



WJMER

World Journal of Medical Education and Research

An Official Publication of the Education and Research Division of Doctors Academy

Careers in

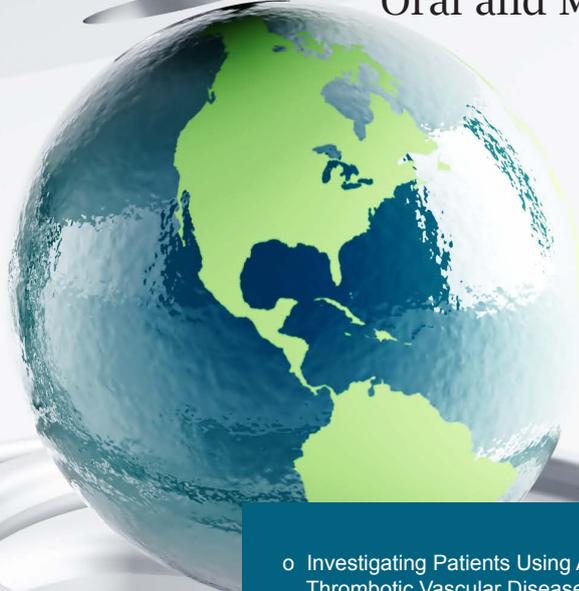
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ISSN 2052-1715

- o Investigating Patients Using Aspirin for the Primary Prophylaxis for Thrombotic Vascular Disease
- o The Prescription of Analgesia: A Questionnaire for Junior Doctors
- o To Study the Level of Stress in Students in Professional School
- o Long QT Syndrome Case Series
- o Varenicline and Depression: a Literature Review
- o Social Science is the Back Bone of Medical Education

Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

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WELCOME

We are pleased to bring you the ninth edition of the World Journal of Medical Education and Research (WJMER). This edition, similar to the previous editions, has an excellent spread of articles from around the world that includes topics on clinical audits, prophylaxis, medical education, career options and case reports.

Our opening article by Quddus and Ottey investigated the use of aspirin in primary prophylaxis for thrombotic vascular disease. They suggest the need for aspirin therapy in primary prevention of thrombotic vascular disease to be individualized. Pettipher conducted a questionnaire for junior doctors on prescription of analgesia and highlights the need for further education and research into analgesic prescription. The study by Kaur and colleagues ascertained the level of stress in students in professional school and concludes that medical students are stressed for a variety of reasons and there is significantly higher level of stress among students of medical professional course than of dental courses.

Following this, Thiru and Vyapury provide a very interesting case series on 'Long QT Syndrome', exploring the complexities surrounding early identification of the high risk groups and the difficulties in safe prescribing. They also shed greater awareness of the LQTS and provide the reader with a further understanding of the syndrome. The literature review by Eugene and colleagues on the relationship between Varenicline and Depression suggests that varenicline could worsen psychiatric symptoms in patients with depression. They conclude that clinicians should err on the side of caution and closely monitor patients with a history of depression taking varenicline. The final article by Dr Algur highlights the need for social science to be the backbone of medical education.

In addition, there are very informative articles on careers in oral and maxillofacial surgery, clinical anatomy, global health medicine and wilderness medicine that will provide the students/junior doctors with a taste of different career paths following qualification from medical school.

We hope that you find all the articles in this edition, which addresses a variety of topics, enlightening, stimulating and enjoyable to read.

With very best wishes,

Ms Karen Au-Yeung
Editor

Dr Ahmed Hankir
Associate Editor

Professor Stuart Enoch
Editor-in-Chief

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Investigating Patients Using Aspirin for the Primary Prophylaxis for Thrombotic Vascular Disease

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**WJMER, Vol 9: Issue 1,
2015**

Abstract

Background and Aims: Since 2009, The Medicines and Healthcare products regulatory agency (MHRA) has issued guidance that does not advocate initiating aspirin in primary prophylaxis. The aim of this audit is to identify any patients on aspirin therapy for the primary prevention of thrombotic vascular disease and to review them specifically for the adverse affects of aspirin.

Methods: The number of patients registered, at one general practice, on aspirin therapy from October 2009 till 1st January 2014 were identified using the computer software SystemOne. All patients were individually analysed to ensure they were not on aspirin for any licensed indication. They were then subsequently reviewed for side effects.

Results: Thirty-seven patients in the practice were identified to be on aspirin for the primary prophylaxis of thrombotic vascular disease. Twenty-seven (73%) of them had been specifically reviewed with the aim of having a discussion with the patient to stop the Aspirin. Three (8%) patients experienced clinically significant side effects which warranted withdrawal of the drug immediately.

Conclusion: Aspirin therapy for primary prevention of thrombotic vascular disease needs to be individualized after fully informing patients of the new available guidelines and the benefits and risks of aspirin therapy.

Key Words

Aspirin, Vascular disease, Thrombosis, NICE, MHRA

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Introduction

Thrombotic vascular disease and its complications are the principal cause of worldwide mortality and its incidence is increasing¹. Platelets have a crucial role in primary hemostasis and atherothrombosis, mitigating the use of antiplatelet agents such as aspirin for prophylaxis². Aspirin principally exerts its antiplatelet effect by producing a disequilibrium between thromboxane A₂ and prostacyclin production by platelets and endothelial cells respectively. This favours the latter and therefore reduced platelet aggregation and vasoconstriction³.

Aspirin is licensed and well known for its use in secondary prevention of thrombotic vascular disease⁴. However, aspirin was reported to have no significant reduction in the risk of major cardiovascular events with low dose aspirin compared to placebo in three different trials ranging from 2005 to 2008⁵. In addition, a meta-analysis of six clinical trials performed by Antithrombotic trialist's collaboration (ATT) yielded the same conclusion^{6, 7}. Whatever slightly positive effects aspirin may confer are also partially offset by an

increase in serious intra and extracranial bleeds⁸. Thus, current trials do not advocate the use of aspirin in primary prophylaxis and this conclusion is independent with regards to the patient's gender, blood pressure, predicted risk of cardiovascular disease and a prior history of diabetes mellitus⁸. These trials stemmed from research conducted by NICE (National Institute of Clinical Excellence) which found no arbitrary benefit of aspirin therapy in patients with type II diabetes mellitus⁹.

The MHRA (Medicines and Healthcare products regulatory agency) reiterates the above point and suggests against starting patients regularly on low dose aspirin for primary prevention. If patients are being initiated on aspirin therapy for primary prevention then this should be decided on an individual basis balancing the risks of vascular disease with the risk of a gastrointestinal bleed. Patients already on aspirin should be reviewed individually with the aim to discuss stopping or continuing treatment after educating patients fully on the available evidence effective from October 2009¹⁰.

Aim

The aim of this audit is to identify and ensure patients, registered to the practice, on aspirin therapy for the primary prevention of thrombotic vascular disease have been reviewed specifically with regards to aspirin in light of the guidelines published by NICE and MHRA from October 2009. We also endeavoured to determine whether these patients have experienced any adverse side effects of the drug.

Methods

In this retrospective study, data was collected using the computer system SystemOne. The system has codes used for certain diagnoses which general practitioners in primary care can input depending on the outcome of consultations. Using these codes, a search was conducted to determine the number of patients at the practice on aspirin therapy from October 2009 till 1st January 2014. Another search was run simultaneously which included the exclusion criteria (common indications for aspirin use): known diagnosis of ischaemic heart disease, cerebrovascular disease (including stroke and TIA) and atrial fibrillation.

The two searches were joined together with the aim of identifying patients on aspirin therapy indicated for primary prevention of thrombotic vascular disease. All patients were individually

analysed to ensure they were not on aspirin for any other licensed indication. These patients were excluded further.

Results

Fifty-three patients in the general practice were picked up as being on aspirin therapy for primary prevention of thrombotic vascular disease in the initial search. However 16 of these patients were on aspirin for other licensed reasons and these were excluded when each patient was analysed individually using their records on SystemOne.

Of the 37 patients left in the final cohort, there were 25 males and 12 females (range 51 – 93). **Figure 1** shows that out of the 37 patients in the practice that were identified as on aspirin for primary prophylaxis of thrombotic vascular disease since October 2009, 27 (73%) of them had been specifically reviewed with the aim of having a discussion with the patient to stop the aspirin.

The outcome of the review has been published above in **Figure 2**. Out of the 27 patients reviewed 14 of them stopped the aspirin, one patient was in the process of stopping and 12 (44%) patients still preferred to continue aspirin treatment despite being presented with the up to date evidence regarding the efficacy of their use. Of these 12 patients eight (67%) were males.

