This ward-based knowledge indicates that a student is 'ward smart', which encompasses being at ease within the ward environment, familiarity with routines, tasks, and equipment on the ward, having knowledge of jargon used in hospitals, and an understanding of roles within the multidisciplinary allied health team. (2, 3) Such knowledge is not only important for patient care, but also helps medical students feel less 'alien' or 'in the way' on the ward: students who feel as though they are a useful part of the team are more able to take advantage of situated (clinical) learning opportunities and their educational outcomes tend to reflect this. (2, 4, 5)

This raises the question of when and where students should acquire 'ward smarts'; formal teaching on ward environments is often neglected, with students feeling unprepared for clinical placement and being left to acquire ward smarts as they progress. (4-6) Furthermore, ward opportunities and quality of teaching can vary greatly between individual placements and hospital trusts. For example, at Nottingham Medical School, undergraduate students have a ward simulation day, but this opportunity is not offered to graduate entry students. Furthermore, those at Queen's Medical Centre for Paediatrics have a 'ward smart day', but no other departments or placements run this session. This variation and the fact that each individual student has their own starting point, having varied levels of previous experience in secondary care, introduce significant variation into students' understanding of the ward environment. (2)

Being ward smart is key for many aspects of medicine; it can be the difference between having a smooth transition to new placements or taking weeks trying to familiarise oneself, and could therefore lead to reduced time for effective learning. (3, 4) As being ward smart has only recently been defined, there is a gap in the literature related to this specific term, but many of the aspects of ward smarts have been studied in isolation or as part of professionalism: for example, there is evidence to suggest that there are deficits in medical students' ward smarts in specific areas such as paperwork and documentation, (7) teamwork and interprofessional communication, (8) awareness of other healthcare professionals' roles, (9) understanding of terminology or jargon used in hospitals, (10) and managing common ward environment distractions. (11)

One way to improve students' ward smarts could be through interprofessional learning experiences; (12) various medical schools run specialised placements on 'interprofessional training wards' or 'clinical education wards' for both medical and nursing students (as well as physiotherapy and occupational therapy students), and have found it beneficial in terms of understanding different professionals' roles in the team, (13-15) awareness of ward-based communication skills, (16) and professional role development. (17) This emphasis on assessing 'non-medical' skills shows significant overlaps with aspects of ward smarts, implying that such learning experiences could make medical students more ward smart. (18)

Research questions

This study aims to develop this area by exploring medical students' ward smarts, and thereby identifying any areas in which there are deficits (or relative strengths), as well as a short qualitative analysis exploring how medical students believe any gaps in their ward-based knowledge could be filled. As such, our key questions were as follows:

1. How much do students know about the ward environment?
   - Are there any specific patterns of weaknesses/strengths?
2. Does this vary by the following factors:
   - Academic year (training stage)
   - Course (graduate entry [GEM]/undergraduate)
   - Previous work experience
     - Healthcare employment
     - Hospital employment
   - Teaching:
     - Formal ward introduction
     - Nurse shadowing
   - Rating of own understanding
   - Gender
   - Age
3. How students feel their ward understanding could be improved.

METHODS

Database Design

We investigated these questions using an online questionnaire. This allowed us to recruit a relatively large number of medical students across different demographics and year groups and to quantitatively analyse their responses.

Participants

Questionnaire participants were medical students in any year of study at the University of Nottingham. They were identified and recruited online through posts on Medical School Facebook Groups and the official Moodle Forum, as well as some students being told about the questionnaire by fellow students and clinical supervisors.

In total, 53 students took part in the questionnaire, but 4 were excluded from our regression analysis due to incomplete data. Of the 49 remaining participants, 29 identified as female and 20 as male. They had an average age of 22.8 (SE = 2.04). They varied from third year to final year students (though 84% were in their penultimate year).

Ethics

Nottingham LREC (Local Research Ethics Committee) did not wish to undertake ethical review – as a questionnaire study requiring no confidential information and with no patient involvement, we did not meet criteria for research ethics committee

review. We had informed consent from participants and conducted the study in line with Helsinki guidelines.

At the start of the online questionnaire, participants were presented with some information about the study and a consent form – in order to continue with the study, participants had to confirm that they had read and understood the information, were participating voluntarily, and that data would be stored in a confidential manner.

Procedure

Research in this area was lacking; therefore, we developed content for the questionnaires based on our own concept of being 'ward smart'. This involved a combination of the previous research and our own perspective as medical students to gauge probable knowledge and limitations. In conjunction with Professor Sahota's observations from supervising students, several key topics were defined. These related to:

- Communication, including understanding of abbreviations and jargon
- Environmental awareness (e.g. ward equipment and procedures)
- Relevant clinical knowledge (e.g. relevance of Waterlow scores)
- Teamwork and understanding of others' roles (including their uniforms and key responsibilities)
- Professional attitude

We piloted a draft version of the questionnaire on five medical students in their fourth year, who found it easy to navigate and suggested a few minor changes to wording to aid clarity.

Recruitment

The medical student forum (new posts emailed to all students weekly) had a post entitled 'Medical Student Awareness of the Ward Environment Survey' with a link to the Google Form, while Facebook advertisements on relevant groups and pages invited students to fill in a quick survey to help us to understand the extent to which medical students understand how wards work. It advised them that it should only take 15 minutes to complete and that all responses were anonymous.

Information and consent

Once potential participants followed the Google Form link, they were presented with some information about the study (see Appendix II) and a consent form (Appendix III) which had to be completed in order to continue with the study.

Materials

We did not use any standard measures for the questionnaire; all questions were devised by the research team. The questions covered the following topics:

- Section 1: Demographics (training stage, course, work experience, teaching, gender, age, rating of understanding)
- Section 2: Knowledge assessment; based on the key topics listed above, used to calculate a 'Ward Smart Score' out of 27 total points (see Appendix I)
- Section 3: Optional open questions:

o Can you think of any way your understanding of wards could be improved?

o Would you be interested in attending a practical/teaching session on the topics mentioned in this questionnaire, i.e. how wards function?

Data analysis

Scoring

Participants' responses to the questionnaire items were scored according to the marking criteria in Appendix III: each answer was scored from either 0-1 or 0-2, with half marks available on some questions for answers deemed to be partially correct. Each question was scored independently and agreed upon by two researchers to demonstrate reliability and ensure validity, and these scores were then combined to form an overall knowledge score for each participant.

Multiple regression

Multiple regression was used to analyse the quantitative data due to the single outcome variable (knowledge score) and a number of potential categorical predictor variables which could impact on the score. Multiple linear regression not only enabled us to identify which factors were most strongly predictive, but also to control for the effects of other variables ('nuisance covariates') and to test for multicollinearity.

The only concerns with this choice of method were the increased risk of Type I errors and the fact that, lacking prior similar studies, we could not use a hierarchical or block approach. We considered forced entry and backward stepwise approaches: both are atheoretical and data-led and are thus particularly suitable when there is no logical or theoretical basis for considering any variable to be prior to any other, as in this case. (19, 20)

Given the large number of independent variables involved, a backward stepwise approach was deemed more appropriate; adding all variables to the model might improve its predictive value, but potentially not to a significant extent, and so simplifying the model by narrowing down variables produces more useful information. Furthermore, a backward stepwise approach avoids the issue of suppression effects for which forward stepwise models can be criticised (19) – i.e. that two variables could be significant if entered together, but not alone, in which case their effects would be missed by the model.

Qualitative analysis

A brief inductive thematic analysis was conducted on the longer text answers with participants' suggestions regarding improving medical students' ward awareness. This had the advantages of being quick, flexible, and not tied to a theoretical framework, making it ideal for exploratory analysis. The only downsides of thematic analysis are that it can produce overwhelming quantities of data, but this is mitigated by the sample size and short question style.

Following Braun and Clarke's six-step process, initial themes were noted (e.g. teaching, more time on wards) as they emerged from participants' answers. The open questionnaire item responses were then reviewed, generating initial codes. This process was repeated four times until no further codes were generated. These codes were then divided into themes and sub-themes. (21)

RESULTS

Data were analysed using SPSS 22. For full results, please see SPSS output in Appendix IV.

Descriptive statistics

Descriptive statistics for the participants (n=49 for multiple regression analysis, n=53 for descriptive and qualitative analysis) are shown in Table 1 and 2. Figure 1 shows the variation in Ward Smart Scores.

It is also worth noting that only 41.5% of students reported having had a ward induction or introduction.

Gender		Year group	
Male	41%	3	2%
Female	59%	4	84%
Age		5	14%
Mean (SD)	22.8 (2.0)	Healthcare employment	
Range	21-33	None	71%
Course		Non-hospital	17%
Graduate Entry	31%	Hospital	12%
Undergraduate	69%		

Table 1
Participant descriptive statistics

	Correct	Incorrect
Reading an oxygen flowmeter	11.3%	88.7%
Locating the 'on' button on a hearing aid	3.8%	96.2%
Knowing what a Waterlow score is	30.2%	62.3% (7.5% partially correct)
Locating the CPR lever on a hospital bed	54.7%	45.3%

Table 2
Individual question response frequencies (NB: full results in Appendix I)

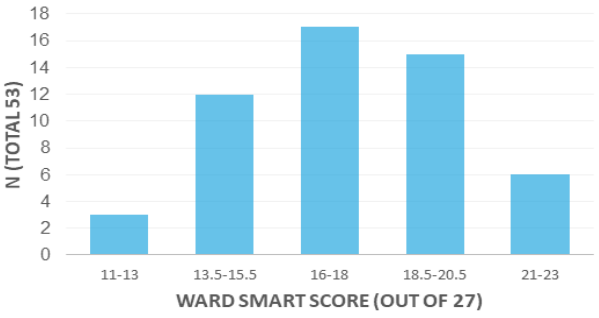


Figure 1
Bar chart showing variation in Ward Smart Scores

Multiple regression: diagnostics

An inspection of tolerances and Variance Inflation Factor (VIF) revealed no problems with multicollinearity: the lowest tolerance was 0.52, well above the 0.10 threshold, (22) and VIF values ranged from 1.02 to 1.93, far below the limit of 10.19 Plotting the residuals against predicted values demonstrated that the data met the assumption of homoscedasticity, and independence of errors was demonstrated by the Durbin-Watson statistic, which was 2.22. (19)

Casewise diagnostics highlighted 3 cases above the limit of 2; (19) we did not consider this of particular concern, as it represents only just over 5% of our total cases and the values ranged from 2.008 to 2.206: still far from approaching the more lenient limit of 3. Cook's distance statistics revealed no outliers, and all Mahalanobis distance values were below the critical values. (23) Overall, this suggests that there were no significant outliers and no cases with undue leverage.

Multiple regression: report

Table 3 shows the Multiple Regression Model. Backward stepwise multiple regression analysis suggested that two predictors (Hospital Experience and Training Stage) explained 28% of the variance in knowledge scores (R2=0.28, F(2,46)=8.95, p=0.001).

Participants who had previously worked in a hospital environment scored an average of 3.44 points higher than those who had not (ß=0.39, p=0.003), and knowledge scores increased by 2.53 points (ß=0.34, p=0.01) with every year of training.

The other predictor variables, i.e. being a graduate-entry student, age, gender, healthcare (non-hospital) employment, having had a ward introduction or the opportunity to shadow a nurse, and participants' rating of their own understanding, did not contribute significantly to the model.

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1 (Hospital Experience)	0.407[a]	0.165	0.148	2.68160
2 (Hospital Experience, Training Stage)	0.529[b]	0.280	0.249	2.51776

Model	Change Statistics					
	R^2 Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1 (Hospital Experience)	0.165	9.321	1	47	0.004	
2 (Hospital Experience, Training Stage)	0.115	7.316	1	46	0.010	2.221

Table 3
Multiple regression model

Qualitative analysis

Several key themes emerged from the thematic analysis, (21) mostly demonstrating a need for clinical teaching on and formal induction to the ward environment, as well as more time spent on the wards and more opportunities for interprofessional learning. Our themes and subthemes were as follows:

- Teaching
    - Introductory session
    - Practical/clinical skills session
- Ward induction
    - Formal induction process
    - Ward tour
- Ward time
    - More ward time scheduled
    - Core ward access
- Interprofessional learning/other healthcare professionals (HCPs)
    - Shadowing nurses
    - Teaching from nurses
    - Learning about multidisciplinary team roles
    - Shadowing various HCPs

DISCUSSION

Our data suggest that medical students are not as 'ward smart' as they may be presumed to be – there are key gaps in their knowledge, including, for example, the ability to read an oxygen flowmeter. The regression analysis suggested that key factors in determining medical students' ward smarts were previous employment in a hospital and stage of training, both of which are likely to represent the amount of time spent on wards; this was also a key theme in the qualitative data. Students also felt that teaching would be helpful, whereas the quantitative data suggest that having attended such sessions did not improve Ward Smart Scores. Students also felt they would benefit from ward inductions and shadowing HCPs on the wards, especially nurses.

However, there is a risk of selection bias: choosing to do and also managing to complete the questionnaire may have screened out potential participants who would not have scored so well, especially as the Ward Smart Score questions feel like a test – people who felt they were not performing well might have dropped out or decided not to participate in the first place. Statistical power was low due to the small sample size, and any small or medium effect sizes may have been missed. This may be due to the methods used for participant recruitment, which was initially limited (due to a communication error with the Moodle Forum poster) to students already on clinical placement. On a similar note, over 80% of the participants were in their fourth year; a more evenly distributed sample would likely be more fully representative of medical students' ward smarts as a whole. We would like to repeat the study with an entire cohort at the start or end of a clinical phase, to ensure experience levels are as controlled as possible.

There is also some debate around the use of our 'Ward Smart Score' (WSS) to assess participants, both in terms of measure validation and what could be considered an 'acceptable' WSS; students' scores should be proportional to the training they have received and which placements they have completed. For example, a student who has completed a health care of later life placement should be better equipped to answer questions about Waterlow scores. There should also be a baseline of 'essential' knowledge expected of all clinical phase (CP) students, ensuring they are safe in the ward environment – this should be conveyed to all students during pre-clinical teaching. 'Further' ward smart knowledge should accumulate throughout clinical phase, as students spend more time in the ward environment.

If we were to divide our questionnaire items into 'essential' and 'further' knowledge, the 'essential' themes could include infection prevention and control, staff roles, key medical knowledge, information governance, and emergency procedures. By this standard, our questionnaire contained ten 'essential' questions (highlighted in Appendix 1), three of which were to do with staff roles, two related to infection prevention and control, one related to information governance, three questions were on key medical knowledge, and one on emergency procedures. Across these ten questions, the mean percentage correct was 74%, with correct responses varying greatly between questions: the most correct answers related to knowing where medical notes are stored (97.6%) and the least for reading an oxygen flow meter (12.2%). However, it is worth noting that some of the questions were 'leading' (e.g. "Should medical notes be kept in a locked trolley?") and that we have retroactively applied this 'essential vs. further' knowledge distinction: it would improve validity if this was considered in terms of questionnaire items and score weighting during the design phase.

Furthermore, as our questionnaire items were the result of brainstorming between medical students and one consultant, in future it would be ideal if we could use a consensus method (e.g. the Nominal Group Technique and Delphi Technique) for idea generation with a variety of HCPs in contact with students. We have since noticed some potential issues with some of our questions – those focused on beds and staff uniforms may not have applied equally to all trusts. Findings using a standardised, reliable, validated measure would be more robust.

These preliminary findings have face validity and merit further research, as well as indicating that an intervention to aid medical students' ward smarts could be beneficial. Prior research has found that interprofessional ward placements have been effective in improving various elements of ward smarts. This would be an ideal intervention in terms of involving students as participating members of an interprofessional team in a ward environment, thereby enhancing their ward smarts through situated learning. (2, 4, 12, 15) The desire for more interprofessional learning opportunities was a strong theme in our thematic analysis, and this would therefore be ideal to implement: medical students, nursing students, HCAs, and perhaps some specialised ward-based teachers could all collaborate on such a project. (24)

CONCLUSION

Medical students' ward smarts can, to some extent, be explained by whether they have worked in a hospital environment and their year group, with increased experience reflected in knowledge scores. These could both be considered proxy measures for time spent on wards. Students also felt they would benefit from more ward time (particularly longer sessions), ward inductions, and shadowing healthcare professionals on the wards, especially nurses. This could be encouraged by adding a ward-based interprofessional learning placement or experience to the medical curriculum.

Ward Smart Scores were not significantly predicted by non-hospital work experience, age, gender, being a graduate entry student, relevant teaching and shadowing, or students' rating of their own understanding. The quality and content of any teaching deemed by participants to be on the ward environment was not measured. The fact that students were generally keen on the idea of a teaching or clinical skills session dedicated to the ward environment, however, suggests that the introduction of additional situated learning experiences, ideally in the form of interprofessional ward training, should nevertheless be considered.

APPENDIX A
WARD SMART KNOWLEDGE QUESTIONS

The knowledge section was prefaced by the following:

This section will try to quantify how well you understand the ward environment. We are not "testing" you, and we do not expect you to know everything there is to know about wards: we are simply trying to highlight areas which have not been sufficiently covered in the curriculum so far. If you do not know an answer, you can always guess/select or write 'don't know'.