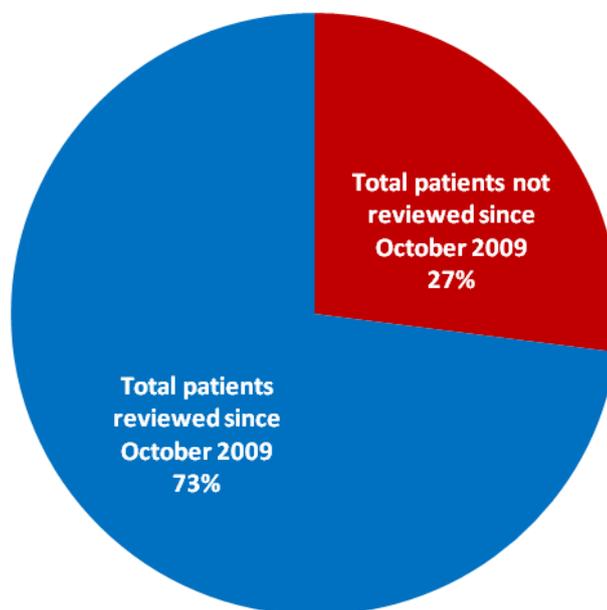


Figure 1: Percentage number of patients reviewed on aspirin specifically for primary prevention of thrombotic vascular disease

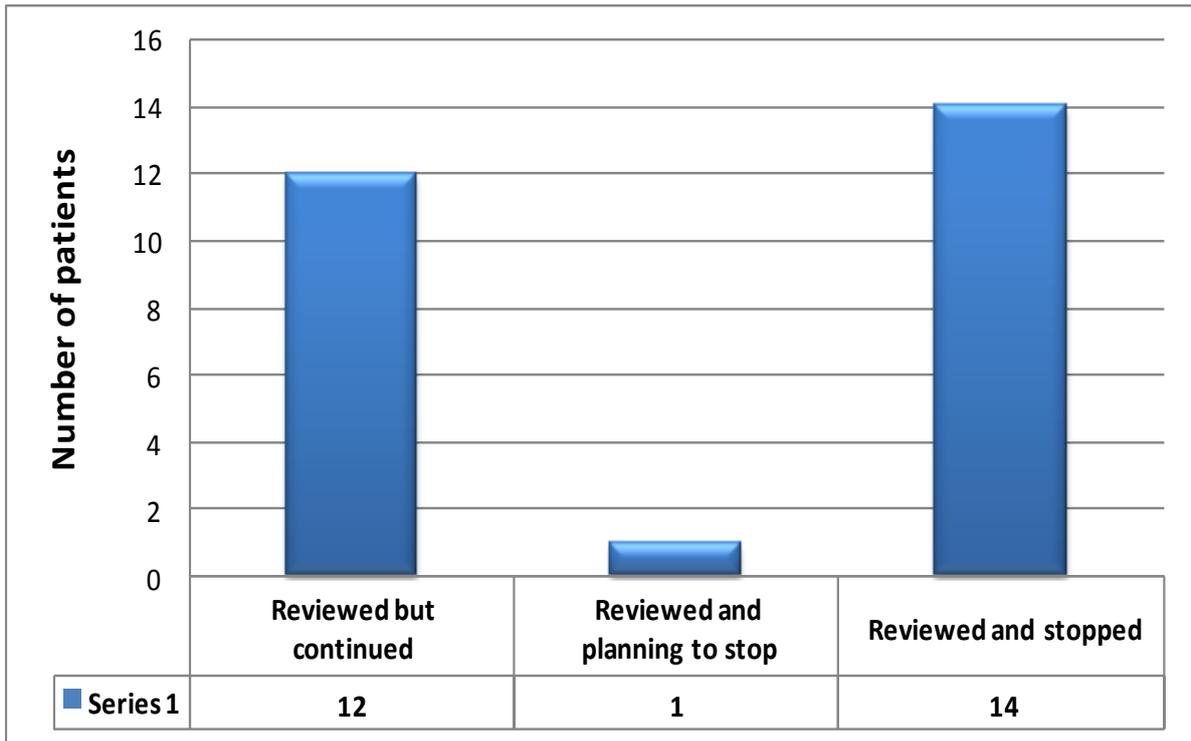


Figure 2: Outcome of patients reviewed on aspirin for the primary prevention of thrombotic vascular disease

Furthermore, out of the 37 patients on primary prophylaxis for thrombotic vascular disease, 19 patients had essential hypertension as their main indication, 17 as diabetes as their main indication and the remaining one person had a combination of both.

Any complications of aspirin therapy were also recorded retrospectively after analyzing each individual record carefully. Out of the 37 patients, three (8%) experienced clinically significant side effects which warranted withdrawal of the drug immediately. One patient experienced bleeding oesophageal varices, another one presented with anaemia secondary to aspirin use and the remaining patient presented with aspirin related gastro oesophageal disease.

Discussion

Out of the 37 patients, 27 were reviewed specifically for the use of aspirin in the primary prevention of thrombotic vascular disease. Out of the patients that were reviewed 44% continued to take aspirin for primary prophylaxis despite full patient education. This may possibly be due to historical reasons when results from aspirin trials achieved contrasting results and the continuing uncertainty of the benefits of aspirin. Regardless of the underlying reason it is imperative to respect patient autonomy and patient choice. The priority of the partners in the practice should still be to fully inform the patients of the new available guidelines

and the benefits and risks of aspirin therapy. This will allow patients to make an informed decision on whether to stop or continue the aspirin.

The underlying indication of patients on aspirin for primary prevention of thrombotic vascular disease in the practice is roughly equally split between essential hypertension (54%) and diabetes (46%). The guidance of MHRA to stop aspirin for primary prevention is independent of whether the patient has diabetes or raised blood pressure. Eight percent of patients suffered clinically significant adverse effects of aspirin therapy. This number seems to be substantial taking into account that aspirin is not licensed for primary prevention of thrombotic vascular disease anymore. This further highlights the significance of reviewing patients on aspirin for any adverse effects and patient education to prevent further cases of aspirin induced side effects.

There were several limitations in this audit. Firstly, the review was retrospective increasing the potential of selection bias. The review we conducted was in one general practice involving 37 patients on aspirin for primary prevention and this small sample size may have caused an overestimation of the prevalence of clinical side effects of aspirin in our cohort. Involving other local general practices to increase the number of patients in the sample size is likely to improve the accuracy of the result and would be the next step in expanding this audit.

Conclusion

Guidance from the MHRA and NICE have recommended that aspirin should not be used as primary prophylaxis for thrombotic vascular disease effective from October 2009. The results obtained from this audit suggest that since the issuing of the guidance, 10 patients (27%) have not been reviewed specifically for aspirin use in primary prevention. This is an area on which the practice can improve on to be in concordance with the guidelines published by the MHRA. Aspirin therapy for primary prevention of thrombotic vascular disease needs to be individualised after fully informing patients of the new available guidelines and the benefits and risks of aspirin therapy.

Recommendations

Our recommendations following this audit include reviewing the remaining ten patients for the use of aspirin in the primary prevention of thrombotic vascular disease as soon as possible. A block review would be more appropriate than waiting for their regular six monthly medication review as it will reduce the likelihood of any aspirin induced side effects. The practice has a qualified pharmacist who runs a session every Friday morning who might be able to see these patients on a short notice. Taking into account the fact that some patients might not be able to make these appointments or other general practices may not have a qualified pharmacist it is recommended that these are seen by the practice doctors.

It is paramount to hold a practice meeting to inform all members of the practice of the MHRA guidelines regarding the use of aspirin in primary prevention so that they are aware of the need to review these patients. A re-audit should be conducted in 12 months to ensure that the remaining 10 patients have been reviewed and that there are not any further new patients on aspirin for primary prevention of thrombotic vascular disease that need reviewing.

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The Prescription of Analgesia: A Questionnaire for Junior Doctors

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Abstract

This project was designed to address Foundation Year One (FY1) doctors' lack of confidence in prescribing analgesia, especially at the beginning of the job. Foundation Doctors prescribing outside of their knowledge limits put patient safety at risk. Those that avoid prescribing analgesia due to lack of confidence, cause significantly reduced patient satisfaction and go against GMC guidelines. An electronic questionnaire, distributed nationally, showed 72 out of 82 (87.8%) FY1 doctors stated they had been unsure when prescribing analgesia, highlighting the need for intervention. Our intervention involved an analgesic prescribing presentation along with a double-sided pocket sized analgesic flashcard (containing common analgesic doses, cautions and local trust guidance) given at their trust induction. A questionnaire was used to compare a subgroup of August 2012 intake FY1's (who didn't undergo the intervention) with FY1's from August 2013 intake who received the teaching and flashcard. Pre-intervention average confidence was 3.62 out of five and post-intervention 3.28 out of five. Chi-squared analysis gives a P-value of 0.344, indicating no statistical difference between the subgroups. This study highlights the need for further education and research into analgesic prescription. Further studies are needed to identify best methods to tackle this problem.

Key Words

Analgesia, Confidence, Pain, Prescribing, Safety

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Introduction:

Problem

The General Medical Council (GMC) guidelines stipulate that one of the duties of a Doctor is to "alleviate pain and distress whether or not a cure may be possible¹." The GMC also advises that Junior Doctors must work within the limits of their own knowledge and capabilities, especially when it comes to prescribing. During my own personal experience, and having discussed the topic with colleagues at Stoke Mandeville Hospital (United Kingdom), it appears that many Foundation Year One doctors are anxious when it comes to prescribing analgesia. It also came to light that many Junior Doctors felt that pain relief was not a priority when forming a management plan for a patient. Despite the fact that many studies reveal that adequate pain relief can have a direct correlation with patient satisfaction². If Junior Doctors are working outside of their knowledge base and competencies when prescribing analgesia, then it raises important issues regarding patient safety.