Communication	What does NBM stand for? [Open] What does TTO stand for and what does it refer to? [Open] Scenarios: toilet assistance/pain relief: to which staff member would you refer the issue? [Multiple choice; NB also relevant to 'Teamwork']
Environmental awareness	What do the nursing notes contain? [Open; NB also relevant to 'Teamwork'] How many visitors are typically allowed at the patient bedside? [Multiple choice] How much oxygen is the patient attached to this flow meter on? [Image] Where would you look to find out about a patient's fluid balance? [Multiple choice] Which lever do you press to make the bed go flat in an acute cardiac arrest? [Image] Where is the 'on' button for the hearing aid? [Image] A patient has a blue infection control sign on their door and your consultant goes straight in. What should you do? [Multiple choice] Which colour bin should gowns and gloves go in? [Multiple choice] What is this device? [Image: bladder ultrasound scanner, multiple choice]
Relevant clinical knowledge	What does a red wristband on a patient indicate? [Open] What is a Waterlow score and who calculates it? [Open] How many categories are there on the Bristol Stool Chart? [Multiple choice] Approximately how long do hearing aid batteries last for? [Multiple choice]
Teamwork and others' roles	What colour uniforms do the following HCPs wear? [Multiple choice] Which of the following professions is a healthcare assistant (HCA) linked with? [Multiple choice] Who is responsible for the controlled drugs cabinet on the ward? [Multiple choice] Who routinely checks patients' observations (BP, HR, SPO2)? [Multiple choice]
Professional attitude	Are students on clinical placement able to log in and view patient observations/notes? [Yes/No] Should medical notes be kept in a locked trolley when not in use? [Yes/No]

APPENDIX B
RAW FREQUENCY DATA

Question	Incorrect %	Partially correct %
What colour uniforms do the following HCPs wear? [Ward sister/matron]	7.3	
What colour uniforms do the following HCPs wear? [Staff nurse]	9.8	
What colour uniforms do the following HCPs wear? [ACP]	36.6	
What colour uniforms do the following HCPs wear? [Occupational therapist/physiotherapist]	19.5	
Please read the scenarios and select the most appropriate person on the ward to whom you would refer the issue: [A patient stops you to tell you that they need assistance to go to the toilet.]	2.4	
Please read the scenarios and select the most appropriate person on the ward to whom you would refer the issue: [A patient tells you that they are in pain and urgently need more pain relief.]	41.5	
Which of the following professions is a healthcare assistant (HCA) linked with?	24.4	
What do the nursing notes contain? Please list as many elements/pages as you can think of.	26.8	22.0
Who is responsible for the controlled drugs cabinet on the ward?	29.3	9.8
Who routinely checks patients' observations (BP, HR, SPO2)? (You can select more than one option.)	36.6	
Are students on clinical placement able to log in and view patient observations/notes?	14.6	
What does a red wristband on a patient indicate?	17.1	
Should medical notes be kept in a locked trolley when not in use?	2.4	
How many visitors are typically allowed at the patient bedside?	12.2	
What does NBM stand for?	4.9	
How much oxygen is the patient attached to this flow meter on?	87.8	
Where would you look to find out about a patient's fluid balance?	31.7	
What does TTO stand for and what does it refer to?	46.3	9.8
What is a Waterlow score and who calculates it?	65.9	9.8
How many categories are there on the Bristol Stool Chart?	36.6	
Which lever do you press to make the bed go flat in an acute cardiac arrest?	41.5	
A patient can't hear you - where is the 'on' button for the hearing aid?	97.6	
Approximately how long do hearing aid batteries last for?	90.2	
A patient has a blue infection control sign on their door and your consultant goes straight in. What should you do?	17.1	31.7
Which colour bin should gowns and gloves go in?	4.9	
What is this device?	51.2	

NB: Highlighted rows indicate the ten questions deemed 'essential'.

Bold text indicates >70% correct or >30% incorrect.

APPENDIX C
QUESTIONNAIRE
INFORMATION

Placement/ward awareness questionnaire

I would like to invite you to take part in our research study investigating whether medical students and doctors have a thorough understanding of how wards operate and what factors are related to their level of awareness.

Main researchers: Emma Poynton-Smith (mzyep7@nottingham.ac.uk), Erica Colwill (mzyec13@nottingham.ac.uk)

Supervisor: Professor Opinder Sahota (Opinder.Sahota@nuh.nhs.uk)

It is up to you to decide whether or not to take part: you can give your consent by checking the appropriate boxes on the consent form below. You are free to withdraw at any time and without giving a reason, and withdrawing would not affect your legal rights. However, please note that it is not possible for your information to be extracted and destroyed once you complete and submit the full survey.

If you choose to give your consent to participate using the form below, you will be able to access the next section, which contains questions about your understanding and awareness of hospital wards. It usually takes about 15 minutes to complete.

We will follow ethical and legal practice and all information about you will be handled in confidence: it will be kept anonymous and only viewed by the researchers and authorised persons. It will be stored securely and deleted after 7 years.

The results of the research may be written up with the aim of producing an article or poster for journal presentation. Please be assured that you will not be identified in any report or publication.

If there is anything that is not clear or if you have any concerns, please do not hesitate to contact us using the details provided.

APPENDIX D
CONSENT FORM

Consent to take part

• I confirm that I have read and understand the information above and have had the opportunity to ask questions.

• I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

• I understand that relevant sections of my information collected in the study may be looked at by the research group and regulatory authorities where it is relevant to my taking part in this study. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential.

• I understand that information about me recorded during the study will be kept in a secure database. If the information is transferred, it will be made anonymous. Information will be kept for 7 years after the study has ended.

• I agree to take part in the above study.

REFERENCES

1. GMC. Outcomes for Graduates. 2018 [accessed 26 June 2020]. Available from: https://www.gmc-uk.org/education/standards-guidance-and-curricula/standards-and-outcomes/outcomes-for-graduates

2. Walker B, Wallace D, Mangera Z, Gill D. Becoming 'ward smart' medical students. Clin Teach. 2017;14(5):336–9 [accessed 26 June 2020]. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1111/tct.12571

https://doi.org/10.1111/tct.12571

PMid:27633265

3. Monrouxe LV, Grundy L, Mann M, John Z, Panagoulas E, Bullock A, et al. How prepared are UK medical graduates for practice? A rapid review of the literature 2009–2014. BMJ Open. 2017;7(1).

https://doi.org/10.1136/bmjopen-2016-013656

PMid: 28087554 PMCid: PMC5253586

4. Seabrook MA. Clinical students' initial reports of the educational climate in a single medical school. Med Educ. 2004;38:659–69.

https://doi.org/10.1111/j.1365-2929.2004.01823.x

PMid:15189263

5. Prince KJAH, Boshuizen HPA, Van Der Vleuten CPM, Scherpbier AJJA. Students' opinions about their preparation for clinical practice. Med Educ. 2005;39(7):704–12.

https://doi.org/10.1111/j.1365-2929.2005.02207.x

PMid:15960791

6. Gimson A, Javadzadeh S, Doshi A. Bedside teaching: everybody's but nobody's responsibility. Adv Med Educ Pract. 2019;10:357-359.

https://doi.org/10.2147/AMEP.S181877

PMid:31213940 PMCid:PMC6539176

7. Nikendei C, Kraus B, Schrauth M, Briem S, Jünger & J. Ward rounds: how prepared are future doctors? Med Teach. 2008;30(1):88–91.

https://doi.org/10.1080/01421590701753468

PMid:18278658

8. Veloski JJ, Hojat M. Measuring specific elements of Professionalism: Empathy, Teamwork, and Lifelong learning. 2006 [accessed 26 June 2020]. Available from: https://www.researchgate.net/publication/291294283

9. McNair RP. The case for educating health care students in professionalism as the core content of interprofessional education. Med Educ. 2005;39:456-64.

https://doi.org/10.1111/j.1365-2929.2005.02116.x

PMid:15842679

10. Cole R. The understanding of medical terminology used in printed health education materials. Vol. 38, Health Education Journal. 1979; 38(4):111-21.

https://doi.org/10.1126/science.aah5982

PMid:28154076 PMCid:PMC5313037

11. Thomas I, Nicol L, Regan L, Cleland J, Maliepaard D, Clark L, et al. Driven to distraction: A prospective controlled study of a simulated ward round experience to improve patient safety teaching for medical students. BMJ Qual Saf. 2015;24(2):154-61.

https://doi.org/10.1177/001789697903800403

PMid:10318516

12. Morphet J, Hood K, Baulch J, Gilbee A, Sandry K, Cant R. Teaching teamwork: an evaluation of an interprofessional training ward placement for health care students. Adv Med Educ Pract. 2014; Jun 25;5:197-204

https://doi.org/10.2147/AMEP.S61189

PMid:25028569 PMCid:PMC4077330

13. Ericson A, Masiello I, Bolinder G. Interprofessional clinical training for undergraduate students in an emergency department setting. J Interprof Care. 2012; 26(4):319-25 [accessed 26 June 2020]. Available from: https://pubmed.ncbi.nlm.nih.gov/22506846/

https://doi.org/10.3109/13561820.2012.676109

PMid:22506846

14. Pelling S, Kalén A, Wahlström O. Preparation for becoming members of health care teams: findings from a 5-year evaluation of a student interprofessional training ward Preparation for becoming part of future health-care teams; findings from a 5-year evaluation of a student interprofessional training ward. J Interprof Care. 2011;25:328–32 [accessed 26 June 2020].

http://dx.doi.org/10.3109/13561820.2011.578222

PMid:21635182

15. Morison SL, Jenkins J. Facilitating undergraduate interprofessional learning in healthcare: Comparing classroom and clinical learning for nursing and medical students. 2003; Available from: https://www.researchgate.net/publication/227797598

https://doi.org/10.1046/j.1473-6861.2003.00043.x

16. Ponzer S, Hylin U, Kusoffsky A, Lauffs M, Lonka K, Mattiasson A-C, et al. Interprofessional training in the context of clinical practice: goals and students' perceptions on clinical education wards. Med Educ. 2004;38(7):727–36.

https://doi.org/10.1111/j.1365-2929.2004.01848.x

PMid:15200397

17. Hylin U, Nyholm H, Mattiasson A-C, Ponzer S. Interprofessional training in clinical practice on a training ward for healthcare students: A two-year follow-up. J Interprof Care. 2009;21(3):277–88.

https://doi.org/10.1080/13561820601095800

PMid:17487706

18. Lindblom P, Scheja M, Torell E, Åstrand P, Felländer-Tsai L. Learning orthopaedics: Assessing medical students' experiences of interprofessional training in an orthopaedic clinical education ward. J Interprof Care. 2007; Aug;21(4):413-23.

https://doi.org/10.1080/13561820701401346

PMid:17654158

19. Field A. Discovering statistics using IBM SPSS statistics. 4th ed. London: Sage Publications Ltd; 2013.

20. Cohen J, Cohen P, West S, Aiken LS. Bivariate correlation and regression. In: Mahwah, NJ. Applied multiple regression/correlation analysis for the Behavioural sciences. 3rd ed. Lawrence Erlbaum Associates; 2003.

21. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.

https://doi.org/10.1191/1478088706qp063oa

22. Hair JF, Anderson RE, Tatham RL, Black WC. Multivariate data analysis. 5th ed. Englewood Cliffs, NJ: Printice Hall; 1998.

23. Barnett V, Lewis T. Outliers in statistical data. John Wiley & Sons; 1978.

24. Kilminster SM, Delmotte A, Frith H, Jolly BC, Stark P, Howdle PD. Teaching in the new NHS: the specialised ward based teacher. Med Educ. 2001;35(5):437–43.

https://doi.org/10.1046/j.1365-2923.2001.00936.x

PMid:11328513

The British Student Doctor, 2020;4(2):30-37
doi: 10.18573/bsdj.130
Discussion article

Too fast to be female? Unravelling the controversy over androgens in female elite athletes

DISCUSSION

AUTHOR

Lily Scourfield
Cardiff University School of Medicine

Address for Correspondence:
Miss Lily Scourfield
Cardiff University School of Medicine
Cochrane Building
Heath Park Way
Cardiff
CF14 4YU
Email: ScourfieldL@cardiff.ac.uk

ORCID ID: 0000-0002-7736-8183

Conflicts of Interest:
Author is the Education Section Editor of the BSDJ. This article was peer reviewed externally and reviewed by a member of the journal's faculty board, in line with the journal's peer review policy.

Accepted for publication: 19.02.20

ABSTRACT

Told through the example of South African middle-distance runner Caster Semenya, this discussion starter examines the controversial area of gender in sport from a scientific viewpoint. Women have been segregated from men in most sporting disciplines for as long as they have been permitted to compete, but seated in a society only just beginning to delineate the concepts of sex and gender identity, consensus needs to be reached on how or if we should categorise elite athletes, whilst upholding the integrity and fairness of competitive sport. The parameters used to sort athletes into today's binary gender categories have recently come under scrutiny in the cases of athletes with Differences of Sex Development (DSD). Semenya has elevated serum testosterone and her eligibility to continue competing and winning with females has now been brought into contention by the IAAF resulting in a legal battle. However, the scientific evidence on which the IAAF ruling is based is far from robust. Athletics, a sport tainted by a history of doping with anabolic steroids, is fighting to maintain values of fairness by aiming to govern the levels endogenous steroids permitted in competition. Semenya's is a pertinent example of a wider issue which is of interest from a scientific, ethical, political, legal and social standpoint because of the complexity of hormone systems and the fact that circulating levels of hormone do not necessarily equate with actions of those hormones. With confusing mainstream media coverage lacking consensus, the scientific community deserve clarity on the issue to allow us to engage in meaningful discussion and contribute to the debate.

INTRODUCTION

As the president of the International Association of Athletics Federations (IAAF) Lord Sebastian Coe put it: "It's pretty straightforward. Athletics has two classifications; it has age and gender." (1) However, far from straight forward is the matter of how we define these currently binary male/female categories in sport. In light of the new competition eligibility regulations released by the IAAF in April 2018, focussed on regulating the levels of testosterone in female athletes with differences of sex development (DSD) that are permitted to compete, (2) the topic is more controversial than ever. This discussion takes place in the context of a progressive society with an increasing acceptance for values of feminism and gender-equality, which is only beginning to understand the complexities of gender as a fluid concept.

For the purposes of this article:

- 'Sex' – the biological classification largely considered binary in terms of male/female as comprised of chromosomal, phenotypic and hormonal components
- 'Gender' – one's own identity in relation to masculinity and femininity, self-defined and nuanced within social and cultural influences

It is indisputable that taking performance-enhancing anabolic steroids in sport is immoral and considered 'doping', but how do we manage and classify athletes, specifically females, who synthesise an excess of these steroids naturally? The issue of gender and sport has generated significant public attention, and although caught up in legal battles themselves, the individual athletes it affects the most have become involuntary figureheads of mainstream media campaigns surrounding the issue. Whilst those in media and sport are quick to discuss the topic through the stories of these athletes, largely left out of the debate has been the scientific community, who could be instrumental in providing the biomedical expertise and objective oversight that this dispute necessitates.

A QUESTION OF SEX (3)

Women have been segregated from men in all competitive sports since their inclusion has been permitted, with a few notable exceptions including equestrian and mixed pair events.

Differences in human physiology based on sex, which give men a physical advantage in many competitive sports, forms the basis of this segregation. However, with any categorisation, a sorting process must occur. Physical examinations were relied upon in the 1960s to prevent men competing as women; these were later replaced by buccal smears to identify sex chromosomes – but the smears were considered unreliable, so the IAAF abandoned them in 1991. Genetic testing is also inherently flawed in some DSD athletes, since XY individuals can develop female characteristics due to androgen insensitivity and conversely, XX individuals can develop male characteristics due to hyperandrogenism for a number of reasons – congenital adrenal hyperplasia, for example, where there is an excess of androgen because of a genetic biochemical aberration in steroid hormone.

Currently, there are no IAAF rules to endorse standard sex testing, since men attempting to compete as women would presumably be identified in anti-doping urine tests. However, any athlete can be asked in front of a medical panel including an endocrinologist, a psychologist and a gynaecologist should their sex be challenged. Since androgens are responsible for the development of many of the advantage-conferring male characteristics in either sex, testosterone is the IAAF's chosen route on which to base their regulation. Such a binary classification system inevitably runs into trouble when it invites a global population which doesn't fit neatly into two categories to compete. Does such a system become discriminatory when it doesn't include transgender and intersex members of society, or subjects them to rigorous medical testing that other athletes would not be subject to?

THE NEW REGULATIONS

Summarised in Box 1 are the current IAAF regulations as released in April 2018 and refined in 2019, stating that DSD female athletes are only permitted to compete in competitive sport with medical intervention. It is important to understand the historical context which shaped these regulations. First mention of 'Hyperandrogenism Regulations' by the IAAF was in May 2011 following the emergence of Caster Semenya at the 2009 Athletics world championships in Berlin, winning the 800m gold at the age of 18. (4) The regulations stated that any athlete, female in law, with hyperandrogenism would only be permitted to compete if their testosterone was below the 'male range' defined as <10 nmol/L or within the 'male range' and have an "androgen resistance such that she derives no competitive advantage". (5)

2015 saw the landmark case of Dutee Chand, a hyperandrogenic female Indian athlete who was one of the first from her country to reach a global sprinting final in 2013, get caught in a legal dispute against the IAAF and her home institution of the Athletics Federation of India who demanded she take a gender test after her elevated serum testosterone was discovered. (6) Chand won her appeal on the grounds of the IAAF providing the panel with insufficient scientific evidence to support their 2011 hyperandrogenism regulations – specifically the exact degree of advantage which testosterone gave hyperandrogenic female athletes. The Court of Arbitration for Sport therefore suspended the 'Hyperandrogenism Regulations' for a period of two years during which the IAAF was expected to provide written evidence to support them, leaving Chand free to resume competing. "I am who I am" she stated at the time. (6,7)

IAAF 2019 Eligibility Regulations for Female Classification

Athletes the regulations apply to: Any athlete recognised by law as either female or intersex who has a Difference of Sexual Development* resulting in a serum testosterone ≥5 nmol/L

Events the Regulations apply to: Track events from 400m to the mile, including hurdles and combined events over the same distances

Conditions to compete: The athlete must reduce her serum testosterone <5 nmol/L (e.g. by use of hormonal contraceptives) for 6 months and maintain this level for as long she wishes to compete

**In the official regulations document (8), the IAAF describes the following DSDs as inclusionary in the regulations:*

- *5α-reductase type 2 deficiency*
- *Partial androgen insensitivity syndrome (PAIS)*
- *17β-hydroxysteroid dehydrogenase type 3 deficiency*
- *Ovotesticular DSD*
- *Any other genetic disorder involving disordered steroidogenesis*

Note: PCOS (polycystic ovary syndrome) which causes a raised testosterone as a result of cysts on the ovaries is not included in the above conditions, the committee reasons it does not tend to raise testosterone levels to > 5 nmol/L. It emphasises that in addition to having one of the above conditions and having a testosterone levels >5 nmol/L, the athlete must have 'sufficient androgen sensitivity […] to have a material androgenising effect'. (8) To put the above conditions into context, with a reminder of the relevant hormone biosynthetic pathways, see figure 1.

Box 1
Summary of the current IAAF regulations for eligibility for DSD athletes refined in 2019. (8)

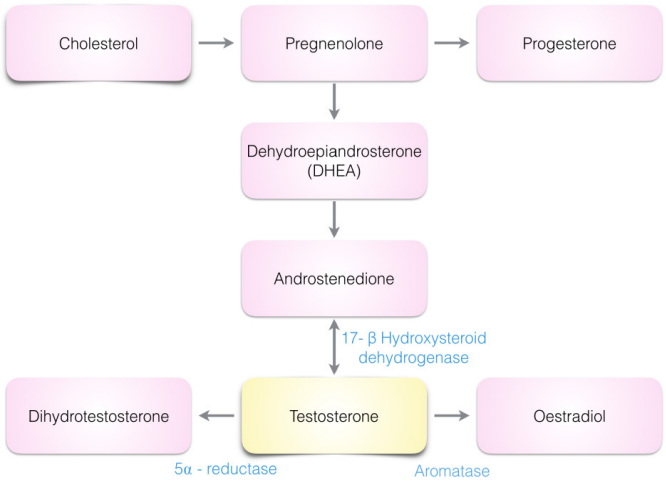


Figure 1
Summary of the normal physiological pathway of androgen synthesis, blue text represents enzymes

During that two years (which was eventually extended to three) the IAAF commissioned two scientific papers to provide a foundation for their revised and most recent regulations on DSD athletes as summarised below. (8,9) The integrity of this research has since been scrutinised by experts. (4)

The regulations propose potentially effective methods to reduce testosterone to below the 5nmol/L limits as oral contraceptives, GNRH agonists (akin to those used to treat prostate cancer) and even gonadectomy. (8) However, it advocates the use of oral contraceptives which "are generally milder and have less significant side effects". (7) Combined oral contraceptives reduce both ovarian and adrenal endogenous androgen production. (10) It justifies the ruling as risk-acceptable due to the fact testosterone reduction is the clinical standard of care for these 46 XY DSD conditions.

SEMENYA'S STORY

Mokgadi Caster Semenya became known on the global athletics stage at the Berlin World Championships in 2009. But instead of being known for her outstanding success of an 800m gold at the age of 18, the South African's achievement soon became overshadowed by becoming the unwilling face of the dispute over hyperandrogenous female athlete. Her gender began to be scrutinised by the world, and Semenya stated that she was facing "relentless public scrutiny". (7,11) The greatest backlash, however, came from her fellow competitors: "These kinds of people should not run with us" said Italian athlete Elisa Cusma. (12) "Just look at her…" said Russian fifth place finisher Mariya Savinova, who ironically later had her London 2012 gold removed for illegal doping, whilst Semenya's silver medal was subsequently upgraded. (13,14)

Figure 2 details a timeline of Semenya's milestones over the last decade; she has been in a battle with the authorities ever since being questioned about her gender in 2009. Semenya is a cisgender woman, a female by law and assigned at birth. Her medical records are rightly confidential, however, there has been significant media speculation over what may have caused her to have an 'androgenous physical appearance'. Given that the DSD regulations have been applied to her, it has been assumed that she is 46XY with DSD. (2,6,7)

One can often empathise with Semenya once understanding her legal battle against the IAAF over her right to race; almost half of her time since its beginning has been spent taking testosterone-suppressing medication. (7) There was no established clinical protocol at the time to lower testosterone to <5 nmol/L in an a 46XY DSD athlete, therefore Semenya's treatment has been somewhat experimental. The ASA contended she did not give informed consent for the participation in the IAAF research. (7) She suffered a range of side effects including weight gain, nausea, fevers and constant abdominal pain (some of this would be attributable to withdrawal from testosterone), which affected her mental and physical commitment to training. (7) Semenya described the treatment she received by the IAAF during the gender verification process, including intimate clinical examinations at age 18, at the same time witnessing the public discussion of her body and private medical information, as "atrocious and humiliating". It should be noted, however, that these words were used as part of her legal case which claims psychological distress, so are not completely objective. (7) On the other side of the case, the IAAF claim that the DSD regulations are "to give female athletes the same opportunities to excel and profit from the sport as male athletes" claiming they "do not involve any judgement on or questioning of an individual's sex or gender identity" (7)

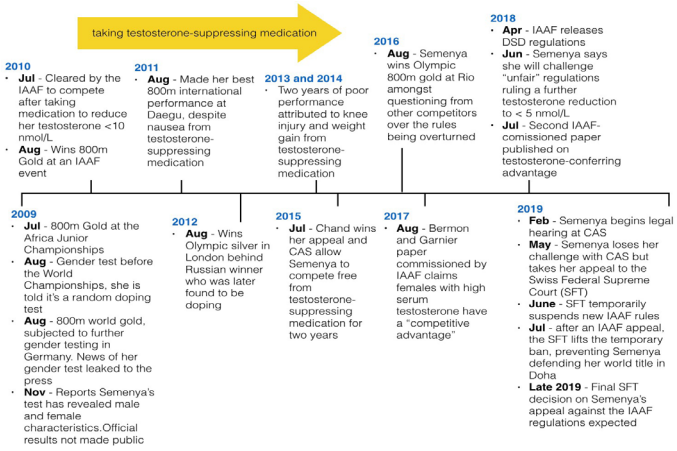


Figure 2
Timeline of key events in Caster Semenya's running career and dealings with the IAAF, adapted from (7,15).

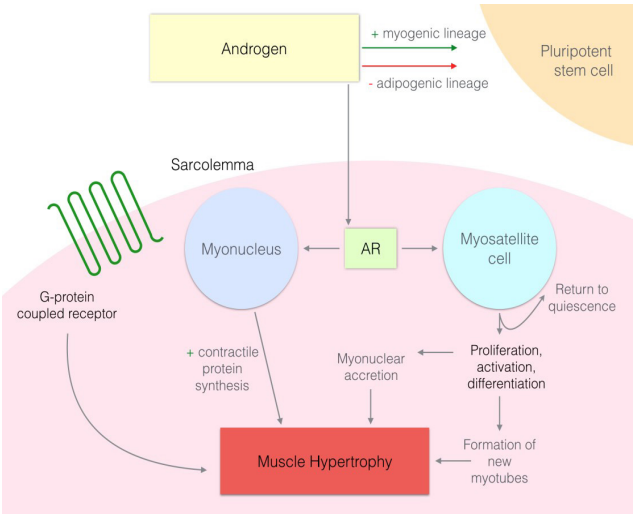


Figure 3
Schematic diagram detailing the anabolic mechanisms by which androgens increase muscle mass. AR = androgen receptor (16).

HOW MUCH TESTOSTERONE IS TOO MUCH?

Masculinisation of females can arise from the delivery of 'male' doses of testosterone (or a synthetic analogue) orally, trans-dermally, or intramuscularly as demonstrated by the historical example of Andreas Krieger (previously European shot-put champion Heidi) in the East German doping scandal of the 80s. (6) Testosterone is a potent androgen transported freely in the blood or bound to sex hormone binding globulin (SHBG), and contributes to the development of male secondary sexual characteristics. (16) Its relevant qualities here are derived from its anabolic action on skeletal muscle, increase in circulating haemoglobin, and inhibition of adipogenesis explaining its exogenous use as a performance-enhancing drug – it has received extensive press coverage in doping scandals. (16) For an outline of the cellular effects of testosterone, see figure 3. Masculinisation of females can arise from the delivery of 'male' doses of testosterone (or a synthetic analogue) orally, trans-dermally, or intramuscularly as demonstrated by the historical example of Andreas Krieger (previously European shot-put champion Heidi) in the East German doping scandal of the 80s. (6) Testosterone is a potent androgen transported freely in the blood or bound to sex hormone binding globulin (SHBG), and contributes to the development of male secondary sexual characteristics. (16) Its relevant qualities here are derived from its anabolic action on skeletal muscle, increase in circulating haemoglobin, and inhibition of adipogenesis explaining its exogenous use as a performance-enhancing drug – it has received extensive press coverage in doping scandals. (16) For an outline of the cellular effects of testosterone, see figure 3.

After the Chand ruling, the main paper released by the IAAF was published in the British Journal of Sports Medicine, which we shall refer to as BG17. (17) A second paper was published a year later in response to criticism (BHKE18), which acknowledged methodological changes which led to changes in calculated performance differences compared to BG17. (4,18) The research found that based on 21 athletic events, female athletes with higher serum free testosterone performed significantly better ($p<0.05$) in 400m (2.73% margin), 400m hurdles (2.78%), 800m (4.53%), hammer throw (4.53%) and pole vault (2.94%). (17) Chand's sprinting distances did not feature in the testosterone performance-enhancing events, hence why the DSD regulations focus on middle distance events. Interestingly, of the aforementioned events which did show testosterone-related performance differences, higher testosterone conferred the smallest advantage in Semenya's event (800m). Despite having shown a significant testosterone-related performance difference in both the hammer throw and pole vault, the IAAF has decided to feature neither of these field events in their DSD regulations. Semenya commented "it feels like this new rule was created because of me". (7)

This work was conducted by those with a conflict of interest and has been methodologically criticised, with many academics arguing that it is inherently flawed. (19-21) Given its importance, it is imperative that this research is held to high bioethical standards, and the only way to do this is by the involvement of the scientific community. Professor Roger Pielke Jr. of the University of Colorado and director of its sports governance centre, who also acted as an

expert witness for Semenya in her CAS case against the IAAF, responded to a question about the integrity of the research: "We wouldn't want tobacco companies doing research on health effects of cigarettes. This is the same." Professor Pielke wrote a thought-provoking piece for Nature on the topic, explaining how the IAAF have violated the principles of the Helsinki declaration in their research process, highlighting the risks of implementing sports policy sanctioning 'unproven interventions'. (22)

Further, the 'cut-off' testosterone level chosen by the IAAF is arbitrary. We have no substantial evidence on the effects of testosterone suppression in this DSD group as interventional placebo-controlled studies aren't practically or ethically feasible. 5 nmol/L was lowered (after the original 10 nmol/L before the Chand ruling) based on the data from Handelsman e. 2018. (23) which actually used performance data from Semenya herself and other athletes who underwent testosterone suppression before the Chand ruling. The paper derived a bimodal distribution of testosterone concentrations in healthy men (7.7-29.4 nmol/L) and healthy pre-menopausal women (0-1.68 nmol/L) and by making an allowance for women with PCOS and mild hyperandrogenism, decided the cut-off should be 5 nmol/L. Based on healthy subjects from the general population, this data may not be directly applicable to elite athletes or those with DSD, and these ranges are not consistent with a more recent review. (24) It is very difficult to ascertain an absolute threshold for a measurement that displays natural variation in the population, and evidence on DSD athletes is extremely limited. However, it is vital that the IAAF is completely informed before sanctioning medical interventions and enforcing bans on athletes in order maintain testosterone below an arbitrary level.

DISCUSSION

Success in elite sport is a product of a range of environmental and genetic factors, and testosterone is a significant but by no means the only influence on this. By following the precedent set by the DSD regulations, do we need to look at other sports and correct other physiological advantages? It would certainly be ethically controversial to approach a successful swimmer and impose a medical intervention to suppress their elevated haemoglobin. Sport can never truly be 'fair', it relies on natural and environmental advantages to separate those who emerge victorious. If we continue to correct for biological advantage, could we eventually homogenise the field?

It is thought provoking to ask: if Semenya hadn't been so successful in her sport, would the new DSD regulations and the controversy surrounding the entire issue exist? We may question whether the regulations are discriminatory based on appearance: not all females get tested so it relies on singling out athletes who have a phenotypically 'male' appearance. One of the reasons these regulations are so controversial is the fact

estosterone are seen to have a fair advantage, whereas female athletes' testosterone-conferring advantage is seen as needing intervention.

The World Medical Association (a partner organisation to the WHO and Global Health Workforce Alliance) displayed ethical concerns, stating: "Medical treatment for the sole purpose of altering the performance in sport is not permissible." (22) Are the IAAF displaying double standards by banning the use of performance-enhancing drugs whilst condoning the use of performance-diminishing ones? No treatment comes without side effects, and we need to weigh up the benefits of protecting the female sporting category against the risks of physical side effects of testosterone withdrawal and potential thromboembolic events in the case of oral contraceptives, in addition to the psychological distress of subjecting them to intimate examinations and gender verification proceedings. (7) It is important to remember that running for these women is not only a passion, but their means of making a living – the judiciary panels owe them a wholly informed decision.

At the core of this debate is what it means to be female. The more this is discussed it emerges that this definition may not be the same in every context. Sex is a combination of genetic, hormonal, psychological and physical components, and what it means to be female in sport may be different to what it means in law, or genetics, for example. As a society we are discovering that what makes the topic of sex and gender so interesting is how it is not binary as traditionally thought. No Y chromosome per se gives you the advantage to win a race. Perhaps the Paralympics are ahead of able-bodied sport in the way that they allow multiple sub-categories within genders and event types, to reflect the diversity of society.

What is non-negotiable in this debate is that these athletes deserve to be treated with sensitivity and respect. We cannot influence individual cases if we are not professionally involved, but we can hold the organisations in charge to the bioethical standards that we expect in all medical research and care, to ensure fairness in the treatment of future athletes. This is clearly a challenging issue that would benefit from the sporting, legal, and medical communities working together to provide the expertise required to reach the best possible outcome. No matter what our opinion as healthcare professionals, the discussion can benefit from further input. Amidst the controversy, much can be learnt from Semenya's case: an athlete who simply wants to run "free of drugs, free of speculation and free of judgement". (7)

ACKNOWLEDGEMENTS

Thank you to Professor Roger Pielke Jr. University of Colorado - Boulder, CO for providing his expert opinion and comments to be used in this article. Thank you to Professor John Wass, Professor of Endocrinology at Oxford University for providing his comments on this article.

REFERENCES

1. Mashiter N. Caster Semenya: Sebastian Coe 'really grateful' to CAS for landmark ruling against South African. The Independent Online; 2019 [Accessed 21 Aug 2019]. Available from: https://www.independent.co.uk/sport/general/athletics/caster-semenya-lord-sebastian-coe-is-gender-testosterone-news-iaaf-dsd-a8896221.html.

2. IAAF Health & Science Department. International Association of Athletics Federations. Eligibility Regulations for the Female Classification (Athletes with Differences of Sex Development) Explanatory Notes/Q&A.¬ Monaco: International Association of Athletics Federations; 2019 [Accessed 21 Aug 2019]. Available from: https://www.iaaf.org/news/press-release/eligibility-regulations-for-female-classifica.

3. Cressey D. A question of sex. London: Springer Nature; 2009 [Accessed 21 Aug 2019]. Available from: https://www.nature.com/news/2009/090820/full/news.2009.850.html

4. Pielke R, Tucker R, Boye E. Scientific integrity and the IAAF testosterone regulations. Int Sports Law J. 2019;19:18-6.

https://doi.org/10.1007/s40318-019-00149-4

5. International Association of Athletics Federations. IAAF Regulations Governing Eligibility of Females with Hyperandrogenism to Compete in Women's Competition. Monaco: IAAF; 2011 [Accessed 22 Aug 2019]. Available from: https://www.sportsintegrityinitiative.com/wp-content/uploads/2016/02/IAAF-Regulations-Governing-Eligibility-of-Females-with-Hyperandrogenism-to-Compete-in-Women%E2%80%99s-Competition-In-force-as-from-1st-May-2011-6.pdf.

6. Slater M. Sport & gender: A history of bad science & 'biological racism'. London: BBC Sport; 2015 [Accessed 22 Aug 2019]. Available from: https://www.bbc.co.uk/sport/athletics/29446276.

7. The C ourt of Arbitration for Sport. CAS 2018/O/5794 Mokgadi Caster Semenya v. International Association of Athletics Federations. Lausanne, Switzerland: The Court of Arbitration for Sport; 2019 [Accessed 22 Aug 2019]. Available from: https://www.tas-cas.org/fileadmin/user_upload/CAS_Award_-_redacted_-_Semenya_ASA_IAAF.pdf

8. International Association of Athletics Federations. Eligibility Regulations for the Female Classification (Athletes with Differences of Sex Development) Version 2.0. Monaco: IAAF; 2019 [Accessed 22 Aug 2019]. Available from: https://www.iaaf.org/news/press-release/eligibility-regulations-for-female-classification.

9. International Association of Athletics Federations. Press release: IAAF Introduces New Eligibility Regulations for Female Classification. Monaco: IAAF; 2018 [Accessed: 22 Aug 2019]. Available from: https://www.iaaf.org/news/press-release/eligibility-regulations-for-female-classifica

10. Zimmerman Y, Eijkemans MJ, Coelingh Bennink HJ, Blankenstein MA, Fauser BC. The effect of combined oral contraception on testosterone levels in healthy women: a systematic review and meta-analysis. Human Reproduction Update 2014;20(1):76-105.

https://doi.org/10.1093/humupd/dmt038

PMid:24082040 PMCid:PMC3845679

11. BBC Sport Athletics. Caster Semenya Q&A: Who is she; what is DSD; why is her case important? London: BBC; 2019 [Accessed 24 Aug 2019]. Available from: https://www.bbc.co.uk/sport/athletics/48114137.

12. Camporesi S, and Maugeri P. Caster Semenya: sport, categories and the creative role of ethics: Journal of Medical Ethics, 2010;36:378-379.

https://doi.org/10.1136/jme.2010.035634

PMid:20530091

13. Liew J. Caster Semenya: Athletics has been trying to sabotage her for a decade. It may have finally succeeded. The Independent Online. 2019 [Accessed 24 Aug 2019]. Available from: https://www.independent.co.uk/sport/general/athletics/caster-semenya-iaaf-cas-testosterone-levels-hormone-therapy-olympics-800m-a8898816.html.

14. BBC Sport Athletics. Mariya Savinova: Russian London 2012 gold medalist stripped of title. London: BBC; 2017 [Accessed 24 Aug 2019]. Available from: https://www.bbc.co.uk/sport/athletics/38931007.