Background

Many Foundation Year One Doctors are anxious about prescribing even commonly used analgesia, especially during the first few months of the job.

This project aims to explore the views of Junior Doctors surrounding the prescription of commonly used analgesics. In particular, looking at how much training they have received on the topic, how important they believe pain management is, how confident they are in prescribing analgesia, whether or not they are aware of World Health Organisation and GMC Guidance regarding analgesia, and identifying whether or not they feel they would benefit from further teaching materials or aids to improve their confidence when prescribing analgesia.

Material and Methods:

Initial Study

The study was carried out using an electronic questionnaire, distributed to Foundation Year one Doctors currently working within the United Kingdom. An online form was utilised in order to try and maximise ease of questionnaire distribution, and in order to maximise questionnaire completion rates. The use of web design software allowed me to link the online questionnaire to a 'My SQL' database in order for data collection to be automatic – generating a 'Microsoft Excel' spreadsheet containing all of the participants' responses automatically.

The Prescription of Analgesia

A Questionnaire for Junior Doctors



This questionnaire is designed for all FY1 Doctors currently working within the UK.

Please complete this questionnaire based on your experiences during your first month as an FY1 Doctor. Thank you for taking the time to complete the form below, your participation is greatly appreciated. Cookies must be enabled on your computer in order for the form to be successfully submitted.

1. When forming a management plan of a patient, how important (on a scale of 1-5) is managing pain to you?

(Not important) 1 2 3 4 5 (Very important)

2. Have you ever received specific teaching on analgesia and the prescribing of analgesia?

Yes No Unsure

3. Are you aware of the World Health Organisation's 'Analgesic Ladder'?

Yes No Unsure

4. Do you think of this 'Analgesic Ladder' when prescribing analgesia for patients?

Yes No Unsure

5. Are you aware of the GMC 'Good Medical Practice' guidelines regarding pain management and prescribing?

Yes No Unsure

6. Would you benefit from additional teaching/simple teaching materials/prompts for prescribing analgesia?

Yes No Unsure

7. Have you ever been unsure when prescribing analgesia?

Yes No Unsure

8. How confident are you in prescribing the following analgesia?

Simple Analgesics (e.g. Paracetamol & NSAID's)

Not Confident 1 2 3 4 5 (Very Confident)

Weak Opioids (e.g. Tramadol & Codeine)

Not Confident 1 2 3 4 5 (Very Confident)

Strong Opioids (e.g. Morphine, Fentanyl, Oxycodone & Pethidine)

Not Confident 1 2 3 4 5 (Very Confident)

Analgesic Adjuvants Meditation not initially designed to treat pain, but effective in difficult to manage pain (e.g. Gabapentin for neuropathic pain)

Not Confident 1 2 3 4 5 (Very Confident)

8. About you:

Name:

Email Address:

Are you a current FYI doctor working in the UK? Yes No

Please select your current Deanery from the list below:

Submit Your Answers

Thank you for taking the time to complete the above form. If you have any questions regarding its' completion, please contact me at: alexpettipher@yahoo.co.uk

Figure 1: A screenshot of the online questionnaire for data collection.

A total of 82 Foundation Year One doctors completed the initial Online Questionnaire. Any participant entries that were not entirely complete,

or were duplicated, were omitted from the study. The participants are from a range of Deanery's within the United Kingdom.

Deanery:	Number of Participants:
Oxford	33
South Thames	17
Staffordshire	14
North Western	6
North Central Thames	3
West Midlands Central	2
Coventry & Warwick	2
Trent	1
Yorkshire & Humber	1
Wales	1
Mersey	1
Severn	1

Table 1: A table to show the distribution of participants by Deanery.

The initial FY1 questionnaire results were as follows:

The majority; 70 out of 82 (85.4%) FY1's said they had received specific teaching on Analgesia and its prescription. All participants; 82 out of 82 (100%) of participants said they were aware of the World Health Organisation's Analgesic Pain ladder. Most (74 out of 82 - 90.2%) Junior Doctors said they think of the World Health Organisation's Analgesic Pain ladder when prescribing analgesia. Only 31 of 82 (37.8%) Foundation Trainees said they were aware of the General Medical Council's 'Good Medical Practice' Guidance on pain management and prescribing. A large proportion; 59 out of 82 (72%)

Junior Doctors feel they would benefit from further teaching resources/materials to help with analgesic prescription. Alarmingly 72 out of 82 (87.8%) of Junior Doctors have been unsure when prescribing analgesia. When asked, when forming a management plan for a patient, how important is managing pain to you? (On a scale of 1-5, with five being 'very important' and one being 'not important') the most common answer selected was four (40 out of 82, 48.8%) with a mean score of 4.37. The table included within the appendix details the responses on a scale of 1-5, with five being 'very confident' and one being 'not confident' of how confident the Foundation Doctors were in prescribing different classes of analgesia.

	Score 1 (Not Confident)	Score 2	Score 3	Score 4	Score 5 (Very Confident)	Average Score
Simple Analgesics	0	0	1	11	70	4.84
Weak Opioids	0	1	7	32	42	4.40
Strong Opioids	2	16	28	32	4	3.24
Analgesic Adjuvants	15	14	38	15	2	2.70
Overall Confidence	17	31	72	90	118	3.80

Table 2: A table to show FY1 confidence in prescribing different classes of analgesia.

As evident in the table above, Foundation Doctors prescribing confidence fell as we move through the classes from simple analgesia to weak opioids, to strong opioids and then to analgesic adjuvants.

Intervention Design

The second part of the study took place following the implementation of a 'Quality Improvement Project' at Stoke Mandeville Hospital, a District General Hospital in Buckinghamshire. The new

Foundation Year one Doctors underwent an additional short lecture/workshop as part of their mandatory trust induction on the prescription of analgesia where they also received an 'Analgesic Flashcard' acting as an aid memoir to help them with analgesic prescription during their first few months of the job. The 'Flashcard' was designed to be pocket-sized and portable and serve as an initial prompt, not replacing the use of other resources such as the British National Formulary.

A Guide to Adult Analgesic Prescribing:
****Always check Allergies before prescribing****
& Check the BNF for further information/complex Pt's

Simple Analgesics:
Paracetamol 1g PO/IV QDS (Caution Liver Impairment)
Ibuprofen 400mg PO TDS (NSAID)
Naproxen 250mg PO TDS (NSAID)
Diclofenac 50mg PR TDS (NSAID)
 Caution: Liver/Renal Impairment, IHD & Elderly. CI - NSAID sensitive Asthma

Weak Opioids:
Codeine Phosphate 30-60mg PO QDS
Tramadol 50-100mg PO QDS
 Caution: Liver/Renal Impairment & Elderly.

Strong Opioids: (+ Px. Anti-emetics with Strong Opioids)
Oramorph 5-10mg PO 4-6 Hourly
Morphine IM 10mg 4-6 Hourly (5mg in Elderly Pt's)
Morphine IV 5mg 4-6 Hourly (Reduce dose in Elderly.)
 Caution: Respiratory/Liver/Renal Impairment & Hypotension.

Patient Controlled Analgesia:
Trust Guidelines for initial setup -
Morphine 1mg bolus PCA set at 5min lockout

Considerations:
Antiemetics, Laxatives & Naloxone.
Adjuvants - Neuropathic pain, Antidepressants,
Non drug therapy.

Remember to add Anti-emetics & Bowel Prophylaxis → **Do not use multiple opioids together unless advised by Pain Team** **Always check Allergies before prescribing** Designed by Dr A Pettipher	REGULAR	PRN	Pain Score: Mild 0-3: Moderate 4-6: Severe 7-10: Assess severity of pain and whether regular and PRN (for breakthrough pain) analgesia required
	Paracetamol +/- NSAID	NSAID or Weak Opioid	
	Paracetamol + Weak Opioid OR + NSAID	Weak Opioid (e.g. Codeine) OR NSAID	
	Paracetamol + NSAID + Strong Opioid Consider: PCA or Regular SC/IM Morphine	Strong Opioid (e.g. Morphine PO/IM)	

Figure 2: A thumbnail of the double-sided 'Analgesic Flashcard'.

Intervention Strategy

PDSA Cycle 1 - Preliminary National FYI Questionnaire distribution to determine and quantify need for intervention. Results highlighted need for intervention. Concept of analgesic flashcard and teaching session developed.

PDSA Cycle 2 - Analgesic flashcard reviewed by Hospital Pain Team nurses - who advised the removal of 'IV' as a route of diclofenac administration as the Trust now only uses oral diclofenac to reduce the risk of cardiovascular complications. Pain scores added.

PDSA Cycle 3 - Analgesic flashcard reviewed again by Hospital Pain Team nurses - who stated "go for it very impressed" but recommended involvement of

target users and ward Consultants.