15. BBC Sport Athletics. Caster Semenya: Olympic 800m champion can compete after Swiss court ruling. London: BBC; 2019 [Accessed 25 Aug 2019]. Available from: https://www.bbc.co.uk/sport/athletics/48504205.

16. Kadi, F. Cellular and molecular mechanisms responsible for the action of testosterone on human skeletal muscle. A basis for illegal performance enhancement. British Journal of Pharmacology. 2008;154:522-528.

https://doi.org/10.1038/bjp.2008.118

PMid:18414389 PMCid:PMC2439525

17. Bermon S, Garnier P. Serum androgen levels and their relation to performance in track and field: mass spectrometry results from 2127 observations in male and female elite athletes. British Journal of Sports Medicine. 2017;51:1309-1314.

https://doi.org/10.1136/bjsports-2017-097792

PMid:28673896

18. Bermon S, Hirschberg AL, Kowalski J, et al. Serum androgen levels are positively correlated with athletic performance and competition results in elite female athletes. British Journal of Sports Medicine. 2018;52:1531-1532.

https://doi.org/10.1136/bjsports-2018-099700

PMid:29982225

19. Camporesi S. A question of 'fairness': Why ethics should factor in the Court of Arbitration for Sport's decision on the IAAF Hyperandrogenism Regulations. British Journal of Sports Medicine. 2019;53:797-798.

https://doi.org/10.1136/bjsports-2018-099387

PMid:29643090

20. Menier A. Use of event-specific tertiles to analyse the relationship between serum androgens and athletic performance in women. British Journal of Sports Medicine. 2018;52:1540.

https://doi.org/10.1136/bjsports-2017-098464

PMid:29351950

21. Sőnksen PH, Bavington LD, Boehning T, et al. Hyperandrogenism controversy in elite women's sport: an examination and critique of recent evidence. British Journal of Sports Medicine. 2018;52:1481-1482.

https://doi.org/10.1136/bjsports-2017-098446

PMid:29351951

22. Pielke Jr R. Caster Semenya Ruling: sports federation is flouting ethics rules. Nature World View. London: Springer Nature; 2019 [Accessed 25 Aug 2019]. Available from: https://www.nature.com/articles/d41586-019-01606-8.

23. David J Handelsman, Angelica L Hirschberg, Stephane Bermon, Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance. Endocrine Reviews. 2018;39:803–829.

https://doi.org/10.1210/er.2018-00020

PMid:30010735 PMCid:PMC6391653

24. Clark RV, Wald JA, Swerdloff RS, et al. Large divergence in testosterone concentrations between men and women: Frame of reference for elite athletes in sex specific competition in sports, a narrative review. Clin Endocrinol. 2019;90:15– 22.

https://doi.org/10.1111/cen.13840

PMid:30136295

The British Student Doctor, 2020;4(2):38-46
doi: 10.18573/bsdj.115
Discussion article

Should healthcare professionals be concerned about the quality of sleep their patients have?

DISCUSSION

AUTHOR

Aleksander Dawidziuk
Imperial College London

Address for Correspondence:
Aleksander Dawidziuk
Imperial College London
South Kensington Campus
London SW7 2AZ
United Kingdom

Email: amd16@ic.ac.uk

No conflicts of interest to declare.

Accepted for publication: 24.04.20

ABSTRACT

Population surveys conducted in many countries, including the United Kingdom, reported participant self-declared insufficient sleep levels. In 2017, the Centre for Disease Control and Prevention (CDC) announced sleep deprivation to be a public health problem. Sleep is essential to maintain life and the restriction of sleep time was postulated to have a negative impact on cognitive function, metabolism and the immune system. Sleep pattern alterations are associated with an increased risk of depression, type II diabetes mellitus, cardiovascular disease and carcinogenesis. Both acute and chronic sleep deprivation, as well as circadian rhythm dysregulation, can lead to adverse health consequences. Moreover, there is a number of prevalent sleep conditions, including insomnia and obstructive sleep apnoea (OSA) which need early diagnosis and appropriate treatment. This essay briefly outlines current theories of the function of sleep and summarises pathologies arising from sleep pattern alterations to argue that it is essential for healthcare professionals to address their patients' sleep hygiene and detect sleep conditions early in order to improve health outcomes.

Over 30% of adults in the United States sleep for less than seven hours in a 24 hour period, (1) failing to meet the healthy length of sleep recommended by the American Academy of Sleep Medicine. (2) In the United Kingdom, 51% of adult respondents declared insufficient sleep on workdays. (3) The Centre for Disease Control and Prevention (CDC) announced sleep deprivation to be a public health problem, (4) and popular media have even described it as an epidemic. (5) This essay will explore the consequences of sleep pattern alterations and discuss the most common sleep disorders to show how important is it for healthcare professionals to address the quality of patients' sleep in their clinical practice.

THE FUNCTION OF SLEEP

To evaluate the effects of sleep loss, it is worth exploring some of its essential functions. The role of sleep has been investigated extensively, and a number of explanations for its importance postulated. Sleep is essential to maintain life; (6,7) individuals forced to remain awake for a period of 40 hours or greater will involuntarily fall asleep. (8) Currently, there are several prominent theories of the purpose of sleep, (9–11) which are summarised in Table 1.

Inactivity theory	Evolutionary pressure promotes creatures inactive at night which are less susceptible to predators active in the dark.
Energy conservation theory	Main function of sleep is energy expenditure reduction; supported by 10% decrease in metabolism during sleep.
Restoration theory	Sleep allows for the body to repair; protein synthesis, tissue growth, muscle repair, release of growth hormone all occur during sleep.
Brain plasticity theory	Sleep is necessary for neural reorganisation and development of brain's structure and function. Theory supported by recent ultrastructural evidence for renormalisation of synapses during sleep.

Box 1
Prominent sleep function theories

THE CONSEQUENCES OF SLEEP DEPRIVATION

While trying to understand the function of sleep, researchers have learned more about its importance by studying the effects of sleep restriction rather than by investigating processes happening during sleep itself. Various neurological consequences of sleep deprivation have been identified. One of the most important is the impairment of cognitive performance. (12) It is particularly crucial not to overlook repeated sleep loss. Chronic restriction of sleep to 6 hours per night or less produces cognitive function deficits equivalent to up to two nights of total sleep deprivation. (13) Sleep loss is responsible for prolonged reaction time and, consequentially, for increased risk of road traffic accidents. (14) It also deteriorates executive function defined as an ability to plan and coordinate a wilful action in the face of an alternative. (15) Sleep can be characterised by cyclic episodes of rapid eye movement (REM) and non-REM sleep which includes lighter sleep (stages 1, 2) and deep slow-wave sleep (SWS, stages 3, 4). Slow-wave and rapid eye movement sleep is crucial for declarative memory consolidation. (16) Furthermore, sleep plays a vital role in maintaining a good mood and sleep alterations are associated with a high risk of depression. (17) To summarise, restricted sleep interferes with our work efficiency, learning, decision making, mood, and increases the risk of accidents.

Sleep is not only essential for the brain and nervous system but also metabolism, endocrine function and immunity. Sleep restriction leads to changes in appetite regulating hormones (increased ghrelin and decreased leptin) which in turn boost hunger and food intake. Also, sleep deprivation was shown by a number of well-designed sleep manipulation studies to cause insulin resistance and reduce glucose clearance resulting in obesity. (18) Alterations in growth hormone and cortisol secretion patterns, adipocyte dysfunction, triggered by irregular sleep, all contribute to pancreatic beta-cell dysfunction and in turn type II diabetes mellitus. (19) Global obesity and diabetes epidemics are major health challenges to be addressed, making education on sleep hygiene even more important.

An acute modest reduction of sleep length by four hours, in comparison to baseline measurement taken at eight hours of sleep, increases proinflammatory cytokine response and can lead to prolonged inflammation. (20,21) In contrast to that, chronic sleep deprivation, defined as less than seven hours of sleep for 14 consecutive days is likely to reduce immune function, e.g. by decreasing natural killer cells activity, and is associated with the risk of developing a common cold almost three times higher than in individuals getting more than eight hours of sleep. (22–24)

A large number of studies investigated circadian rhythm dysregulation resulting from sleep alterations. Among findings of extensive importance for public health were increased risk of cancer and cardiovascular disease. (25) The most prominent are epidemiological investigations of female shift-workers, which identified a 1.5 higher risk of developing breast cancer in a population of Norwegian radio and telegraph operators after adjusting for fertility factors. (26,27) Evidence was also provided for a link between circadian rhythm and the incidence of myocardial infarction (threefold higher frequency of onset at the peak - 9 a.m., compared to trough - 11 p.m.), (28) and stroke (highest incidence between 6 a.m. and 12 p.m.). (29) Further research is needed to confirm if modifications of the circadian rhythm can delay or prevent the occurrence of these events.

COMMON SLEEP DISORDERS

Sleep quality can be deteriorated by environmental factors, such as work pattern or light-dark imbalance, but also by internal conditions. International Classification of Sleep Disorders (ICSD-3) identifies six major categories of them. (30) This essay will focus on the most prevalent, hence important for public health: obstructive sleep apnoea (OSA) and insomnia. (31)

OSA is characterised by repeated airway collapse during sleep, causing oxygen desaturation and disruption of sleep. (32) The current OSA prevalence estimates are 9% for women and 24% for men (over 1.5 million cases in the United Kingdom, of which up to 85% are undiagnosed). (33,34) There are several diagnostic factors associated with obstructive sleep apnoea, including obesity, male sex, maxillomandibular abnormalities, excessive daytime sleepiness, episodes of apnoea, episodic gasping, restless sleep, insomnia, macroglossia and chronic snoring. Polysomnography is currently the only definitive test. Its result, the Apnoea-Hypopnoea Index (AHI) of >15 episodes/hour is confirmatory, however, AHI of >5 is sufficient for a symptomatic patient. Continuous positive airway pressure (CPAP) is the 1st line treatment of choice for severe OSA (AHI >30), while titratable devices are preferred in mild to moderate (AHI 5-30) cases. (35) OSA leads to daytime sleepiness, which can result in road traffic accidents, (36) and systemic hypertension, (37) the incidence of which can be alleviated by treatment with CPAP. (38)

10% of adults meet the criteria for chronic insomnia and almost 20% report some symptoms of it. (39) It is a widely prevalent condition, although few people seek medical care. (40) Sleep partner complaints, delayed sleep onset, multiple and long awakenings and presence of risk factors which include female sex, advancing age, chronic illnesses and use of alcohol, drugs or stimulants should be considered when taking the history. There are several questionnaires which can be administered to facilitate the diagnosis: Pittsburgh Sleep Quality Index, Insomnia Severity Index, Stanford Sleepiness Scale, Epworth Sleepiness Scale and Athens Insomnia Scale. (41) Comorbidities such as anxiety, depression, substance misuse and pain are associated with chronic insomnia. (42) When making the diagnosis it is important to differentiate between true insomnia and sleep disturbance resulting from other conditions which can be challenging. The management of acute and chronic insomnia should begin with providing guidance on sleep hygiene and relaxation techniques, however, the evidence supporting this approach is still limited. Cognitive behavioural therapy for insomnia (CBT-I) and hypnotic medications are the other two first line treatments, which have been shown to be effective remedies. (41)

Causes and consequences of sleep pattern alteration, described in this essay, are outlined in Figure 1.

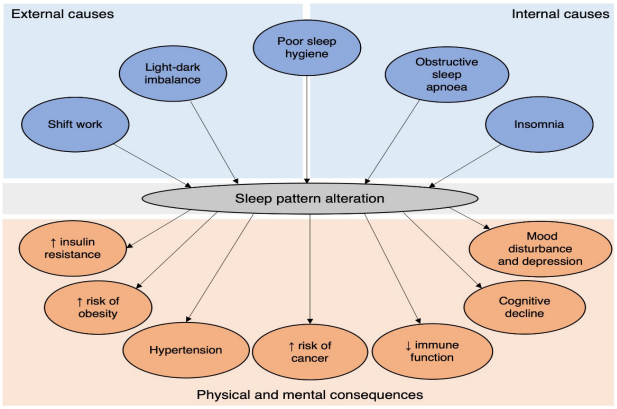


Figure 1
Causes and consequences of sleep pattern alterations.

ADDRESSING THE QUALITY OF SLEEP

Sleep alterations have a profound effect on public health, ranging from increased risk of obesity to road traffic accidents. It is very important for healthcare professionals to properly diagnose and treat underlying risk factors and comorbidities associated with these sleep disorders. However, from a public health perspective, it is even more important for healthcare professionals to raise awareness of sleep hygiene by the general public. (43,44) It is also vital to use evidence-based resources and tools for delivering this education. Currently, a variety of sleep analysis smartphone applications with a range of functionalities are available, however, the algorithms they utilise are not yet validated by the scientific literature. (45) There also is a number of applications designed to help improve the time and quality of sleep, and three of these are recommended by the National Health Service: Pzizz (uses a mix of music, voiceovers and sound effects to help people fall asleep), Sleepio (an online sleep improvement programme based on CBT techniques) and Sleepstation (a 6-week online course providing information on falling and staying asleep throughout the night). All of these applications have been clinically validated. (46)

Education on healthy sleep has the potential to improve the quality of life of millions and contribute to solving one of society's major public health issues. In its 2016 report, the Royal Society for Public Health has suggested that the government should publish a national sleep strategy and introduce sleep education into workplaces and national school curricula. (47) The experts argue that raising awareness should begin in early childhood. (48) As of writing this article, there are a number of sleep awareness campaigns run by organisations like The Sleep Council, however, there is currently no national sleep policy in the United Kingdom. (49) As a result, the task of educating the public on sleep hygiene falls to healthcare professionals, who should proactively advise their patients on improving the quality of their sleep.

REFERENCES

1. Liu Y, Wheaton AG, Chapman DP, Cunningham TJ, Lu H, Croft JB. Prevalence of Healthy Sleep Duration among Adults — United States, 2014. Atlanta: Centers for Disease Control and Prevention MMWR Morb Mortal Wkly Rep; 2016 [accessed 15 Dec 2019]. Available from: http://www.cdc.gov/mmwr/volumes/65/wr/mm6506a1.htm.

2. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society on the Recommended Amount of Sleep for a Healthy Adult: Methodology and Discussion. Sleep. 2015;38(8):1161–83.

https://doi.org/10.5665/sleep.4886

PMid:26194576 PMCid:PMC4507722

3. National Sleep Foundation. 2013 International Bedroom Poll - National Sleep Foundation Washington D.C.: Sleep Foundation; 2013 [accessed 15 Dec 2019]. Available from: https://www.sleepfoundation.org/professionals/sleep-america-polls/2013-international-bedroom-poll.

4. Hafner M, Stepanek M, Taylor J, Troxel W, Stolk C. Why sleep matters -- the economic costs of insufficient sleep: A cross-country comparative analysis. Why sleep matters -- the economic costs of insufficient sleep: A cross-country comparative analysis. Santa Monica, CA: RAND Corporation; 2017.

5. During EH. The Epidemic of Sleep Deprivation: A Modern Curse. New York: HuffPost; 2017 [accessed 15 Dec 2019]. Available from: https://www.huffpost.com/entry/the-epidemic-of-sleep-deprivation-a-modern-curse_b_597e836be4b09982b73765e7?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAABkpYiitRalgY1KM-HdzL19n3wJWB_u25TrZui8YNFam4evHB27t4Zul7hHaRK7p8nN.

6. Everson CA, Bergmann BM, Rechtschaffen A. Sleep Deprivation in the Rat: III. Total Sleep Deprivation. Sleep. 1989;12(1):13-21.

https://doi.org/10.1093/sleep/12.1.13

PMid:2928622

7. Cirelli C, Tononi G. Is Sleep Essential? PLoS Biol. 2008;6(8):e216.

https://doi.org/10.1371/journal.pbio.0060216

PMid:18752355 PMCid:PMC2525690

8. Adam M, Rétey J V., Khatami R, Landolt H-P. Age-Related Changes in the Time Course of Vigilant Attention During 40 Hours Without Sleep in Men. Sleep. 2006;29(1):55–7.

https://doi.org/10.1093/sleep/29.1.55

PMid:16453981

9. Brinkman JE, Sharma S. Physiology, Sleep. StatPearls. 2018.

10. De Vivo L, Bellesi M, Marshall W, Bushong EA, Ellisman MH, Tononi G, et al. Ultrastructural evidence for synaptic scaling across the wake/sleep cycle. Science. 2017;355(6324):507–10.

https://doi.org/10.1126/science.aah5982

PMid:28154076 PMCid:PMC5313037

11. Cirelli C, Tononi G. The Sleeping Brain. Cerebrum: the Dana Forum on Brain Science. New York: Dana Foundation; 2017 [accessed 15 Dec 2019]. Available from: https://dana.org/article/the-sleeping-brain.

12. Pilcher JJ, Huffcutt AI. Effects of Sleep Deprivation on Performance: A Meta-Analysis. Sleep. 1996;19(4):318–26.

https://doi.org/10.1093/sleep/19.4.318

PMid:8776790

13. Van Dongen HPA, Maislin G, Mullington JM, Dinges DF. The Cumulative Cost of Additional Wakefulness: Dose-Response Effects on Neurobehavioral Functions and Sleep Physiology From Chronic Sleep Restriction and Total Sleep Deprivation. Sleep. 2003;26(2):117–26.

https://doi.org/10.1093/sleep/26.2.117

PMid:12683469

14. Connor J, Norton R, Ameratunga S, Robinson E, Civil I, Dunn R, et al. Driver sleepiness and risk of serious injury to car occupants: population based case control study. BMJ. 2002;324(7346):1125.

https://doi.org/10.1136/bmj.324.7346.1125

PMid:12003884 PMCid:PMC107904

15. Durmer JS, Dinges DF. Neurocognitive Consequences of Sleep Deprivation. Semin Neurol. 2005;25(01):117–29.

https://doi.org/10.1055/s-2005-867080

PMid:15798944

16. Diekelmann S, Born J. The memory function of sleep. Vol. 11, Nature Reviews Neuroscience. 2010. p. 114–26.

17. Tsuno N, Besset A, Ritchie K. Sleep and Depression. J Clin Psychiatry. 2005;66(10):1254–69.

https://doi.org/10.4088/JCP.v66n1008

PMid:16259539

18. Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. Lancet. 1999;354(9188):1435–9.

https://doi.org/10.1016/S0140-6736(99)01376-8

19. Reutrakul S, Van Cauter E. Sleep influences on obesity, insulin resistance, and risk of type 2 diabetes. Vol. 84, Metabolism: Clinical and Experimental. Philadelphia: W.B. Saunders; 2018. p. 56–66.