PDSA Cycle 4 - Analgesic flashcard reviewed by Surgical SpR and Surgical Consultant, suggested addition of anti-emetics and altered aesthetics of flashcard. They also recommended seeking opinion of other FYI doctors.

PDSA Cycle 5 - Analgesic flashcard reviewed by colleagues (fellow FYI's) - who were impressed by the flashcard and had no suggested changes or recommendations. Many stated that they wished they had been given a similar flashcard when they first started work as an FYI doctor. The QIP was then implemented. Post-intervention questionnaire distributed and pre- and post-intervention confidence in prescribing analgesia was then compared.

	All FYI's	Oxford Deanery Pre-QIP	Oxford Deanery Post-QIP
Q1. Did you attend teaching & get flashcard?	N/A	N/A	96.4% YES
Q4. Have you ever received specific teaching?	85.4% YES	81.8% YES	92.9% YES
Q5. Aware of WHO pain ladder?	100% YES	100% YES	100% YES
Q6. Do you think of WHO pain ladder when prescribing?	90.2% YES	84.8% YES	100% YES
Q7. Aware of GMC guidance on prescribing?	37.8% YES	42.4% YES	35.7% YES
Q8. Would you benefit from additional teaching?	72% YES	81.8% YES	60.7% YES
Q9. Have you ever been unsure when prescribing?	87.8% YES	90.9% YES	92.9% YES

Table 3: A table to show FYI 'Yes/No' answer comparisons from the initial National survey and before and after the 'intervention'.

Results

After carrying out the 'Quality Improvement Project', the questionnaire was adapted to reflect their teaching session, and was re-distributed to see if it made a significant impact on their levels of confidence in prescribing analgesia.

A cohort of (33) Oxford Deanery Foundation Year one Doctors starting work in August 2012 were then compared to (28) Oxford Deanery Foundation Year one Doctors starting work in August 2013 who had undergone the 'QIP' tutorial and were given the analgesic flashcard. Their confidence levels in analgesic prescribing were then compared.

The following are the results comparisons from the initial National FYI survey, with the pre-intervention and post-intervention questionnaires:

The majority of Foundation Year One's completing the questionnaire did attend the teaching session and receive the analgesia flashcard – 96.4% (27 out

of 28). There was an increase in people reporting that they had received specific analgesic prescribing up 11.1% from 81.8% pre-intervention to 92.9%. In all phases of the study, all foundation doctors had awareness of the 'World Health Organisations Pain Ladder' – 100%. Post intervention, there was an increased consideration of the WHO Pain Ladder when prescribing analgesia, from 84.8% (28 out of 33) up to 100% (28 out of 28). Both pre- and post-intervention groups had a poor awareness of the GMC guidance surrounding the prescription of analgesia 42.4% (14 out of 33) and 35.7% (10 out of 28) respectively. Less FYI's post-intervention felt that they would benefit from additional analgesic prescribing teaching, down from 81.8% (27 out of 33) to 60.7% (17 out of 28). Alarming, the majority of foundation year one doctors have been unsure when prescribing analgesia. 90.9% (30 out of 33) pre-intervention and 92.9% (26 out of 28) post-intervention. The intervention has not unfortunately reduced this figure.

	All FYI's	Oxford Deanery Pre-QIP	Oxford Deanery Post-QIP
Q2. Did you find the flashcard useful?	N/A	N/A	3.71
Q3. Management plan, How important is managing pain to you?	4.37	4.3	4.64
Q10a. How confident are you in prescribing Simple Analgesics?	4.84	4.82	4.5
Q10b. How confident are you in prescribing Weak Opioids?	4.4	4.36	3.75
Q10c. How confident are you in prescribing Strong Opioids?	3.24	2.97	2.61
Q10d. How confident are you in prescribing Analgesic Adjuvants?	2.7	2.33	2.25
Q10. Overall calculated prescribing confidence	3.8	3.62	3.28

Table 4: A table to show FYI average 'Confidence Scores' (scores out of 5) comparisons from the initial National survey and before and after the 'intervention'.

The post-intervention group receiving the Analgesic Flashcard scored it on average 3.71 out of five in terms of usefulness, with a score of five representing 'very useful' and a score of zero representing 'not useful.' The increased awareness of analgesic prescribing following this study may have contributed to the increased perceived importance in prescribing analgesia. Up from 4.3 out of five (pre-intervention) to 4.64 out of five (post-intervention). Foundation Doctors prescribing confidence fell as we move through the classes from simple analgesic to weak opioids, to strong opioids and then to analgesic adjuvants – this trend remained apparent and consistent between all three stages/subgroups of the study.

Pre-intervention average confidence was 3.62 out of five and post-intervention 3.28 out of five. Chi-squared analysis gives a P-value of 0.344, indicating

no statistical difference between the subgroups. Suggesting that the intervention did not meet the initial intended aims, and that further research is needed in order to determine the best way to meet this learning need.

Discussion

This study clearly highlights the fact that many Junior Doctors are working outside their confidence limits when prescribing analgesia. It highlights rather alarming statistics that across all parts of the study an average of 90.5% of Foundation Doctors are uncertain when prescribing analgesia. Further education, teaching aids and resources are required in order for GMC's Good Medical Practice Guidelines to be achieved. Although a slight increase from 4.3 to 4.64 out of five was noted regarding the FYI's view of the importance of prescribing analgesia - an increased

awareness regarding the importance of pain management and how it impacts upon patient satisfaction is still needed.

It is evident that Undergraduate Medical Training clearly highlights the 'World Health Organisations Pain Ladder' as all FY1's were aware of it. However, only a small minority of Foundation Doctors were aware of the GMC guidance regarding the prescription of analgesia. This is a topic that needs to be addressed in further interventions.

Although there was no statistical difference between the two sub-groups most Foundation Year One doctors felt that the 'Analgesic Flashcard' was beneficial, with an average score of 3.71 out of five (where a score of zero represents 'not useful' and a score of five represents 'very useful').

The statistical significance of the study results were also limited by a relatively small sample size.

Conclusion

This study highlights the need for further education and research into analgesic prescription. The study has raised alarming statistics that suggest that many Foundation Doctors are working outside of their confidence limits when prescribing analgesia - which in turn goes against GMC guidance.

Despite the Quality Improvement Project 'intervention' there still remains an obvious lack of confidence in the prescription of analgesia. Further studies and research are needed to identify the best methods in order to tackle this problem. Future studies could contain prescribing scenario questions or involve an analytic review of ward drug charts so that both an objective and subjective assessment can be made of not only analgesic prescribing

confidence, but of analgesic prescribing ability.

Although this Quality Improvement Project did not show a statistically significant improvement in Foundation Doctor confidence levels in prescribing analgesia, many did find the prescribing prompt card useful. By carrying out this Quality Improvement Project, I have also gained further understanding of the process, and now realise that the amount of work put into a project, does not necessarily correlate with an improved outcome. Rather, a concise, well-researched and planned intervention before carrying out initial data collection may well have had an improved outcome.

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To Study the Level of Stress in Students in Professional School

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Abstract

Excessive burden of information leaves minimal opportunity for the students to relax and recreate and sometimes leads to serious sleep deprivation. Studies have shown high rates of psychological morbidity in medical students at various stages of their training. An extensive internet search showed limited studies on stress in undergraduate professional course students in India. Hence this study was designed to study the level of stress in students of medical and dental course at time of education in a professional college in India. A prospective study was conducted on students in the second year of medical and dental professional course. The study was approved by the IEC of the institute and informed consent obtained from all the participants. One group of students were in their medical professional course and the second group were in their dental professional course. The students were subjected to Kessler 10 (K10) and Perceived stress scale 14 (PSS-14) questionnaire. A total of 165 students were enrolled in the study; both groups had compromised scores, higher K10 scores and PSS questionnaire score was seen in students of medical professional course. There was a significantly higher ($p < 0.05$) stress in students of the medical professional course in both K10 and PSS score as compared to other group. In conclusion, students of the professional school were stressed and there was significantly higher level of stress among students of medical professional course than of dental courses.

Key Words

Stress, Education, Medical students, Dental students, Professional course

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Introduction

The relationship of stress and medical or dental education is important because the personality of these students suggest that they are highly motivated, action oriented achievers, securing high grades prior to admission and we expect them not to be affected by stress or being incapable of handling it^{1,2}.

Based on these characteristics, one may anticipate medical school would be a time of personal growth, fulfilment, and well-being despite its challenges. Unfortunately, studies suggest that the current educational process may have an inadvertent negative effect on students' mental health³, with a high frequency of depression, anxiety, and stress among medical and dental students^{4, 5}. Overwhelming burden of information leaves a minimal opportunity for the student to relax and recreate⁶. Stress and depression have been consistently linked to mental and physical health effects⁷. An optimal level of stress enhances learning while excess of stress can cause health problems⁸.

A number of factors have been hypothesized to

contribute to this decline in students' mental health—including academic pressure, workload, financial concerns, sleep deprivation, exposure to patients' suffering and deaths, student abuse, and a 'hidden curriculum' of cynicism⁴. Stress may adversely influence their academic performance, contribute to academic dishonesty, and play a role in alcohol and substance abuse⁹. Student distress has also been reported to be associated with cynicism, an unwillingness to care for the chronically ill and decreased empathy^{4, 5, 10}.

Medical students are a valuable human resource for our future and depression in them leads to less productivity, reduced quality of life, learning difficulties and may negatively affect patient care¹¹. It may continue later in internship, postgraduate study period and later in physicians' practical life and it may reach burnout level. Early detection of such problems shortens the duration of the episode and lessens the social impairment in the long term^{12, 13}.

Studies suggest that mental health worsens after student begins medical school and remains poor throughout training. Therefore, to inform the

educators and researchers, and also to sensitize and guide stakeholders in this area, hence this study was designed to study the level of stress in students of medical and dental course at time of education in a professional college in India.

Material and Methods

This prospective study was conducted in Department of Pharmacology, GSMCH, Patiala in February 2013-14 after approval from Institutional Ethics Committee (IEC). After written informed consent, the students of medical and dental professional course were enrolled. All steps were taken to maintain the confidentiality of the participants. All the participants had to fill in two questionnaires to assess the level of stress. The study was done in 60 min class at a time when the students did not have any examination in the preceding or the next two months, to minimise the extra stress that could influence the study and symptoms of stress.

Kessler-10 Questionnaire:

The instrument Kessler10 Psychological Distress (K10) developed by Kessler and colleagues are widely used in population-based epidemiologic studies to measure current (one-month) distress. It has been shown to be without substantial bias with respect to sex and educational level. It measures the level of distress and severity associated with psychological symptoms in population surveys. It is being used widely, including in the World Health Organization World Mental Health Survey, and as a clinical outcome measure¹⁴⁻¹⁶. The K10 comprises 10 questions of the form, 'how often in the past month did you feel ...' and offers specific symptoms such as 'tired out for no good reason', 'nervous', 'sad or depressed'. The five possible responses range from 'none of the time' to 'all of the time' and are scored from one to five respectively; the items are assumed to obtain a total score. A score of less than 20 was considered not to represent a 'case' possibility of mental illness. A score of 20-24 was considered to present a mild stress, 25-29 score represented moderate stress and 30-50 represented severe stress¹⁷. This K10 questionnaire is observed to have good psychometric properties with Cronbach's alpha of 0.8938 {95% Confidence Interval (C.I.): 0.8793-0.9072}¹⁸.

Perceived Stress Scale-14:

Perceived stress was measured using the perceived stress scale (PSS-14)¹⁹, which comprised of 14 questions with responses varying from zero to four for each item and ranging from never, almost never, sometimes, fairly often and very often respectively on the basis of their occurrence during one month prior to the survey. The PSS has an internal consistency of 0.85 (Cronbach a co-efficient) and

test-retest reliability during a short retest interval (several days) of 0.85²⁰. It assesses the degree to which participants evaluate their lives as being stressful during the past month. It does not tie appraisal to a particular situation; the scale is sensitive to the non occurrence of events as well as ongoing life circumstances. PSS-14 scores are obtained by reversing the scores on four positive items, for example 0 = 4, 1 = 3, 2 = 2, etc. and then summing across all 14 items. Items four, five, six, seven and 10 are the positively stated items. The scale yielded a single score with high scores indicating higher levels of stress and lower levels indicating lower levels of stress. The PSS-14 has a possible range of scores from 0 to 56^{20, 21}.

Statistical Analysis:

The data assembled was presented as mean \pm SD. Results were analyzed with the help of appropriate parametric and non-parametric tests like students t-test, chi-square test, ANOVA, Mann Whitney test. The results with p value of <0.05 was considered as statistically significant.

Results

A total of 200 students in medical and dental professional course took part in the study, 35 students did not give written informed consent for the study and hence were excluded from the study. A total of 165 students were enrolled in the study, out of which 126 were girls and 39 were boys. All students filled both the questionnaires, a total of 90 students of the MBBS professional course and 75 students of BDS professional course participated in the study. The comparison of both groups is given in **Table I**. A comparable number of students in both groups had no stress. A higher number of students in dental professional course had no stress (36% versus 29%), whereas students of medical professional course had varying level of stress (71% versus 64%), although it was not statistically significant. The total Kessler score was significantly higher in the students of medical professional course as compared to dental professional course students (24.43 ± 9.86 versus 20.93 ± 7.47 , $p < 0.05$). Similarly the PSS-14 score was also significantly higher (28.76 ± 10.56 versus 24.59 ± 9.16) in students of medical professional course.

Kessler-10 Questionnaire: There was a significantly higher score in most of the questions of questionnaire in students of MBBS than BDS professional course (**Figure 1**). The students of MBBS course had a significantly ($p < 0.05$) greater feeling of worn out for no good reason, restlessness that nothing could calm them down, worthlessness, depressed, sad that nothing could cheer them up, worthlessness and feeling that everything was an effort.

Characteristic	MBBS	BDS	p value
Number of participants	90	75	
Male: Female	31:59	18:57	p=0.17*
Kessler Score (Mean ± SD)	24.43± 9.86	20.93± 7.47	p<0.05 [#] §
PSS -14 (Mean ± SD)	28.76± 10.56	24.59± 9.16	p<0.05 [#] §
Stress			
Nil (%)	26 (28.9)	27 (36.0)	p=0.60*
Mild (%)	27 (30.0)	16 (21.3)	
Moderate (%)	16 (17.8)	14 (18.7)	
Severe (%)	21 (23.3)	18 (24.0)	

*using Chi-Square Test
#using two tailed unpaired student 't' test
§using Mann Whitney U Test

Table 1: Comparison of students in both groups

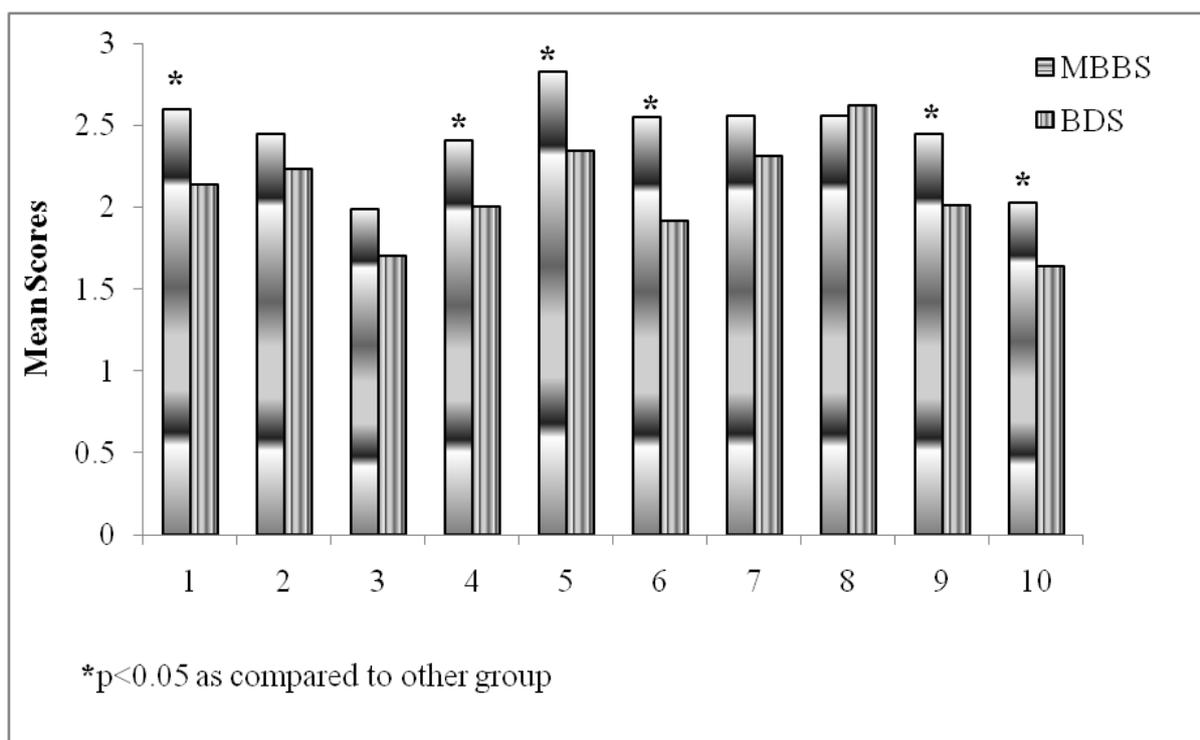


Figure 1: Comparison of Kessler Score in both groups

Perceived stress score-14: There was a significantly higher score in seven questions of questionnaire in students of MBBS professional year (Figure 2). The students had a significantly (p<0.05) greater feeling of upset because of something that happened unexpectedly, unable to control the important things in their life, angered because of declining confidence, irritation, and less achievement.