20. Irwin MR, Wang M, Campomayor CO, Collado-Hidalgo A, Cole S. Sleep deprivation and activation of morning levels of cellular and genomic markers of inflammation. Arch Intern Med. 2006;166(16):1756–62.

https://doi.org/10.1001/archinte.166.16.1756

PMid:16983055

21. Lange T, Dimitrov S, Born J. Effects of sleep and circadian rhythm on the human immune system. Ann N Y Acad Sci. 2010;1193(1):48–59.

https://doi.org/10.1111/j.1749-6632.2009.05300.x

PMid:20398008

22. Irwin M, Mcclintick J, Costlow C, Fortner M, White J, Christian Gillin J. Partial night sleep deprivation reduces natural killer and cellular immune responses in humans. FASEB J. 1996;10(5):643–53.

https://doi.org/10.1096/fasebj.10.5.8621064

PMid:8621064

23. Haus EL, Smolensky MH. Shift work and cancer risk: Potential mechanistic roles of circadian disruption, light at night, and sleep deprivation. Sleep Medicine Reviews. 2013;17:273–84.

https://doi.org/10.1016/j.smrv.2012.08.003

PMid:23137527

24. Cohen S, Doyle WJ, Alper CM, Janicki-Deverts D, Turner RB. Sleep habits and susceptibility to the common cold. Arch Intern Med. 2009;169(1):62–7.

https://doi.org/10.1001/archinternmed.2008.505

PMid:19139325 PMCid:PMC2629403

25. Abbott SM, Malkani RG, Zee PC. Circadian Dysregulation in Mental and Physical Health. In: Principles and Practice of Sleep Medicine. Amsterdam: Elsevier; 2017. p. 405-413.

26. Tynes T, Hannevik M, Andersen A, Vistnes AI, Haldorsen T. Incidence of breast cancer in Norwegian female radio and telegraph operators. Cancer Causes Control. 1996;7(2):197–204.

https://doi.org/10.1007/BF00051295

PMid:8740732

27. Schernhammer ES, Laden F, Speizer FE, Willett WC, Hunter DJ, Kawachi I, et al. Rotating Night Shifts and Risk of Breast Cancer in Women Participating in the Nurses' Health Study. JNCI J Natl Cancer Inst. 2001;93(20):1563–8.

https://doi.org/10.1093/jnci/93.20.1563

PMid:11604480

28. Muller JE, Stone PH, Turi ZG, Rutherford JD, Czeisler CA, Parker C, et al. Circadian Variation in the Frequency of Onset of Acute Myocardial Infarction. N Engl J Med. 1985;313(21):1315–22.

https://doi.org/10.1056/NEJM198511213132103

PMid:2865677

29. Argentino C, Toni D, Rasura M, Violi F, Sacchetti ML, Allegretta A, et al. Circadian variation in the frequency of ischemic stroke. Stroke. 1990;21(3):387–9.

https://doi.org/10.1161/01.STR.21.3.387

PMid:2309262

30. Sateia MJ. International classification of sleep disorders-third edition highlights and modifications. Chest. 2014;146(5):1387–94.

https://doi.org/10.1378/chest.14-0970

PMid:25367475

31. Amara AW, Maddox MH. Epidemiology of Sleep Medicine. In: Principles and Practice of Sleep Medicine. Amsterdam: Elsevier; 2017. p. 627-637.

32. Jordan AS, McSharry DG, Malhotra A. Adult obstructive sleep apnoea. The Lancet. 2014;383:736–47. https://doi.org/10.1016/S0140-6736(13)60734-5

33. Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The Occurrence of Sleep-Disordered Breathing among Middle-Aged Adults. N Engl J Med. 1993;328(17):1230–5.

https://doi.org/10.1056/NEJM199304293281704

PMid:8464434

34. British Lung Foundation. Obstructive sleep apnoea: Toolkit for commissioning and planning local NHS services in the UK. London: British Lung Foundation; 2015 [accessed 23 Dec 2019]. Available from: https://www.blf.org.uk/sites/default/files/OSA_Toolkit_2015_BLF_0.pdf.

35. BMJ Best Practice. Obstructive sleep apnoea in adults. London: BMJ Group; 2018 [accessed 23 Dec 2019]. Available from: https://bestpractice.bmj.com/topics/en-gb/215/pdf/215.pdf.

36. Terán-Santos J, Jimenez-Gomez A, Cordero-Guevara J. The Association between Sleep Apnea and the Risk of Traffic Accidents. N Engl J Med. 1999;340(11):847–51.

https://doi.org/10.1056/NEJM199903183401104

PMid:10080847

37. Peppard PE, Young T, Palta M, Skatrud J. Prospective Study of the Association between Sleep-Disordered Breathing and Hypertension. N Engl J Med. 2000;342(19):1378–84.

https://doi.org/10.1056/NEJM200005113421901

PMid:10805822

38. Montesi SB, Edwards BA, Malhotra A, Bakker JP. Effect of continuous positive airway pressure treatment on blood pressure: A systematic review and meta-analysis of randomized controlled trials. Journal of Clinical Sleep Medicine. 2012;8:587–96.

https://doi.org/10.5664/jcsm.2170

PMid:23066375 PMCid:PMC3459209

39. Morin CM, LeBlanc M, Daley M, Gregoire JP, Mérette C. Epidemiology of insomnia: Prevalence, self-help treatments, consultations, and determinants of help-seeking behaviors. Sleep Med. 2006;7(2):123–30.

https://doi.org/10.1016/j.sleep.2005.08.008

PMid:16459140

40. Morin CM, LeBlanc M, Bélanger L, Ivers H, Mérette C, Savard J. Prevalence of insomnia and its treatment in Canada. Can J Psychiatry. 2011;56(9):540–8.

https://doi.org/10.1177/070674371105600905

PMid:21959029

41. BMJ Best Practice. Insomnia. London: BMJ Group; 2019 [accessed 23 Dec 2019]. Available from: https://bestpractice.bmj.com/topics/en-gb/227/pdf/227.pdf.

42. Morin CM, Benca R. Chronic insomnia. The Lancet. 2012;379(9821):1129–41.

https://doi.org/10.1016/S0140-6736(11)60750-2

43. Irish LA, Kline CE, Gunn HE, Buysse DJ, Hall MH. The role of sleep hygiene in promoting public health: A review of empirical evidence. Sleep Medicine Reviews. 2015;22:23–36.

https://doi.org/10.1016/j.smrv.2014.10.001

PMid:25454674 PMCid:PMC4400203

44. Mukherjee S, Patel SR, Kales SN, Ayas NT, Strohl KP, Gozal D, et al. An Official American Thoracic Society Statement: The Importance of Healthy Sleep. Recommendations and Future Priorities. Am J Respir Crit Care Med. 2015;191(12):1450–8.

https://doi.org/10.1164/rccm.201504-0767ST

PMid:26075423 PMCid:PMC5442970

45. Ong AA, Gillespie MB. Overview of smartphone applications for sleep analysis. World J Otorhinolaryngol Neck Surg. 2016;2(1):45–9.

https://doi.org/10.1016/j.wjorl.2016.02.001

PMid:29204548 PMCid:PMC5698521

46. NHS. Sleep apps. London: NHS England; 2019 [accessed 23 Dec 2019]. Available from: https://www.nhs.uk/apps-library/category/sleep.

47. Royal Society for Public Health. Waking up to the health benefits of sleep. London: Royal Society for Public Health; 2016 [accessed 23 Dec 2019]. Available from: https://www.rsph.org.uk/uploads/assets/uploaded/50220c8f-febb-416e-8f3f7a4d2f973897.pdf.

48. Grandner MA. Sleep, Health, and Society. Sleep Medicine Clinics. 2017;12:1–22

https://doi.org/10.1016/j.jsmc.2016.10.012

PMid:28159089 PMCid:PMC6203594

49. Awareness Campaigns - The Sleep Council. Skipton, North Yorkshire: The Sleep Council; 2019 [accessed 23 Dec 2019]. Available from: https://sleepcouncil.org.uk/press/awareness-campaigns.

The British Student Doctor, 2020;4(2):47-53
doi: 10.18573/bsdj.137
Discussion

Balint Groups: a doctor-student mutual investment company

DISCUSSION

AUTHOR

Dr Emma Salter
Somerset Partnership NHS
Foundation Trust

Address for Correspondence:

Dr Emma Salter
Wessex House
Broadway Health Park
Bridgwater, Somerset
United Kingdom
TA65LX

Email: emma.salter@doctors.org.uk

No conflicts of interest to declare.

Accepted for publication: 29.04.20

ABSTRACT

Balint Groups were traditionally established as reflective groups by psychoanalyst Michael and Enid Balint for general practitioners to reflect on the doctor-patient relationship. Balint described components of this relationship between doctor and patient including the collusion of anonymity, the doctor as a drug and the mutual investment company.

This paper discusses two case examples from the perspective of a junior doctor facilitating medical student Balint groups and from the junior doctor participating in a peer group. Comparisons between the doctor and student emotional expression, empathic ability and apparent preconceived ideas of the "doctor role" are discussed, with reflection on potential origins and contributing factors to such internalised views and responses.

The author explores potential professional benefits of medical student Balint groups facilitated by junior doctors in influencing empathic response and internalised personas, as discussed through the eyes of Balint's components of the interpersonal doctor-patient relationship.

INTRODUCTION

The eponymously named Balint Group provides a model for reflective practice, traditionally comprising 8-12 general practitioners (GPs) and one psychoanalyst facilitator. (1,2) Balint advocated for the exploration of the doctor-patient relationship within these groups, with awareness of the effect the patient has on the doctor and the doctor's ability to establish deeper meaning within the patient presentation. Since their origin in the 1950s, groups have adapted and are now commonplace in UK psychiatry and GP training programmes with facilitators of various professional backgrounds.

While training as a psychiatrist, I facilitated medical student groups and participated in regular peer groups. This led me to reflect on preconceived ideas of the doctor and patient roles as well as comparison of doctor versus student empathy and emotional expression. I continue by discussing whether Balint groups might help maintain physician empathy and reduce a sense of isolation many describe within their professional work. Further, I propose a potential mutual benefit for both parties when junior doctors facilitate student groups, through the doctor-student relationship.

BALINT GROUP CASES

During the student groups, a student presented a case involving a 55-year-old gentleman with terminal bowel cancer. The student first encountered the patient in discussion with her consultant colleague, whom she described as rigid, abrupt, and controlled in manner. After meeting the patient, she described feeling deeply sad for him yet disappointed with herself as she felt so emotionally overwhelmed. She also felt surprise that the patient appeared so "normal". In the group, students shared their pain at meeting patients with similar issues to those of themselves or family members. Profoundly, they described conflicted inner feelings: shock at the consultant's apparent nonchalance when discussing the case, and disappointment with their comparative personal "emotional weakness". There was a feeling of unity as students shared their internal struggles in gathering their identities in this new world of clinical medicine.

I was interested when comparing this case with a peer Balint group. A fellow trainee presented a case of a professional lady in her early twenties who had been studying law at university, had a supportive family and during an acute manic episode had destroyed personal relationships, dropped out of university and presented as angry, rude and derogatory to others. Following much silence, the group spoke of practical management plans for the patient. Increasingly, the patient angered the group with her apparent incompetence. Alongside themes of frustration arose a sense of unspoken fear. The presenter felt her own mortality within this patient, commenting the patient was "like us". However, we skirted around the topic of our own vulnerability completely. The vulnerability was in the patient, and she angered us with her inability to solve it.

Facilitating the students, I was struck and saddened most by the intense shame the students felt from being so emotionally moved by patients. One participant asked if it was weakness to show sadness in front of patients. It was as if the students were learning how to be stoical medics, torn between their natural human responses and desire to mimic their seniors. I also felt ashamed that, with the students' case, I would have behaved more like the consultant than the students.

DISCUSSION

In both cases, the presenter was surprised at identifying with the patient, and discussion of the patient and doctor archetypes arose. One notable difference I observed between the doctor and student groups, was the raw sadness shared between the students and the anger and practical solutions thrown out by the junior doctors.

There were recurring themes amongst the students of death and sadness when identifying with the "normal", every-day person. Students struggled to disentangle the stark contrast between the doctor's structured patient-interactions, and their own emotional responses. Professional development, identity and role confusion are common themes in medical student groups. (3) Feelings relating to treating patients who may never get back to full health and witnessing injustice are also common. (4)

In my doctor groups, presenters often brought a sense of frustration and anger, usually born of helplessness. Published literature involving doctors in Balint groups highlight common themes, including trainee emotional experience, trust and responsibility, (5) and difficult feelings of inadequacy and insufficiency. (6)

In both cases I described, the doctor's role was objective, immune, and apparently lacked emotional expression and empathy. This persona conflicted with the students' natural emotional responses to the patients but was nonetheless held as an ideal: to exhibit raw emotion was a weakness, while remaining un-phased by adversity was stoical. This was mirrored in the groups' emotional expression where students shared sadness and pain while the doctors showed anger at perceived incompetence, once the lack of emotion was worked through.

Balint, on describing the Apostolic Mission, stated "in the first place that every doctor has a vague, but almost unshakably firm, idea of how a patient ought to behave when ill". (7) So too, might there be a presumption of the doctor's behavior.

When do we create such views of the doctor/patient personas and why did the students aspire to such structured, non-empathic responses?

The doctor's professional role, throughout time, has carried with it certain stereotypic personas: trusted, (8) a guide, (9) high ranking in society, (10) professionally unaffected by stress, (9) confident, (11) rescuing, (10,12) and heroic. (12,13)

From ancient Egyptian times, the doctor was "the healer", with paternalistic practice dominating throughout centuries until Szasz and Hollender advocated for mutual doctor-patient participation in the 1950s. (10) Perhaps, we harbour, at a core societal level, a deeply internalised perception of what the doctor role entails and strive to achieve this whilst avoiding shame at failing, much like the students in my group.

Patients might also view doctors with preconceived ideas, resulting in the doctor persona being impressed upon us from the expectations of the other. In the doctor case mentioned above, one participant shared a line thrown at them once by a patient, "You're not ill! You don't know!" The doctor had been filled with anger and confusion: to this patient, he, a doctor, could not have any illness. In that moment of patient assumption, he described feeling robotic and inhuman, not mortal: his emotions and identity were taken from him. And so, the "immortal doctor" persona was established in that moment of engagement with someone holding the patient role.

This persona of immunity might co-occur with decreased empathy expression. A decline in student empathy has been observed as the training years progress, regardless of gender or specialty. (14) This decline was most significant in the 3rd year of training, which is when most students commence their clinical training. A decline in empathy has been linked to physician burnout and psychological defense mechanisms. (15) Training is a time where many doctors focus on learning to avoid feelings of failure and shame. (16) Trainees can learn to rationalise fears and soldier on. (11) Horrifically, this external persona, does not match what is being felt inside. (16)

Our own beliefs that we must cope have a part to play. So too, does the system. Doctors' clinical years have been described as "a breeding ground for feelings of insecurity and self-doubt". (11) Increasing technological systems, as well as specific incidents like the unexpected death of a patient, systemic issues such as staffing shortages, and course structure, including volume of knowledge required and workplace rotations have been linked with reduced clinician empathy. (15,17) The impact of the institutional or organisational faculty on trainees is important to recognise. (18) If a busy faculty fails to address its own motivation, ambivalence and feelings of being overwhelmed by workload, this is likely to be, at least partly, projected onto the trainees who, in turn, identify with it and act it out. (18) The result is that trainee behaviour towards patients mirrors the physical and emotional unavailability of the faculty. Therefore, if the faculty can resolve their own systemic issues, such as feeling overwhelmed and busy, they are less likely to delegate unhelpful parts of themselves to trainees. (18)

A combination of system pressures, internalised societal views of what it is to be a doctor, personal defence mechanisms and unsupportive faculty responses might coalesce to create this breeding ground for burnout, rather than compassionate medics.

"Empathy can be lost, but it can also be gained" (15)

Balint proposed several components of the Doctor-Patient relationship: the Drug Doctor, the Collusion of Anonymity and the Mutual Investment Company. (7) The doctor-patient relationship is fundamentally different from the student-doctor relationship. However, the wordings of Balint's doctor-patient relationship components led me to consider this analogy within Balint groups and in particular, within doctor-student relationships.

INTRAPERSON DRUG DOCTOR

"The Drug Doctor", describes the idea that the patient-doctor relationship itself acts as the most valuable aspect of consultations and treatment. Balint groups are recognised as tools for reduction of both stress and burnout in clinicians. (19-21) Of course Balint groups are not personal therapy and it is right to maintain focus of the relationship between the patient and the doctor (the interpersonal). However, these cases highlight that once the students and doctors acknowledged their human (patient-like) vulnerabilities, empathy with the patients and a deeper understanding of the interpersonal relationship ensued. Here, I observed the doctors and students, within the professional boundaries of the Balint group, acknowledging the doctor-patient relationship within themselves (the intrapersonal). Balint groups might, through exploration of the intrapersonal doctor-patient relationship, have a therapeutic benefit to participants. Participating in Balint groups can actively contribute to development of one's professional identity. (22) Trainees report groups left them feeling "more at home with own emotional responses, (22) improving their confidence to exhibit spontaneous emotion and vulnerability in clinical encounters, which can benefit patients, (23) while maintaining optimal self-care. Groups can relieve confusion and frustration, (24) by helping trainees separate themselves from the dynamics occurring within consultations. (25) The result can be modification of attitudes and behaviours with improved student awareness of the impact their personality has on the doctor-patient relationship. (3,24) In the cases I facilitated, I observed students acknowledging their own intrapersonal doctor-patient relationships, following which they could better access a therapeutic stance for their patients. Balance in acknowledging our own vulnerability and patients' needs is required and this is where facilitation of groups is key. (23) Students have found that an empathic role model helps reduce, if present, their detached personas. (17) This is where I feel junior doctors, in their transitional position between student and consultant, might play a part. I wonder if junior doctors who model an empathic stance whilst facilitating student

groups might hold a pivotal role within the doctor-student relationship. If we extend Balint's Drug Doctor to the doctor-student relationship, one might even view junior doctor facilitators as the drug themselves within the interpersonal doctor-student relationship: as long as the doctor models empathy, encourages sharing of emotions and supports students in exploring the doctor-patient relationship.