Discussion

Our study demonstrated that there is considerable amount of stress among both medical and dental students as is evident from the mean Kessler score and PSS-14 score. The students enrolled in our study had a mean Kessler score of 24.43 and 20.93 respectively in the students of medical and dental professional course suggestive of mild stress as per

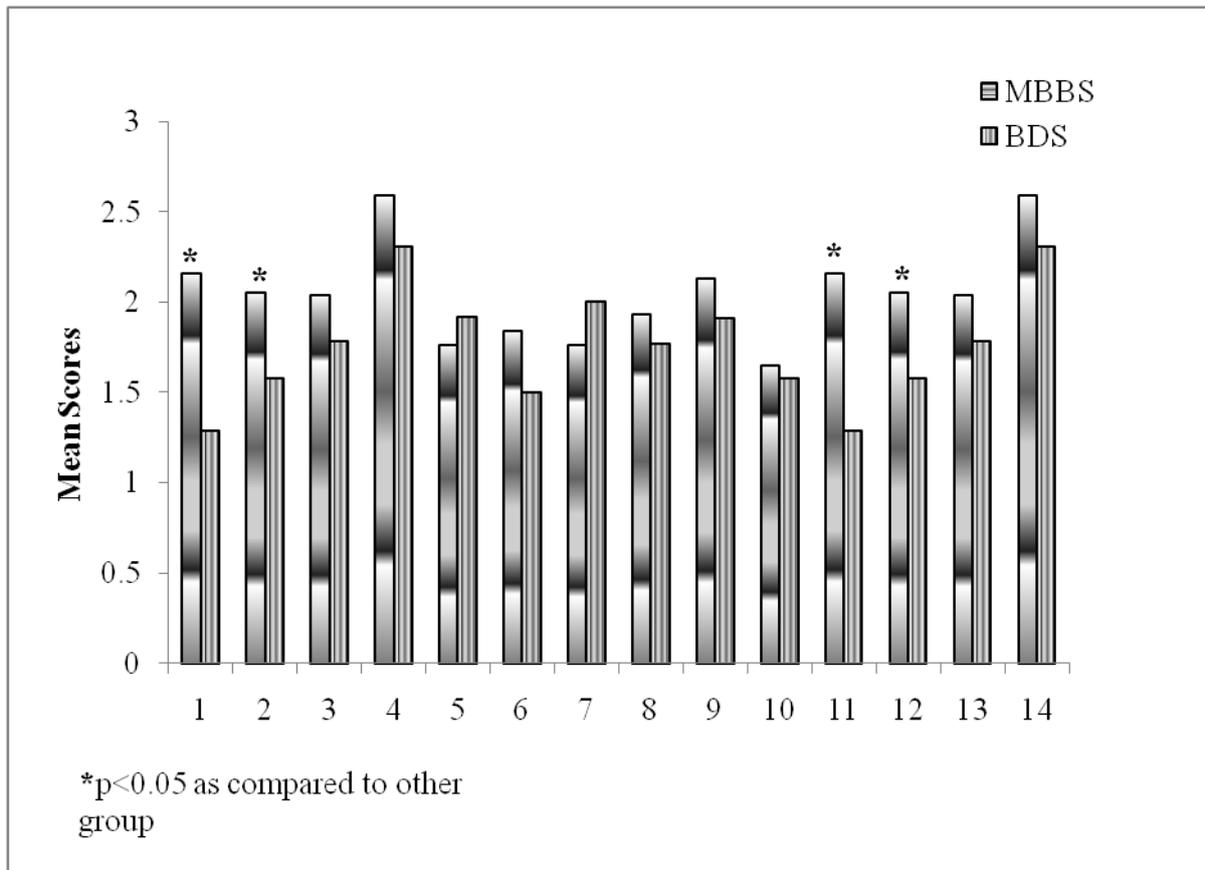


Figure 2: Comparison of PSS-14 score in both groups

the grading of the score¹⁷. It was found that stress was significantly more in students of medical professional course as compared to students of dental professional course as evident by Kessler Score and Perceived Stress Score ($p < 0.05$).

The frequency of stress seems considerable with little difference between males and females. The symptoms of the greater feeling of worn out for no good reason, restlessness that nothing could calm them down, worthlessness, depressed, sad that nothing could cheer them up, worthlessness and feeling that everything was an effort, greater feeling of upset because of something that happened unexpectedly, unable to control the important things in their life, angered because of declining confidence, irritation, and less achievement were more frequently cited²². As is evident from our study students who were in medical professional course were more stressed as compared to other students.

Our study compared the stress level of medical professional course students and dental professional course students, showing a significantly higher stress level in medical professional course students. The most challenging aspect of conducting this type of analysis is the absence of a common set of metrics to consistently measure stressors for each group¹.

In our study, students of medical professional course reported a higher level of perceived stress, whereas a study done by Murphy *et al* in US showed the dental students experience higher levels of stress during their training than medical students¹. The study used a modified form of Dental Environmental Stress questionnaire (DES), which would not have taken into account other sources of stress unique to medical students, thereby accounting for higher dental student scores.

A study done by Schmitter *et al* in 2008 comparing medical and dentals students showed more stress in dental students as compared to medical students.²³ This increased prevalence of stress was found in relation to performance pressure due to practical work like teeth setting. Mild, moderate, and high levels of stress have been reported amongst medical students and health care professionals from other countries and life of a medical student or a health care professional can be very stressful^{16, 20}.

There are certain limitations to our study. This is a cross-sectional study that provides only a snapshot of the stress prevalence, a longitudinal study to investigate the real pattern and trend of stress among medical and dental students is recommended. This study has more number of girls than boys especially in the dental professional

course, so it could modulate the stress levels perceived, hence we used Kessler 10. It has been shown to be without substantial bias with respect to sex and educational level. Also, an insight into the reasons for the stress and an intervention to take care of the stress would have been a good parameter.

To conclude our study showed that students of professional school were stressed and there was a significantly higher level of stress among students of medical professional course as compared to students of dental professional course. Interventions addressing the mental health of professional students should be initiated and some ways explored to limit the factors that cause stress, decrease the negative effects that result from that stress, and provide appropriate support and treatment to the students of medical schools.

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Long QT Syndrome Case Series

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Abstract

Long QT syndrome is a clinically important condition that has wide ranging implications including death. Its prevalence varies from one in 2500 to one in 7000 worldwide. Its awareness and screening is on the rise and this is mainly due to the greater understanding of the condition. It is inherited or acquired, both forms are thought to have a common pathophysiological mechanism. The inherited form is still being extensively researched, and the establishment of the International Long QT Syndrome Registry has become a catalyst to various clinical and genetic studies. This paper explores long QT syndrome using three case studies and the relevant ECGs. These cases provide a sneak preview into the complexities surrounding early identification of the high risk groups and the difficulties in safe prescribing. Finally, this paper aims to shed greater awareness of the LQTS and provides the reader with a further understanding of the syndrome.

Key Words

Long QT syndrome, LQTS, Aetiology, ECG, Torsade de Pointes, Ventricular fibrillation

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Introduction

The Long QT Syndrome (LQTS) is an umbrella term for a large group of inherited and acquired disorders characterised by a prolonged QT interval on an electrocardiogram (ECG)¹. The prevalence of the condition currently ranges between one in 2500 to one in 7000 people worldwide but it has been estimated that this may increase as the awareness and screening facilities of the condition increases². LQTS is clinically important because it can lead to sudden cardiac death (SCD) from ventricular arrhythmias; polymorphous ventricular tachycardia (VT) known as Torsade de Pointes and ventricular fibrillation. The risk of cardiac events is higher in males during the prepubertal phase while it is higher in females after puberty³. Individuals usually do not exhibit any structural heart abnormalities. LQTS is identified in the following scenarios; when clinically evaluating an unexplained syncopal event with an ECG, as part of a family study when a family member is diagnosed with the syndrome or when investigating congenital neural deafness⁴.

The first two traceable descriptions of the disease were by Jervell and Lange-Nielsen in 1957 and Romano and Ward in the early 1960s^{4,5}. Jervell and Lange-Nielsen investigated a family of six children, four of which were deaf and suffered from episodes

of recurrent syncope during activity. Three of the four deaf children were died suddenly before the age of 10 while playing. Their ECGs had showed prolonged QT interval. The parents and the two other unaffected children remained healthy. The syncopal events and the sudden deaths were interpreted as a condition that was inherited through an autosomal recessive pattern. However, Romano and Ward described a similar disease entity but without deafness. They reported families with children and one parent exhibiting QT prolongation, recurrent syncopal events and sudden death. Thus, the Romano-Ward (RW) syndrome is an autosomal dominant disorder without congenital deafness while Jervell-Lange-Nielsen (JLN) syndrome is an autosomal recessive disease with congenital deafness.

These two syndromes are further divided into various subforms based on the different mutations (more than 700) in the different genes (at least 13 from LQT1 to LQT13)⁶. These genes affect the functionality of the cardiac ion channels, subsequently affecting the length of the cardiac repolarisation phase in the cardiac cycle. These channelopathies form the basis of LQTS and manifest as a prolonged QT interval on an ECG recording.