DOCTOR-STUDENT COLLUSION OF ANONOYMITY

Collusion of anonymity exists when "the patient is passed from one specialist to another with nobody taking responsibility for the whole person". (26) It can carry benefits: less burden of responsibility and allows different specialties to learn from each other. However, it can leave patients confused in their care and medical leadership.

As students and doctors, recruitment is a national process: we are ranked, then sieved through interviews in a centralised location. Like our patients travelling from one speciality to another, we travel on the conveyor belt of training, moving from rotation to rotation as "another nameless junior doctor". Similar to Balint's patients, within the Collusion of Anonymity, feeling confused with their care and leadership, medical students struggle with the level of uncertainty they carry as they transition into clinical work. (27) Such uncertainty may be related to factors such as patient management or workload expectations and has been linked with anxiety and stress. (27) This, in turn, could lead to burnout and reduced mental health if not addressed. Balint groups, by their very process of not aiming to find solutions, might aid students in practising the process of holding uncertainty as doctors. Furthermore, recognising one is not alone in uncertainty can be healing in itself. Trainees found groups left them with feelings of increased solidarity and they felt more confident and satisfied in their work. (22,28) Student Balint groups facilitated by junior doctors might help reduce this isolating anonymity by providing continuity for students through one facilitating clinician, and by providing a space where clinicians may share experiences, not only amongst themselves, but also between generations of training colleagues.

DOCTOR-STUDENT MUTUAL INVESTMENT COMPANY

Balint described the doctor-patient relationship as a mutual investment. The doctor is involved in "educating" patients. (7) The investment is long-term and both parties provide, borrow, and lend skills and knowledge. The strength of the investment allows trust and confidence to build and risks to be taken. (29) Just as both parties provide, so too do they benefit: doctors might gain employment and patient improvement whilst the patient might gain care.

The idea of a mutual investment, where two parties build a trusting relationship and can learn from one another, with mutual gain, feels apposite to such doctor-student groups. Facilitating student groups, not only was I able to impart support and aid discussions, but I learnt from the students. I was reminded of a more empathic stance I had not achieved through co-participation with peers.

As a participant in trainee Balint groups, I have frequently completed the task set before me, attending groups out of duty. As facilitator for students, I felt humbled and privileged to be part of their group discussions: a space where I felt more freely again. I could observe professional-patient relationships with a fresh eye, reminding me of what it was like during those first encounters with patients (and how much I had somehow changed even in my relatively short years of being a doctor). I feel it brought me back to a more human stance, which left me rejuvenated. I was able to carry this forward into my relationships with my own patients, hopefully aiding in improving their care.

Junior doctors hold a pivotal position in the development from student to consultant. Without facilitating student Balint groups, I wonder if I would have recognised my transition towards acting like the consultant in the student case described. A shift in culture may well be required to support students and trainees in cultivating professional identities whilst maintaining expression of innate emotional responses. I advocate for more medical student Balint groups, where junior doctors nurture that relationship, lead by example and professionals learn from each other, creating containing spaces for our own mutual investment to flourish.

REFERENCES

1. Salinsky J. A very short introduction to Balint groups. UK: The Balint Society; 2009. [accessed 29 Apr 2020]. Available from: https://balint.co.uk/about/introduction/.

2. Salinsky J. Balint under the microscope: What really happens in Balint groups? Int J Psychiatry Med. 2018;53(1-2):7-14

https://doi.org/10.1177/0091217417745287

PMid:29226753

3. Monk A, Hind D Daniel and Crimlisk H. Balint groups in undergraduate medical education: a systematic review. Psychoanalytic Psychotherapy. 2017;3(2):1-26. https://doi.org/10.1080/02668734.2017.1405361

4. Torppa MA, Makkonen E, Mårtenson C, Pitkälä KH. A qualitative analysis of student Balint groups in medical education: contexts and triggers of case presentations and discussion themes. Patient Educ Couns. 2008;72(1):5-11.

https://doi.org/10.1016/j.pec.2008.01.012

PMid:18295432

5. Smith M, Anandarajah G and MS. Mutiny on the balint: Balancing resident developmental needs with the balint process. Family Medicine. 2007;39(7):495–497.

6. Forssell J. Has anyone met a patient? Balint groups with young doctors in their foundation years at a county hospital in Sweden. Psychoanalytic Psychotherapy. 2007;21(2):181–191.

https://doi.org/10.1080/02668730701359896

7. Balint M. The Doctor, His Patient and the Illness. 2nd ed. (millennium reprint). London: Churchill Livingstone; 1957.

8. Hall MA, Camacho F, Dugan E, and Balkrishnan R. Trust in the Medical Profession: Conceptual and Measurement Issues. Health Serv Res. 2002;37(5):1419–1439.

https://doi.org/10.1111/1475-6773.01070

PMid:12479504 PMCid:PMC1464022

9. Gill V, Bridges S and Nicholls CM. The standards expected of doctors: Patient & public attitudes. National centre for social research for The General Medical Council. London: GMC (UK); 2012.

10. Kaba R and Sooriakumaran P. The evolution of the doctor-patient relationship. Int J Surg. 2007;5(1):57-65.

https://doi.org/10.1016/j.ijsu.2006.01.005

PMid:17386916

11. Patel P, Martimianakis MA, Zilbert NR, Mui C, Hammond Mobilio M, Kitto S and Moulton CA. Fake It 'Til You Make It: Pressures to Measure Up in Surgical Training. Acad

Med. 2018;93(5):769-774.

https://doi.org/10.1097/ACM.0000000000002113

PMid:29280754

12. Cassell J. Dismembering the Image of God: Surgeons, Heroes and Miracles. Anthropology Today. 1986;2(2):13-15.

https://doi.org/10.2307/3033031

13. Jiwa M. Doctors and the media. Australas Med J. 2012;5(11):603–608.

https://doi.org/10.21767/AMJ.2012.1562

PMid:23289051 PMCid:PMC3518778

14. Hojat M et al. The devil is in the third year: a longitudinal study of erosion of empathy in medical school. Acad Med. 2009;84(9):1182-91.

https://doi.org/10.1097/ACM.0b013e3181b17e55

PMid:19707055

15. Haslam N. Humanizing medical practice: the role of empathy. Med J Aust. 2007;187(7):381-2.

https://doi.org/10.5694/j.1326-5377.2007.tb01305.x

PMid:17907998

16. Henry S. When do medical students lose their empathy? Nashua, New Hampshire: KevinMD, LLC; 2013 [accessed 29 Apr 2020]. Available from: https://www.kevinmd.com/blog/2013/10/medical-students-lose-empathy.html.

17. Mahoney S, Sladek RM and Neild T. A longitudinal study of empathy in pre-clinical and clinical medical students and clinical supervisors. BMC Med Educ. 2016;16:270.

https://doi.org/10.1186/s12909-016-0777-z

PMid:27756379 PMCid:PMC5070083

18. Stein, HF. Physician Balint groups as an organizational laboratory of psychohistory: An exploration in historical repetition and transcendence. The Journal of Psychohistory. 2003;30(3):226–253.

19. Kjeldman D and Holmström I. Balint groups as a means to increase job satisfaction and prevent burnout among general practitioners. Ann Fam Med. 2008;2:138-144.

https://doi.org/10.1370/afm.813

PMid:18332406 PMCid:PMC2267420

20. Bar-Sela G, Lulav-Grinwald D and Mitnik I. Balint Group Meetings for oncology residents as a tool to improve therapeutic communication skills and reduce burnout level. Journal of Cancer Education. 2012;27(4),786–789.

https://doi.org/10.1007/s13187-012-0407-3

PMid:22923383

21. Cataldo KP, Peeden K, Geesey ME and Dickerson L. Association between Balint training and physician empathy and work satisfaction. Family Medicine. 2005;37(5):328–331.

22. McKensey A and Sullivan L. Balint groups - Helping trainee psychiatrists make even better use of themselves. Australasian Psychiatry. 2016;24(1):84–87.

https://doi.org/10.1177/1039856215598870

PMid:26253524

23. Malterud K and Hollnagel H. The Doctor Who Cried: A Qualitative Study About the Doctor's Vulnerability. Ann Fam Med. 2005;3(4):348–352.

https://doi.org/10.1370/afm.314

PMid:16046568 PMCid:PMC1466903

24. Freedy JR. Professional identity development and the psychotherapeutic function of residency Balint group. J Balint Soc. 2006;34:16–20.

25. Player M et al. The role of Balint group training in the professional and personal development of family medicine residents. International Journal of Psychiatry in Medicine. 2018;53(1–2):24–38.

https://doi.org/10.1177/0091217417745289

PMid:29235909

26. Salinsky J. Editorial: The Doctor, his Patient and the Illness – revisited. Balint Society Journal. 2005;33.

27. Brennan N, Corrigan O, Allard J, Archer J, Barnes R, Bleakley A, Collett T and de Bere SR. The transition from medical student to junior doctor: today's experiences of Tomorrow's Doctors. Med Educ. 2010;44(5):449-58.

https://doi.org/10.1111/j.1365-2923.2009.03604.x

PMid:20518984

28. Omer S and McCarthy G. Reflective practice in psychiatric training: Balint groups. Irish Journal of Psychological Medicine. 2010;27(3):115–116.

https://doi.org/10.1017/S0790966700001269

PMid:30282198

29. Crossman S. Investing in each other-Balint groups and the patient-doctor relationship. Virtual Mentor. 2012;14(7):551-4.

https://doi.org/10.1001/virtualmentor.2012.14.7.medu1-1207

PMid:23351290

The British Student Doctor, 2020;4(2):54-59
doi: 10.18573/bsdj.170
Discussion article

COVID-19 impact on medical education and the future post-pandemic era for medical students

DISCUSSION

AUTHOR

Samantha Barratt Ross
Australian National University

Maarisha Kumar
Griffith University

Anne Dillon
The University of New South Wales

Danial Bahudin
Bond University

Magnolia Cardonas
Gold Coast University Hospital

Address for Correspondence:
Associate Professor Magnolia Cardona
EBP Professorial Unit, Gold Coast University Hospital, Southport QLD , 4215, Australia

Email: mcardona@bond.edu.au

No conflicts of interest to declare.

Accepted for publication: 09.07.20

ABSTRACT

The COVID-19 global emergency has brought about unexpected changes in the format and quality of undergraduate medical education in a short period of time. The impact of remote delivery on medical students learning, satisfaction, confidence, social relationships, communications and emotional wellbeing has been significant. The lack of direct patient and teacher contact is generating anxiety about their future competence. The ambivalence about the urge to help without sufficient clinical skills and the fear of being either infected or becoming an asymptomatic carrier that puts patient safety at risk is of concern to them.

We offer suggestions for enhancing pandemic or global emergency preparedness for the future. Strategies to manage the way in which remote learning is delivered need to be implemented as a matter of urgency if social distancing and quarantine regulations keep medical students away from hands-on clinical practice for long periods. Actions to maintain motivation and trust in the medical schools to meet their learning needs now and in the future are warranted.

Keywords: pandemics, medical students, COVID-19, medical education, remote delivery

INTRODUCTION

The world as we know it has forever changed with the devastating physical, psychosocial and economic impact of Coronavirus 2019 (COVID-19). Medical students and trainee doctors are experiencing a clinical and educational challenge of massive proportions their predecessors have not seen. Many tutorials, grand rounds and health service activities have either scaled down or ceased to allow personnel and scarce resources to be redirected to respond to the epidemic. The impact for patients within the hospital system are widespread with conditions going untreated, elective surgeries delayed, treatments for chronic disease interrupted, and inadequate ambulatory management of conditions due to hospital avoidance, mental illness exacerbation, deterioration of quality of life, and ultimately an excess all-cause mortality. (1) The forced transition to remote learning for an undetermined length of time has brought about anxiety, depression, and fear of future incompetence for medical students. This body of work summarises and builds on the views of a selection of Australian medical students from four different universities in three States (SR, MK, AD, and DB) who have been directly impacted by the COVID-19 pandemic.

HOW HAS SOCIAL DISTANCING IMPACTED ON TRAINING QUALITY?

The COVID-19 pandemic has changed the future landscape of medical education, revealing the need to address challenges that ensure a safe and effective learning environment for students. They report that the shift towards remote online delivery for graduate doctors such as residents has undergone rapid adaptation thanks to expert input and collaborative efforts to integrate re-structuring of existing resources innovatively. (2) By contrast, for undergraduate cohorts of students the quality of education has suffered in the few weeks since the social distancing measures were implemented.

For students in their early years, the sporadic opportunities to examine patients, practice in laboratories, attend the morgue, analyse blood samples, and develop communication skills are being replaced with non-interactive videos, passive power point files, and pre-recorded lectures with no opportunity for live questions and answers. While the importance of independent learning is understood, students find it difficult to stay motivated and have a sense of abandonment and exclusion from hands-on practice. In this very early stage of the transition period medical school, academics have been working endlessly to bridge the gap and produce some valuable new resources.

For medical students in intermediate years, life has changed more dramatically. In recent months they faced a robust number of ward inpatients across specialties and crowded outpatient clinics. Now, they are either forced to stay at home for their own protection, or to wait in very quiet rooms as many appointments have migrated to telehealth services; even for patients with multiple comorbidities, many have cancelled for fear of contracting the virus. Telehealth is becoming ever more important in the delivery of care in an emergency setting (3) as it does not pose additional risks for the patient, healthcare workers or students. However, the uptake of telehealth introduces new challenges for medical education as it restricts the development of skills formed through personal contact, including proficiency in patient communication and physical examination.

For students in their final years, clinical placements comprise the majority of teaching. Therefore, withholding access to the healthcare system may result in a shortage of competent medical graduates for internships in 2021 and 2022. It is for this reason that some universities are bringing final and pre-final year medical students back into the clinical environment. While this is mostly seen as a positive initiative, students hope that the time off clinical placements allowed medical schools to develop a safer system for both patients and students. Some students were relieved when placements were suspended, with all teaching being delivered through online platforms, as they feared being asymptomatic carriers that could unintentionally infect vulnerable patients. This was primarily as wider population screening was not in place to detect mild or asymptomatic cases and students perceived social distancing was not implemented early enough. With the implementation of a more extensive testing regime for healthcare workers, which includes medical students, early identification might improve.

AMBIVALENCE ABOUT PERSONAL SAFETY AND MISSING OUT ON DEVELOPING SKILLS

A terrifying reflection for medical students is the increasing number of cases among healthcare workers due to the lack of adequate personal protection. This can be seen in Italy, where healthcare workers comprise of 9% of total cases. (4) Being a medical student in the current climate resembles a limbo where they feel they have some skills to contribute but lack the length of clinical experience that is required for safe medical practice in an overwhelmed healthcare system. Medical students, on the one hand, are eager to gain as much clinical exposure and contribute to alleviate workforce shortages; on the other, they fear for their safety in a high-risk area with inadequate protective equipment and for their patients' safety if they become asymptomatic vectors. Feeling the need to protect themselves in a widespread pandemic puts a break on medical students when deciding to play a role in the front lines.for a period of two years during which the IAAF was expected to provide written evidence to support them, leaving Chand free to resume competing. "I am who I am" she stated at the time. (6,7)

HOW SOON SHOULD MEDICAL STUDENTS RETURN TO FACE-TO-FACE TRAINING?

In areas where the pandemic has not overwhelmed the health system it might be safe for students in final and pre-final clinical years to be encouraged to complete face-to-face training required for intern-level work, while there are still doctors to supervise and guide them. However, while final year students are closer to gradu-

ating and equipped with the skills required to actively participate in the hospital, pre-final year medical students are hesitant to return to clinical placements as they also do not want to be an added burden for healthcare professionals.

Although, as there is no timeframe for an end to the pandemic, the decision as to when pre-final year medical students should go back is a difficult one. Much of the available data is derived from modelling studies, hence there is still variation and uncertainty in the validity of estimates of transmissibility, duration of pre-symptomatic periods and effectiveness of social distancing strategies. (5)

In line with the position of medical schools, students agree they should not be at the forefront dealing with COVID-19 cases. On the flip side, however, up-skilling them now in the management of non-COVID19 patients may enable them to make a positive contribution to the healthcare system if hospitals get overloaded and to put less pressure on the post-COVID19 healthcare system. Therefore, as the curve starts to flatten it may be a good time to return and upskill pre-final year medical students. If cases rise then placements may again have to go on hold.

PREPAREDNESS FOR OVERWHELMED HEALTH SYSTEMS

Medical students' views on the health system's preparedness to meet demand started to change since witnessing progressive collapse of healthcare systems in other developed countries in Europe, Asia and America. The expectation that hospitals would be fully equipped to handle any medical emergencies that might arise, has been shattered by the scale of the disaster and the uncertainty of this occurring again in the future once they enter the medical workforce. Students are already detecting early signs of resource shortages of basic items such as personal protective equipment (PPE) and hand sanitiser, signalling an already stretched healthcare system even before the pandemic peak is reached. Worse, they have witnessed patients taking PPE to stockpile at home. Students are also concerned about the exacerbation of existing problems, that relate to budget and staff shortages, such as the lengthening of waitlists for elective surgeries, procedures such as screening colonoscopy following a positive FOBT result, or suspension of chemotherapy sessions for patients who may be at greater risk of infection by presenting at hospital.

POSSIBLE NEED FOR RATIONING OF CRITICAL HEALTHCARE IN CATASTROPHIC EMERGENCIES

As grim as it looks, this hyperawareness of mortality risk at any age —not just the elderly and immunosuppressed— and the reality of a sudden and unanticipated shortage of ICU beds and essential consumables in developed nations presents an opportunity to rethink the way in which we operate in health services. Many groups of scientists, health professionals, government officials, and health economists have gathered to model disease trajectories and economic predictions to come to a good compromise strategy (6) that prevents cases, saves more lives and diminishes an inevitable economic recession. Unfortunately not all are working at the same pace, (7) and some stretched health systems will not have the capacity to offer the same level of resources to guarantee equitable human survival, so hard decisions will have to be made. (8)

The logical approach as perceived by medical students, in the event of an extreme shortage of resources, is to prioritise patients with the highest chances of immediate and long-term survival (if feasible to identify them). In terms of pandemic triage, students support a variety of views. Some have inclination for those with lower level of co-morbidities, individuals with anticipated better quality of life post-disease, and those who would have greater potential to benefit society, such as medical staff, (9) who if allowed to recover would then be able to help others in turn. Others support giving preferential treatment to those who are significantly ill or vulnerable, (6) and others believe that younger patients and those with fewer risks of complication should be given priority. (10)

Students find it morally distressing to think that one day it may be their responsibility to decide who gets access to critical healthcare and who will likely die without it, as a result of some public health emergency-related hospital policy that overrides their clinical judgment. After all, they all went into medicine to help people and save lives, not to use artificial intelligence-derived prognostic algorithms or play God and let people die.

They are aware that vulnerable groups including indigenous people may be at risk of missing out on access if, as in previous pandemics, the rules are based on utility and efficiency (11) rather than on severity levels. Indigenous people are also disadvantaged by the following: the scarcity of culturally sensitive healthcare services, remote location, language barriers, reluctance to utilise available medical resources and services, high prevalence of asthma and chronic obstructive pulmonary disease, (12) and the range of unaddressed social determinants of poor health. (13) This would render them less likely to benefit from critical care or less likely to recover. Effective healthcare that reflects the values and priorities of socially disadvantaged groups requires a focus on community autonomy, cultural sensitivity, local communication and social support, much of which may not be feasible to incorporate in a pandemic situation.

EMOTIONAL IMPACT OF UNCERTAINTY OF PANDEMIC DURATION

The fact that vaccine development takes over a year, and that re-infection is a possibility, as limited evidence suggests not all people will mount a long-lasting immunological response, creates significant anxiety. There is the added concern that no known cure but only symptomatic and supportive treatments exist, and many tested and untested therapies are being tried, from anti-malarial drugs to Chinese medicines and vitamin supplements. This weighs on the minds of students with respect to uncertainty about the length of the pandemic and associated social distancing and exposure to risk when clinical practice returns.

Early year students feel that being isolated from campus and hospital environments for extended periods of time is also detrimental to the mental health of the entire cohort, given that part of what makes university enjoyable is the immersive social experience. Attending classes in person and seeing peers are strong motivators for regular study, and having a regular routine makes life feel more stable and controllable. As first year students, losing face-to-face contact with their new friends after a few weeks of classes is gloomy even though virtual contact is still feasible. The dynamics of study in groups is also transforming for an indefinite length of time and for those who thrive on collaborative efforts, being home alone makes the university term feel optional, unmotivating and stressful.

Social media partly helps to reduce levels of anxiety and depression associated with both getting ill and academic anxieties. But it is clear that providing and receiving emotional support over text, especially when busy self-learning schedules delay opportunities to send or receive a reply, are triggering a sense of abandonment. If the pandemic prolongs, there is growing uncertainty for the future of medical education, in particular for ensuring both a safe learning environment and adequate progression. (14)

For all, the restricted access to facilities, academic staff and peers will lead to decreased confidence in their clinical skills and deteriorating mental health, which have both been associated with an increase in clinical error rates in graduates. (15)

HOPES AND STRATEGIES FOR THE FUTURE NORMAL

In the midst of this human catastrophe many positive activities are emerging that give medical students hope for a future where they can be equipped to deal with global threats: (16)

- Ongoing dissemination of research as it happens (pre-prints)
- Ethics committees and Journals prioritizing COVID-19 research from epidemiology to trials and vaccine development
- Living systematic reviews of evidence
- Living guidelines for pandemic preparedness and control from clinical experts
- Positive attitude encouraged on television and social media

In the immediate future, misconceptions about the sources of infection, mode of transmission and potential cures for COVID-19 disseminated through social media will need to be debunked through public education. Medical students can add to the expert advice by updating themselves with news concerning the virus, understanding its pathophysiology and participating in this social duty of widely promoting the facts. These simple measures are important contributions. For the longer-term plan, several options exist for positive change in preparation for a future global emergency situation and for improvements in training approaches after the current pandemic subsides (Table 1).

A) Strategies to prepare medical students for a future global emergency
In preparation for *the new normal* the medical curriculum could be revised to devote more sessions to enhance practical skills in:

- Rapid assessments of public health threats
- Rapid emergency response beyond the one-on-one health care
- Health service transformation to creatively increase capacity
- Interdisciplinary team work
- Research design and evaluation of impact of interventions
- Communication of bad news and impending end-of-life
- Shared decision-making
- Telehealth and web-based practice as alternatives that can be used as demand increases
- Grief support for survivor relatives

B) Strategies for the current change in training approaches
To tackle the current aspects of lower training quality, students want:

- Formal peer support to protect mental health of health professionals
- Opportunity for curriculum co-design for more satisfactory alternative delivery methods
  Such as a pandemic training package that can be launched at early stages in a future public health emergency to prevent student isolation and disadvantage
- Provision of protective equipment to return to clinical training in a safe environment
- Refine skills to help manage non-COVID-19 patients during the recovery period
- Implementation of intensive practical skill sessions when normal classes resume

Table 1
Strategies for emergency preparedness and post-pandemic training

CONCLUSION

For medical students, the experience of the COVID-19 pandemic to date has been both eye-opening and overwhelming. It is true their education has been temporality compromised, however it is hoped the lessons learned during the pandemic will have positive impacts for their future professional careers. Resources for remote delivery are anticipated to be refined to meet student need. While it remains uncertain when and how this pandemic will end, with some medical students currently in voluntary or enforced confinement, they are still able to take a positive attitude and think of ways in which they can contribute to refine the medical curriculum to better equip us for a future health or environmental catastrophe. They can use their skills in web design, programming, accountancy, dietetics, counselling or art to co-design a future healthcare system that can assist the response to the unintended and unpredictable consequences of new pandemics, evolution and environmental degradation. They can adopt a positive attitude to be prepared rather than despair.

REFERENCES

1. EuroMOMO Collaborative Network. 2020 [accessed 9 July 2020]. Available from: https://www.euromomo.eu/

2. Zuo L, Dillman D, Miller AJ. Learning At-Home During COVID-19: A Multi-institutional Virtual Learning Collaboration. Medical Education. 2020; 54:7

https://doi.org/10.1111/medu.14194

PMCID: PMC7267181 PMID: 32330317

3. Smith AC, Thomas E, Snoswell CL, Haydon H, Mehrotra A, Clemensen J, et al. Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). Journal of Telemedicine and Telecare. 2020; 26(5): 309-313 [accessed 9 July 2020]. Available from: https://journals.sagepub.com/

https://doi.org/10.1177/1357633X20916567

PMID: 32196391 PMCID: PMC7140977

4. Anelli F, Leoni G, Monaco R, Nume C, Rossi RC, Marinoni G, et al. Italian doctors call for protecting healthcare workers and boosting community surveillance during covid-19 outbreak. BMJ. 2020;368 [accessed 9 July 2020]. Available from: https://www.bmj.com/content/368/bmj.m1254

5. Park M, Cook AR, Lim JT, Sun Y, Dickens BL. A Systematic Review of COVID-19 Epidemiology Based on Current Evidence. J Clin Med. 2020;9(4):967.

https://doi.org/10.3390/jcm9040967

PMID: 32244365 PMCID: PMC7231098

6. Poole DN, Escudero DJ, Gostin LO, Leblang D, Talbot EA. Responding to the COVID-19 pandemic in complex humanitarian crises. International Journal for Equity in Health. 2020;19(1):41.

7. COVID-19: learning from experience [Editorial]. The Lancet. 2020;395.

https://doi.org/10.1016/S0140-6736(20)30686-3

8. Curtis JR, Kross EK, Stapleton RD. The Importance of Addressing Advance Care Planning and Decisions About Do-Not-Resuscitate Orders During Novel Coronavirus 2019 (COVID-19). JAMA. 2020; 323(18):1771-1772.

https://doi.org/10.1001/jama.2020.4894

PMID: 32219360

9. Rothstein MA. Currents in contemporary ethics. Should health care providers get treatment priority in an influenza pandemic? J Law Med Ethics. 2010;38(2):412-9.

https://doi.org/10.1111/j.1748-720X.2010.00499.x

PMID: 20579237 PMCID: PMC3033763

10. Pinho M, Pinto Borges A, Cookson R. Do Healthcare Professionals have Different Views about Healthcare Rationing than College Students? A Mixed Methods Study in Portugal. Public Health Ethics. 2017;11(1):90-102.

https://doi.org/10.1093/phe/phx005

11. Silva DS, Nie JX, Rossiter K, Sahni S, Upshur RE. Contextualizing ethics: ventilators, H1N1 and marginalized populations. Healthcare quarterly. 2010;13(1):32-6.

https://doi.org/10.12927/hcq.2013.21613

PMID: 20104034

12. Australian Institute of Health and Welfare. Australia's Health 2018 [accessed 9 July 2020]. Available from: https://www.aihw.gov.au/getmedia/7c42913d-295f-4bc9-9c24-4e44eff4a04a/aihw-aus-221.pdf

13. Reading CL, Wien F. Health Inequalities and Social Determinants of Aboriginal People's Health. 2019 [accessed 9 July 2020]. Available from: https://www.ccnsa-nccah.ca/docs/determinants/RPT-HealthInequalities-Reading-Wien-EN.pdf

14. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. Lancet Infectious Disease. 2020;7(7):777-778 [accessed 9 July 2020]. Available from: https://www.thelancet.com/pdfs/journals/laninf/PIIS1473-3099(20)30226-7.pdf

https://doi.org/10.1016/S1473-3099(20)30226-7

PMID: 32213335 PMCID: PMC7270510

15. Crutcher RA, Szafran O, Woloschuk W, Chatur F, Hansen C. Family medicine graduates' perceptions of intimidation, harassment, and discrimination during residency training. BMC Med Educ. 2011;11:88 [accessed 9 July 2020]. Available from: https://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-11-88

https://doi.org/10.1186/1472-6920-11-88

16. Chater N. Facing up to the uncertainties of COVID-19 Nature Human Behavior 2020; 4(439) [accessed 9 July 2020]. Available from: https://www.nature.com/articles/s41562-020-0865-2

The British Student Doctor, 2020;4(2):60-63
doi: 10.18573/bsdj.137
Education

Lymphoedema- a chronic disease, not a side effect

EDUCATION

AUTHORS

Jessica Leighton
Newcastle University

Lesley Holmes
St. Benedict's Hospice

Ann Thompson
St. Benedict's Hospice

Mark Lee
St. Benedict's Hospice

Address for Correspondence:

Jessica Leighton
Newcastle University, Newcastle-upon-Tyne, NE1 7RU

Email: jessleighton@live.co.uk

ORCID ID: 0000-0002-6027-8026

No conflicts of interest to declare

Accepted for publication: 03.06.20

ABSTRACT

Summary: Lymphoedema (soft tissue swelling resulting from obstruction of the lymphatic drainage system) is a chronic illness that has immense physical and psychological impact on a patient's life.

Relevance: Management of this illness, while conservative, can be life changing when approached by a co-ordinated multidisciplinary team. (1,2) In the UK, specialist lymphoedema services are often run from hospices.

Take-home messages: Although some patients with lymphoedema will require minimal support, it is vital that patients and healthcare professionals are vigilant for rare but serious complications.

AETIOLOGY

Primary lymphoedema is usually occurs as a result of congenital physiological abnormalities, one example being Milroy's disease. Secondary lymphoedema may be iatrogenic (following surgical removal of lymph nodes as part of cancer treatment, most common in developed countries) or post infectious (a key cause in developing countries, particularly filariasis in South East Asia). (3,4) Previously known as elephantitis, filariasis is a parasitic infection of the lymphatic vessels by nematodes (roundworms) belonging to the Filariodidea family. (5) Even though this illness poses a huge global challenge, there are very few lymphoedema specialists outside of Europe. (6)

DIAGNOSIS

Lymphoedema is usually diagnosed clinically. Patients complain of uncomfortable swelling and skin atrophy in an extremity (including the scrotum, head, and neck) following infection or surgery. (3) Common pitfalls in diagnosis lie in the differential diagnoses such as cellulitis and peripheral vascular disease. In cases of uncertainty, it is important to note that specialist diagnostic tests are available, including tissue tonometry (non-invasive) and lymphoscintigraphy or MR lymphangiography (invasive). (3)

MANAGEMENT

Most lymphoedema is treated conservatively, guided by symptom burden, and led by a lymphoedema specialist nurse. Specialist lymphoedema services, (1) along with psychology and physiotherapy input have proven to have better patient outcomes. (7) In one intensive specialist intervention programme over half of their participants achieved a 50% reduction in lymphoedema. (2) Patient education plays a vital role. Patients benefit from lymphoedema specialists ensuring they understand the condition, including important and serious risks. (8)

Non-surgically, the aim of therapy is to reduce the volume of lymph fluid in the tissue, thereby reducing pain, weight, and the likelihood of local infection. (4) This can be achieved by a decongestive lymphatic therapy (DLT) which is a combination of manual lymph drainage and compression bandaging. DLT in combination with adjuvant skin care and light exercise can take months of intensive treatment to take effect. Newer techniques such as laser and pneumatic decompression are also available. (4)

Pharmacologically, diuretics are not recommended outside of comorbid renal/cardiac failure. (9) In general antibiotics should only be used during episodes of cellulitis or for long term prophylaxis in recurrent cellulitis e.g. more than twice in 12 months. (10) In the context of post-infective lymphoedema, the World Health Organisation recommends annual preventative chemotherapy in endemic areas to end the cycle of nematode infection. (5) Liposuction, tissue excision and lymphatic bypass are all potential surgical options. (11) However, at present NICE has only deemed liposuction as adequately safe and effective. (12)

COMPLICATIONS

In the chronic care of patients with lymphoedema, reducing risk of complications is a huge component. The theoretical risk of infection should be avoided. Experts advise diligent skincare and avoiding invasive procedures (venepuncture, cannulation) on a lymphoedematous limb where possible (10, 13, 14). Sudden worsening of lymphoedema should be actively investigated. While a concomitant oedema (for example, cardiogenic) may be a cause, venous thromboembolism, cellulitis, or recurrent carcinoma could also be responsible (3, 14). A rare and fatal condition which can occur in chronic lymphoedema is lymphangiosarcoma, a soft tissue neoplasia, known as Stewart Treves syndrome, which requires specialist input from dermatology and Lymphoedema services. (15) Stewart Treves syndrome has a poor prognosis and should be considered in patients with long term lymphoedema who present with skin changes such as nodules or non-healing ulcers. (15)

WHAT YOU NEED TO KNOW

1. Tissue swelling could be lymphoedema in any patient. Consider congenital and infective causes if there is no history of node removal, as globally, lymphoedema is not always a cancer-related diagnosis.

2. Involvement of specialist lymphoedema services has significantly better outcomes and should be an early priority in suspected cases.

3. Patients with lymphoedema are at high risk of local infection. Bear this in mind when carrying out any invasive procedure, right down to venepuncture.

4. In a patient with pre-existing lymphoedema, sudden worsening should be investigated fully: consider venous thromboembolism, cellulitis, recurrent carcinoma, or oedema of another cause. A rare but fatal complication is lymphangiosarcoma.

REFERENCES

1. Foeldi E, Dimakakos EP. Interdisciplinary Lymphology: The Best Place for Each Discipline in a Team. International Journal of Lower Extremity Wounds. 2012;11(1):28–30.

https://doi.org/10.1177/1534734612438057

PMid:22336902

2. Papadopoulou MC, Tsiouri I, Salta-Stankova R, Drakou A, Rousas N, Roussaki-Schulze AV, et al. Multidisciplinary Lymphedema Treatment Program. International Journal of Lower Extremity Wounds. 2012;11(1):20–7.

https://doi.org/10.1177/1534734612438436

PMid:22336900

3. Szuba A, Rockson SG. Lymphedema: classification, diagnosis and therapy. Vascular Medicine. 1998 May 1;3(2):145–56.

https://doi.org/10.1191/135886398674160447

PMid:9796078

4. Kayıran O, De La Cruz C, Tane K, Soran A. Lymphedema: From diagnosis to treatment. Turkish Journal of Surgery. 2017 Jun 1;33(2):51–7.

https://doi.org/10.1191/135886398674160447

PMid:9796078

5. Lymphatic filariasis [Internet]. [cited 2020 Mar 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/lymphatic-filariasis

6. Schulze H, Nacke M, Gutenbrunner C, Hadamitzky C. Worldwide assessment of healthcare personnel dealing with lymphoedema. Health Econ Rev [Internet]. 2018 Apr 16 [cited 2019 Jul 5];8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5901432/

https://doi.org/10.1186/s13561-018-0194-6

PMid:29663122 PMCid:PMC5901432

7. Margaret C Sneddon. Lymphoedema: service provision and needs in Scotland [Internet]. Macmillan Cancer Support; 2008 [cited 2019 Jul 5]. Available from: http://eprints.gla.ac.uk/50066/1/50066.pdf

8. Fu MR, Axelrod D, Haber J. Breast cancer related lymphedema: Information, symptoms, and risk reduction behaviors. Journal of Nursing Scholarship. 2008; 40(4):341-8.

https://doi.org/10.1111/j.1547-5069.2008.00248.x

PMid:19094149

9. Ogawa Y. Recent Advances in Medical Treatment for Lymphedema. Annals of Vascular Diseases. 2012;5(2):139–44.

https://doi.org/10.3400/avd.ra.12.00006

PMid:23555501 PMCid:PMC3595870

10. British Lymphology Society and the Lymphoedema, Support Network. Consensus Document on the Management of Cellulitis in Lymphoedema. 2016 [accessed 5 Jul 2019]. Available from: https://www.lymphoedema.org/wp-content/uploads/2020/01/cellulitis_consensus.pdf

11. Schaverien MV, Coroneos CJ. Surgical Treatment of Lymphedema. Plastic and Reconstructive Surger. 2019 Sep 1;144(3):738–58.

https://doi.org/10.1097/PRS.0000000000005993

PMid:31461041

12. National Institute for Health and Care Excellence. Interventional procedure overview of liposuction for chronic lymphoedema [Internet]. 2017 May [cited 2020 Mar 2] p. 47. Available from: https://www.nice.org.uk/guidance/ipg588/evidence/overview-final-pdf-4548738349

13. Cole T. To Needle or Not to Needle… That Is the Question! [Internet] 2005 [cited 2020 Jun 14]. Available from: https://www.lymphoedema.org/information/useful-articles/to-needle-or-not-to-needle-that-is-the-question/

14. Cohen SR, Payne DK, Tunkel RS. Lymphedema: strategies for management. Cancer: Interdisciplinary International Journal of the American Cancer Society. 2001 Aug 15;92(S4):980-7.

https://doi.org/10.1002/1097-0142(20010815)92:4+<980::AID-CNCR1410>3.0.CO;2-E

15. Sharma A, Schwartz RA. Stewart-Treves syndrome: Pathogenesis and management. Journal of the American Academy of Dermatology. 2012;67(6):1342–8.

https://doi.org/10.1016/j.jaad.2012.04.028

PMid:22682884

The British Student Doctor, 2020;4(2):64-65
doi: 10.18573/bsdj.193
Reflections

"We're in this together"

REFLECTIONS

AUTHOR

Natalie Farmer
Sheffield Teaching Hospitals NHS Foundation Trust

Address for Correspondence
Natalie Farmer
Sheffield Teaching Hospitals NHS Foundation Trust
Royal Hallamshire Hospital
Glossop Road
Broomhall
Sheffield, S10 2JF

Email: natalieonezero@aol.com

No conflicts of interest to declare

Accepted for publication: 16.04.20

Doctors at the start of their careers are now facing the biggest medical crisis of the century. Natalie Farmer, a Foundation Year One Doctor and Research Editor at The BSDJ, shares how her team is finding hope in difficult times.