The acquired form of LQTS is often reversible when the offending event is removed. Drugs are the most common offending agent while others such as electrolyte imbalances and bradyarrhythmias can also contribute to the acquired form of LQTS⁷. In 1979, the International Long QT Syndrome Registry was established which has become the catalyst for extensive clinical and genetic studies. The Registry currently involves 1,276 proband-identified LQTS families involving over 3,600 clinically or borderline affected family members with about 2,000 of these family members with genetically confirmed LQTS mutations. Regular publications from the International LQTS Registry have provided insight into risk mechanisms, genotype-phenotype associations, risk stratification by age, gender, genotype, and syncope preceding cardiac arrest or sudden cardiac death³.

Background

The derangement of cardiac ion flows in LQTS from congenital defects or from an acquired form result in prolonged repolarisation within the cardiac cycle. Prolongation of repolarisation is caused by a reduction in net repolarising current secondary to an increase in inward current (sodium or calcium), a decrease in outward current (potassium), or both⁴. Early after depolarisation (EAD) occurs in association with the prolonged repolarisation phase of the cardiac action potential cycle⁴. Triggered responses, which are EADs that reach threshold potential, may be subsequently propagated causing premature ventricular depolarisations. This is the precipitant of ventricular arrhythmias; Torsade de Pointes and ventricular fibrillation in susceptible individuals⁸.

Congenital LQTS is subdivided into distinct genotypes distinguished by mutations in at least 13 different ion-channel and structural anchoring genes located on chromosomes 3, 4, 6, 7, 11, 17, 20 and 21. The Jervell and Lange-Nielsen syndrome is caused by two genes that encode for the slowly activating delayed rectifier potassium channel (KCNQ1 and KCNE1) while the more common Romano-Ward syndrome is caused by mutations in 13 different genes resulting in the 13 different types of LQTS of autosomal dominant inheritance; LQT1 to LQT13 (Table 1)^{4,6,8}. The majority of the 13 genes encode for the rapidly or slowly activating delayed repolarizing cardiac potassium ion channels causing a reduced outward current while the rest encode for cardiac sodium or calcium ion channels resulting in increased incoming current. In LQT4, the gene encodes for a protein called ankyrin B (ANKB) which functions to anchor ion channels to specific domains on the plasma membrane. Mutations involving the ion channel genes in LQT7 and LQT8 result in multisystem diseases known as

the Andersen-Tawii syndrome and Timothy syndrome^{4,6}. Extracardiac manifestations are prominent in these syndromes. The former is characterised by potassium sensitive episodic attacks of periodic paralysis without myotonia and dysmorphic features while the latter is characterised by congenital heart defects, dysmorphic features and variable degree of autism. However, these are relatively rare and the LQT1, LQT2 and LQT3 types represent the majority and are responsible for more than 90% of cases of congenital LQTS^{4,6}.

The acquired form of the LQTS can be attributed to a number of causative factors. Drugs are by far the most commonly implicated. The mechanism in which they prolong the QT interval is similar in principle to that of the hereditary form where there is a net reduction in repolarising current. Anti-arrhythmic drugs especially those from Class IA and III possess potassium channel blocking properties which result in prolongation of the action potential⁹. This can precipitate EAD and Torsade de Pointes as mentioned earlier. Class IA drugs have a greater propensity to induce arrhythmias at a lower dose because at higher doses there is greater sodium channel blockade compared potassium channels¹⁰. This prevents the formation of EADs. Besides anti-arrhythmics, there are many other drugs that can block cardiac potassium channels (i.e. erythromycin and terfenadine) or stimulate cardiac sodium (i.e. ketanserin) and calcium channels (i.e. prenylamine) prolonging the repolarisation phase⁹. Other causes of acquired LQTS include metabolic imbalances (hypokalaemia, hypomagnesaemia and hypocalcaemia), bradyarrhythmias, CNS lesions (subarachnoid haemorrhage and ischaemic strokes), liquid protein diet, obesity and age⁷. Three case reports below demonstrate various aetiologies leading to a prolonged QT interval, its implications and management options.

Cases

Case 1

Patient A, a 43-year-old gentleman with a past medical history of alcohol excess, schizophrenia on quetiapine, ex IVDU on methadone and asthma was admitted following an RTA and sustained an open right distal tibia fibular fracture. He was taken to theatre for debridement and application of an external fixator. Following surgery, he had a VF/Torsades arrest, CPR commenced, emergency cardioversion given resulting in return of spontaneous circulation. Post arrest ECGs done subsequently showed prolonged QTc of 520ms which was potentially exacerbated by a combination of factors including methadone, quetiapine and surgery. An ECHO was done during this admission which showed good LV function. Following the arrest, patient A was transferred to CCU for

monitoring and was then stepped down to a cardiology ward once stabilised. Daily ECGs that were done on the ward revealed a QTc that remained at 470ms despite withdrawal of precipitating causes. Patient A was given bisoprolol to control the heart rhythm and advised that no other medication was needed if the QTc remained around 450-460ms and there was also no clinical indication for an ICD. To exclude any genetic predisposition for prolonged QTc and Torsades (as the QTc remained at 470ms throughout his admission); family screening on first degree relatives was done.

Case 2

Patient B, a 36-year-old gentleman with a background of IHD, MI (two years ago) and a family history of IHD presented with sharp, intermittent chest pain that was worse on breathing and slightly relieved with the use of GTN spray. There was associated palpitations and dizziness. Initial ECG was done which showed prolonged QTc of 571ms and whilst on telemetry, patient was noted to have non sustained episodes of VT. Electrolytes including magnesium, calcium and potassium were normal. ECHO was done which showed borderline LV hypertrophy with normal left ventricular systolic function. Daily ECGs did show a prolonged QTc but this normalised to 426ms prior to discharge. Patient had an inpatient ETT in order to assess if this precipitated any arrhythmia and also to assess if QT interval changed during exercise or in the recovery period. The ETT did not show any evidence of QT prolongation or arrhythmia and so the patient was discharged with an outpatient cardiac MRI and adrenaline test.

Case 3

Patient C, a 33-year-old female was admitted following an overdose of 80 tablets (60 mg) of citalopram with alcohol. She presented with right sided abdominal pain and vomiting. She then had a seizure which preceded a VT cardiac arrest with recurrent torsades on telemetry. Electrolytes showed low potassium of 2.9mmol/L, calcium of 2.36mmol/L and magnesium of 0.81mmol/L. She was given one emergency cardioversion which resulted in return of spontaneous circulation, given IV magnesium 2g and potassium replacement. ECG done showed prolonged QTc of 602 ms. ECHO was done which showed normal left ventricular wall thickness, normal left ventricular size and normal diastolic function. Subsequent ECGs also showed prolonged QTc. Patient unfortunately self-discharged from the ward a few days later.

Discussion

As mentioned above, the acquired form of the LQTS can be attributed to a number of causative

factors and this includes methadone and citalopram based on the cases demonstrated.

Methadone prolongs the QT interval and can progress to Torsade de Pointes. Methadone is known to have various effects on myocardial function by enhancing the inotropic response to sympathetic nerve stimulation and increasing the functional refractory period¹¹. Methadone also decreases the maximum rate of depolarisation and increases the action potential duration in Purkinje fibers, which can then subsequently lead to prolongation of the QT or QTc interval. High doses of methadone have been associated with a prolonged QT interval and Torsades based on a few clinical reports. In a retrospective case series of 17 methadone-treated patients who developed Torsades, investigators found that a daily dose of methadone was linked to a prolonged QTc interval after taking into account variables such as age, presence of structural heart disease and the presence of hypokalaemia¹².

Several case reports have also described the development of Torsades in patients on high dose methadone therapy and a shortening of the QT interval when the methadone doses had been decreased^{13,14}. Methadone blocks the flow of potassium ions through HERG channels which delays cardiac repolarisation¹⁵. In vitro data has demonstrated that methadone is a very effective inhibitor of the HERG channel in human cells transfected with the HERG potassium channel gene¹⁶. Therefore, leading to prolongation of the QT interval which was demonstrated in Case 1.

Citalopram on the other hand is a new selective serotonin reuptake inhibitor that has been approved by the FDA for major depression¹⁷. Citalopram at concentrations in clinical range is known to have a safer cardiac profile with regards to QT-interval prolongation and cardiac arrhythmias compared to TCAs¹⁸. However, there have been several studies and case reports of cardiac arrhythmias and deaths related to citalopram in patients with citalopram overdose or in combination with other antidepressant medication and antiarrhythmic agents^{19,20}. Citalopram-induced QT-interval prolongation and fatal arrhythmias are presumed to result from one of its metabolites, didemethylcitalopram which inhibits cardiac K⁺ and Ca²⁺ channels^{21,22}. In overdose, this produces bradycardia, QT prolongation and Torsades de Pointes which usually develops within the first 24 hours after exposure^{18,19}. However, the dose of citalopram required to cause fatal arrhythmias is 240 mg, four times the maximum recommended dose²¹.

The diagnosis for LQTS is complex and involves a myriad evaluation of specific clinical parameters (presence/absence of any cardiac event, asymptomatic family members, incidental discovery of QT prolongation) and ECG characteristics. Because of the diverse causative factors of acquired long QTS, clinicians are advised to routinely investigate family history for sudden deaths and perform baseline ECGs before prescribing medications that can potentially prolong the QT interval. Any drug that either delays cardiac repolarisation or inhibits the metabolism of another drug that delays cardiac repolarisation can increase the risk for Torsades and hence should be monitored regularly²³⁻²⁵.