It's funny how so much can change in such a short space of time.

This time last year, I lived in a completely different city. Woke up, went to placement at the hospital, got home, revised, repeated. I was mentally exhausted, permanently grumpy, and desperately missed my loved ones who lived more than 120 miles away.

Now, I would give anything to go back to those bleak times. At least jumping on a train was an option, no matter how inconvenient it seemed at the time.

I started working as a junior doctor in August last year. It's tough at the best of times, but at the moment feels impossible. A global pandemic was never something that I envisioned happening at any point during my medical career – especially not in my FY1 year, when I'm still learning the basics. I am constantly being exposed to high risk patients, all of which tend to be very unwell, given that I work in geriatric medicine. As a junior, I can't help but feel hopeless, like anything that I do will make absolutely no difference to the outcome.

Of course, 'curing' a patient is not always possible or the right thing to do. One thing that I have learned from treating the elderly population is that sometimes, making someone comfortable is the kindest act of all. Holding someone's hand could be preferable to antibiotics. A nasal cannula is less fear-inducing than a non-rebreathe mask.

COVID-19 has forced all of this to the forefront of the frontline. DNACPR forms are rife, with a patient's swab status being the first question asked at handover. There's an expectation that the NHS will not be able to withstand the immense pressures being piled on its shoulders. It all sounds very grim.

But actually – it's not.

The claps I hear every Thursday tell me that it's not, as do the unbelievably supportive messages from my friends and family. The number of kind gestures from both large and small businesses tells me that there's still hope. The way that the country is pulling together to support the NHS says more than any statistic ever could.

There's no doubt that work for healthcare professionals has changed over these past weeks, but not necessarily for the worst. There's a sense of camaraderie like never before and I feel like part of a big, dysfunctional family.

To all the final year medical students coming to join us: welcome. As scary as it seems, everyone within the NHS is so grateful for you and you will all fit in within no time. Before you start, brush up on your history-taking and ABCDE assessments. But also remember that we're all here to help if ever you need it. You are not alone.

We're coping. We can do this. We're in it together.

This was first published on 16 April 2020 as part of the 'Coronavirus: Stories from the Frontline' blog, an online series run by The British Student Doctor Journal. Throughout the pandemic we shared the stories of healthcare workers and students tackling the COVID-19 pandemic. You can find the full series on our website: www.bsdj.org.uk/covid19

The British Student Doctor, 2020;4(2):66-68
doi: 10.18573/bsdj.115
Reflections

Lessons learnt from my medical elective in a developed country

REFLECTIONS

AUTHOR

Wafaa Binti Mowlabaccus
Department of Medicine
University of Mauritius

Address for Correspondence

Department of Medicine
University of Mauritius,
Reduit 80837
Mauritius

Email: wafaamed23@gmail.com

ORCID: 0000-0003-3984-4203

No conflicts of interest to declare.

Accepted for publication: 03.06.20

Medical electives are placements organised by students within the medical curriculum. I am a medical student from Mauritius, a developing island nation, where we have only one teaching hospital. Thus, carrying out a medical elective in a highly prestigious NHS hospital in London was an eye-opening experience for me. While I had many apprehensions on whether I would be able to adjust to and learn from a new health care system, I was very excited to learn from this new adventure. I scribbled a list of objectives before embarking on this journey and, after returning, I wrote how I achieved them.

OBJECTIVE NO. 1:

EXPLORE THE DIFFERENCE BETWEEN THE NHS AND THE HEALTH SYSTEM IN MAURITIUS

Through spending six weeks with the team of geriatric medicine at St Thomas' Hospital, I was able to make progress towards achieving my first elective objective: gaining an understanding of the differences between Mauritius and British healthcare systems. This placement allowed me to appreciate the experiences of both patients and healthcare workers in the NHS, which I could compare to my previous experience of placements within the Mauritian health care system.

What did I learn?

Both countries have a combination of public and private care. In Mauritius, the government runs hospitals and outreach area health centers, which provide a basic version of the services available on the NHS. One striking difference I found between Guy's and St Thomas hospital (GSTT) and Mauritian hospitals is the paperless system at GSTT. Every patient record and all documentation can be accessed via the intranet. In Mauritius, all the hospitals still use paper and sometimes, records are lost and handwriting is difficult to understand.

Another difference is the abundant resources available, such as urgent CT scans and blood results, and use of the latest drugs available on the market. In Mauritius, CT and MRI scans are only done on selected patients and expensive medications are not available in public hospitals.

Moreover, GSTT is very well staffed with designated teams that handle several aspects of the patient's health. In Mauritius there is a scarcity of professionals in each medical department, leading to severe staffing issues.

What are the implications?

I gained a global understanding of the disparities that exist between the health care system of a developed and a developing country. It also helped me to gain a clearer idea of the healthcare model in a developed country.

OBJECTIVE NO. 2:

OBSERVE THE DAY TO DAY RUNNING OF A GERIATRICS DEPARTMENT

The general setup of the geriatrics department was divided into 2 parts; the ambulatory care for older person (AOPU) and two admissions wards.

There are two consultants on each ward. A typical day on Henry's ward (one of three geriatrics wards) would begin with nurses handing over the patients and highlighting any specific issues that happened overnight. We would then proceed with the ward round where any new patients admitted to the ward were reviewed before going to see them. We went through their clinical notes on EPR (Electronic Patient Records) and their medications on 'Med Chart'. The consultant did a quick head-to-toe examination depending on the patient's presentation and clinical status.

After the ward round, we usually had a one-hour multidisciplinary team meeting (MDM) where the doctors, the physiotherapist, the dietician, the nurse, the social worker and the discharge nurse were present. The team would discuss each patient and actions which could be taken in their best interests. In addition to the ward rounds, there are morning and afternoon outpatient clinics every day. At GSTT there are various clinics; for incontinence, falls, heart failure, mindfulness, proactive care of older people (POPS), cognitive geriatric assessment (CGA) and bone health.

What did I learn?

I observed some important aspects of how a geriatrics department works. First, there are two teams: the acute team and the ward team. This makes triage of elderly patients coming to the hospital much easier.

Second, each and every aspect of the patient's health is taken into consideration. For instance, there is a dietician who will look after the patient's daily food intake, the physiotherapist who will assess the mobility of the patient, the pharmacist who will review the medications and the doctors who will see to patients' clinical status and well-being.

It was enriching to attend clinics as I had the opportunity to see how major problems faced by the elderly are tackled by the doctors. Besides the general functioning of the geriatrics department, I came across new concepts unfamiliar to me. One of them is the 'package of care': A continuation of care for people who are assessed as having significant ongoing healthcare needs, arranged and funded by the NHS. This notion was completely new to me as such care is not yet available in Mauritius.

I also learnt about the AMBER care bundle. This stands for 'Assessment, Management, Best practice, Engagement with patient and carers and Recovery of uncertain patients', and is a framework which provides a systematic approach to the management of hospital patients who are facing an uncertain recovery and who are at risk of dying in the next one to two months.

What are the implications?

Working in a geriatrics department for six weeks changed my outlook on how elderly patients should be treated and cared for. I intend to bring the crucial things I have learnt back to my home country and apply them during my foundation years. I would also like to explore how to to implement frameworks like the AMBER care bundle.

OBJECTIVE NO. 3:

DEVELOP THEORETICAL KNOWLEDGE AND COMMUNICATION SKILLS

Being in a geriatric department provided many learning opportunities and a chance to enhance my theoretical knowledge as well as develop my communication skills. Since most elderly patients presenting to the ward or the AOPU had a number of co-morbidities associated with the presenting illness, it was a great opportunity for me to refresh my knowledge on those diseases and also learn how they are treated at GSTT.

For instance, it was quite common for a frail patient to have hypertension, diabetes, atrial fibrillation and osteoarthritis, amongst other diagnoses. I frequently used the EPR and e-noting to review and clerk patients. At GSTT I noticed that they make use of many evidence-based scores to assess patients. For example, I had only a brief knowledge on the National Early Warning Sign (NEWS) score, but at GSTT I had the chance to use it daily thus making

myself familiar with this scoring system.

While shadowing my supervisor I learnt a lot about how to communicate with patients and the importance of compassion and empathy. It was amazing to see how patients feel less anxious and become more engaged through these simple gestures.

What did I learn?

I learnt that compassion is a key component of patient care. The presence of a compassion gap will often lead to patient not engaging with the doctors, which impacts on their care.

What are the implications?

I feel more confident managing diseases that present in a variety of healthcare settings. I will carry the lessons of patient care wherever I practice in the future. Secondly, as a final year medical student and soon, a junior doctor, I hope to be as compassionate and empathetic to my patients as I can be.

CONCLUSIONS

My elective at GSTT, one of the most prestigious NHS hospitals in the UK, really has been an enriching experience for me. Six weeks in the geriatrics department changed my perspective on how elderly people should be cared for and, most importantly how compassion plays an important role in the holistic treatment of patients. I will try to implement the many things I've learnt at GSTT in my day to day work as a junior doctor. I wish to thank everyone who supported me during my medical elective.

The British Student Doctor, 2020;4(2):69-70
doi: 10.18573/bsdj.138
Correspondence

"The data will see you now": digital literacy in the medical profession

CORRESPONDENCE

Mark P. Khurana
University of Copenhagen

Address for correspondence:
Mark P. Khurana
Rigshospitalet, University of Copenhagen
CHIP, Department of Infectious Diseases, Section 2100
Centre for Cardiac, Vascular, Pulmonary and Infectious Diseases
Blegdamsvej 9
2100 Copenhagen Ø
Denmark

Email: mark.poulsen.khurana@regionh.dk

No conflicts of interest to disclose

Accepted for publication: 21.04.20

I recently attended a talk titled "Can you trust your doctor to have your best interest?". The speaker was a prominent biohacker who shared his experience of dealing with stress by becoming more in tune with his body through tracking stress levels using an ear monitor, testing his vitamin levels and identifying high-risk genes. He quoted an encounter with a GP in which he had noted an elevated level of homocysteine in his body, an amino acid linked to inflammation, (1) which received little attention from the GP; in fact, the GP didn't know whether it could be routinely tested.

The merits of this biohacker's claim will not be discussed further, but there is no doubt that one of the major trends in medicine has been an increase in patient involvement and engagement in healthcare which has shown to improve patient outcomes. Another is increased digitalization. The marriage of these two is a unique arrangement facilitating patients to take control of their own health.

While we can hardly expect to regularly treat prominent biohackers, just like biomarkers, it is a warning sign for what is to come. As patients become more tech-savvy and have access to data and technology that isn't routinely used in clinical settings, they will demand solutions to their ailments that are based on the findings from these resources. As a medical student nearing the end of medical school, I fear we are woefully under-prepared for this future.

Increasing access to information enables patients to ask more relevant and focused questions; we shouldn't take this as an affront to our knowledge, but as a blessing in providing better care. However, trust is based on a mutual respect for competency: patients should recognize the expertise of doctors, and doctors should recognize that patients are the experts when it comes to their own body. As trust in healthcare professionals continues to decline, (2) it would be unsurprising to predict that this trend will persist. As patients embrace the digital

revolution in healthcare, the medical profession needs to keep pace.

We are simply not taught to work with these digital tools in medical school. Even in an age where artificial intelligence is being adopted in every sector of medicine, we receive little to no training in its fundamentals. In regard to biohacking and bioinformatics, we similarly receive minimal education in their applications and potential.

I am not convinced that tenured professors will be willing to learn the language of digital health; but we should at least be teaching it to the next generation of healthcare professionals. In fact, previous studies have also demonstrated that 'medical students desire broader training in informatics. (3) Digital health education is an untapped investment in the future of healthcare professionals.

So, here is my call to action: update the medical curriculum to reflect the digital reality that we live and work in. Help us attain a level of digital literacy that helps us provide the best possible care to our patients. We owe it to ourselves and more importantly, we owe it to them.

REFERENCES

1. Moretti R, Caruso P. The Controversial Role of Homocysteine in Neurology: From Labs to Clinical Practice. International Journal of Molecular Sciences. 2019;20(1):231.

https://doi.org/10.3390/ijms20010231

PMid:30626145 PMCid:PMC6337226

2. Blendon R, Benson J, Hero J. Public Trust in Physicians — U.S. Medicine in International Perspective. New England Journal of Medicine. 2014;371(17):1570-1572.

https://doi.org/10.1056/NEJMp1407373

PMid:25337746

3. Banerjee R, George P, Priebe C, Alper E. Medical student awareness of and interest in clinical informatics. Journal of the American Medical Informatics Association. 2015;22(e1):e42-e47.

https://doi.org/10.1093/jamia/ocu046

PMid:25726567

The British Student Doctor, 2020;4(2):71-72
doi: 10.18573/bsdj.148
Correspondence

Obesity as a disability and health risk

CORRESPONDENCE

Dr Sagar Sharma
St George's, University of London

Pippa Oakeshott
St George's, University of London

Address for correspondence:
Population Health Research Institute
St George's, University of London
London SW17ORE

Email: sagar.sharma@uhl-tr.nhs.uk

ORCID: 0000-0002-3265-8021

No conflicts of interest to disclose

Accepted for publication: 14.04.20

Dear Editor,

In a thoughtful discussion article, (1) Biyyam Rao considers whether obesity should be classified as a disability. She also points out that rates of obesity are increasing worldwide. This is resulting in an increasing prevalence of type 2 diabetes. (2) For a medical student project relating to obesity, we conducted a service evaluation using a brief anonymous questionnaire to explore awareness of risk factors for type 2 diabetes in attenders sitting in the waiting room at an urban general practice.

The response rate was 82% (69/86). The mean age of responders was 44 years (range 16 to 82) and 63% were female. Most responders (70%) identified themselves as 'White British', 13% as 'Black African', 9% as 'Indian' with the remaining 8% as 'other mixed background'. The mean BMI for the 40% (27/69) who provided data on their height and weight was 27.2 (range 18.5 to 35.2). Nine responders (13%) said they were diabetic.

Using an open question, we asked these patients if they knew any risk factors for type 2 diabetes (e.g. being overweight, having a family history of diabetes, or being of Black or Asian ethnicity.) Only 32% (22/69) knew at least one risk factor for type 2 diabetes. Knowledge appeared better in diabetics when compared to non-diabetics: 54% (7/13) of diabetics knew one risk factor for type 2 diabetes compared with 27% (15/56) of non-diabetics. However, the sample size was small and the difference was not statistically significant.

Rao points out that one view is that "Obesity itself is not the disability but rather the many complications that arise from obesity lead it to becoming one." We found low awareness of obesity as a risk factor for diabetes in this group of ethnically diverse GP patients. We agree with Rao's conclusions that it is important to "encourage healthier lifestyles that improve individual health". Perhaps this should include educating patients about the risks of obesity as also suggested by the Diabetes UK (2) and The Obesity Society. (3)

REFERENCES

1. Rao BM. Should obesity be considered a disability?. The British Student Doctor Journal. 2020;4(1):17–25. [Accessed 16th March 2020]

http://doi.org/10.18573/bsdj.96

2. Diabetes UK. Number of people with obesity almost doubles in 20 years. London: Diabetes UK; 2019 [Accessed 16th March 2020]. Available from: https://www.diabetes.org.uk/about_us/news/number-obesity-doubles-twenty-years

3. Jastreboff AM, Kotz CM, Kahan S, Kelly AS, Heymsfield SB. Obesity as a Disease: The Obesity Society 2018 Position Statement. Obesity (Silver Spring). 2019 Jan;27(1):7-9. [Accessed 16th March 2020].

doi: 10.1002/oby.22378.

PMid:30569641

The British Student Doctor Journal

To discuss an article published in this issue, please contact:

editorinchief@bsdj.org.uk

The British Student Doctor
Cardiff University Press
PO Box 430
1st Floor, 30-36 Newport Road
Cardiff, CF24 0DE
United Kingdom

bsdj.org.uk

/thebsdj

@thebsdj

@thebsdj

To submit an article for publication in **The British Student Doctor**, please visit: bsdj.org.uk/author-guidelines

bsdj.org.uk