Genetic Screening

Specific mutations resulting in LQTS can be easily identified through genetic testing which is limited given the complexity and heterogeneity of the disorder^{22,26}. A particular mutation in one of the three major genes (KCNQ1, KCNH2, and SCN5A) can be recognised in approximately 75% of patients presenting with LQTS (31). The chances of identifying a mutation increased progressively with increasing QTc, ranging from 0 to 62% as the QTc increased from the lowest (<400msec) to the highest (>480msec) category.

The Schwartz score that was developed in 1985 is a weighted scoring system for the diagnosis of congenital LQTS. It incorporates the measured QTc interval and other clinical and historical factors. Patients with a score ≥ 4 , suggesting a strong probability of LQTS, had with a mutation identified more frequently than those with a score <4.

A higher yield from genetic testing may be available with more sophisticated and creative strategies²⁷. There are several ways of which genetic testing can be utilised for screening in LQTS; a multitier approach. Firstly, focusing testing on small number of genetic sites with frequent mutations that could be stopped once a defect is found. For example, in suspected cases of LQTS, the 64 frequently mutated codons should be genotyped, which could yield diagnoses in 40 to 50 percent of cases²⁸.

Secondly, screening coding regions of KCNQ1 and KCNH2 (LQT 1 and 2) which account for more than 80% of cases in LQTS. Lastly, for patients who test negative in the second stage, full genotyping for less common mutations in SCN5A, KCNE1 and KCNE2 could be done.

An important limitation of this multitiered approach is that, if one mutation were identified in an early stage, the second would not be detected^{29,30}. This could alter management recommendations for

affected patients. Furthermore, since family screening is limited to an identified disease-causing gene, the failure to identify a second locus could prevent detection of affected family members.

In patients with a confirmed or suspected clinical diagnosis of LQTS, genetic diagnosis could have important implications for both management decisions and family members²⁶.

- Comprehensive or LQT1-3 (KCNQ1, KCNH2, and SCN5A) targeted LQTS genetic testing is recommended for any patient in whom a cardiologist has established a strong clinical index of suspicion for LQTS based on examination of the patient's clinical history, family history, and expressed electrocardiographic (resting 12-lead ECGs and/or provocative stress testing with exercise or catecholamine infusion) phenotype.
- Comprehensive or LQT1-3 targeted LQTS genetic testing is recommended for any asymptomatic patient with QT prolongation in the absence of other clinical conditions that might prolong the QT interval (such as electrolyte abnormalities, hypertrophy, bundle branch block, etc.) on serial 12-lead ECGs defined as QTc>480 ms (prepuberty) or >500 ms (adults).
- Mutation-specific genetic testing is recommended for family members and other appropriate relatives subsequently following the identification of the LQTS-causative mutation in an index case.

Comprehensive or LQT1-3 targeted LQTS genetic testing may also be considered for any asymptomatic patient with otherwise idiopathic QTc values >460 ms (prepuberty) or >480 ms (adults) on serial 12-lead ECGs.

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Varenicline and Depression: a Literature Review

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Abstract

Introduction: Varenicline is the most effective smoking cessation monotherapy medication. Pre-marketing trials excluded participants with psychiatric disorders. This literature review investigated the effects of varenicline among patients with depression. Method: On 30th December 2013, a literature search was performed using PubMed with the following search terms: 1) varenicline and 2) depression. From the 75 retrieved documents, 13 articles are used in this review. Results: Seven case reports show exacerbation of psychiatric symptoms in patients with depression taking varenicline. One case report shows that varenicline improves the affective symptoms of a smoker who developed depression and suicidal tendencies during previous cessation attempts. Two observational studies (n = 217 and 9) show worsening of psychiatric symptoms in patients with depression taking varenicline, and one study (n = 110) shows improvement. There are two clinical trials on patients with depression taking varenicline. One trial (n = 1117) shows worsening of psychiatric symptoms, whereas the other one (n = 525) shows improvement of smoking abstinence and no worsening of psychiatric symptoms. Discussion: The findings suggest that varenicline could worsen psychiatric symptoms in patients with depression. Clinicians should err on the side of caution and closely monitor patients with a history of depression taking varenicline.

Key Words

Varenicline, Depression, Psychiatry, Smoking Cessation, Adverse Effect

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Introduction

It is believed that depression is a predictor of smoking initiation.¹ Smoking prevalence among patients with depression is about 1.5 times higher than that of people without depression.² Only 37% of the depressed smokers are able to abstain from smoking for one week, compared to 56% of the non-depressed smokers.³ It has been suggested that patients trying to stop smoking who have histories of severe depression should be serially monitored and given prophylactic antidepressant therapy.⁴

Varenicline is currently the most effective smoking cessation monotherapy medication on the market⁵, with a 12-week abstinence rate of 43.9% (versus 29.8% and 17.6% in the bupropion and placebo groups, respectively) and a six-month abstinence rate of 29.7% (versus 20.2% and 13.2% in the bupropion and placebo groups, respectively).^{6,7} However, in the pre-marketing clinical trials of varenicline, patients with psychiatric disorders (such as schizophrenia, bipolar disorder and major depressive disorders) were excluded.⁸ Numerous post-marketing reports of serious psychiatric symptoms led to the manufacturer adding a boxed

warning regarding these adverse events.⁹ Doctors are advised to closely monitor patients with a history of psychiatric illness on varenicline for any changes in mood or behaviour such as suicidal thoughts or acts.

Varenicline acts as a partial agonist at the $\alpha 4\beta 2$ nicotinic acetylcholine receptor that binds more tightly to the receptor than nicotine itself.¹⁰ This mechanism prevents nicotine stimulation in the mesolimbic dopamine system, which is associated with nicotine addiction.⁸ At the same time, varenicline, to a lesser degree, stimulates dopamine activity, and thus decreases craving and withdrawal symptoms of nicotine. Similarly, bupropion is a dopaminergic and noradrenergic agent which has official indications for both the treatment of depression and smoking cessation.⁸ Nevertheless, the FDA Adverse Event Reporting System (AERS) database from 1998 through September 2010 reported a total of 2925 cases of suicidal/self-injurious behaviour or depression due to varenicline.¹¹ The number of cases was significantly larger than the number among bupropion and nicotine replacement users (229 and 95,

respectively).¹¹ The depressive symptoms are hypothesized to be due to varenicline activating the nicotine acetylcholine receptors and their subtypes, such as ganglionic ($\alpha3\beta4$) receptors.¹²

If varenicline exacerbates underlying depressive symptoms, patients with depression may be prone to experience them. The efficacy of varenicline may be reduced among these patients, because they may stop the therapy early due to side effects. There is not yet a literature review that discusses the association of psychiatric symptoms with the use of varenicline among patients with depression. The current review aims to investigate the efficacy and side effects of varenicline among patients with depression.

Methods

On 31st December 2013, a literature search was performed using PubMed with the following search terms: 1) varenicline and 2) depression. A total of

PubMed Search: 30 December 2013
Search terms:
1) Varenicline
2) Depression
PICO: P: human subjects with history of depression I: varenicline C: placebo or any comparators O: clinical characteristics, efficacy, adverse effects
Search results: 75 articles
Excluded in the systematic review: 62 articles
Editorials (n = 1) Patient information package (n = 1) Pre-clinical studies (n = 7) Reviews (n = 8) Articles not in English (n = 2) Irrelevant articles (n = 43)
Included in the systematic review: 13 articles

Figure 1: The PICO (Participants, Intervention, Comparator, Outcome) statement and study selection flow chart for the literature review

75 documents were retrieved. Two researchers reviewed the titles and abstracts of all documents. The documents are included in the current review if they meet the PICO criteria (**Figure 1**). Documents are excluded if they were editorials (n = 1), patient information package (n = 1), pre-clinical studies (n = 7), reviews (n = 8), articles not in

English (n = 2), and articles that do not discuss the effects of varenicline on patients with history of depression or depressive symptoms (n = 43). From the retrieved documents, 13 articles are used in this literature review (**Figure 1**).

Results

The first case report on the effects of varenicline on patients with depression was published in June 2008. A man experienced an acute exacerbation of depressive symptoms, which resolved after he stopped his varenicline treatment.¹³ Since then, there have been six other case reports that described exacerbation of psychiatric symptoms in patients with depression taking varenicline.¹⁴⁻¹⁹ One case reports suggests the use of bupropion to treat exacerbation of depressive symptoms associated with varenicline.¹⁸ In contrast, varenicline has been shown to improve the affective symptoms of a smoker who developed depression and suicidal tendencies during previous cessation attempts.²⁰

Table 1 lists these case reports and case series.

There are three observational studies on patients with depression taking varenicline: 1) an open-labeled study on 110 outpatient smokers with persistent depressive symptoms shows significant improvement in Quick Inventory of Depressive Symptomatology starting from week 2;²¹ 2) A 6-18 month questionnaire on 217 varenicline users shows that depressive symptoms at the time of varenicline initiation (measured by Patient Health Questionnaire-2, a screening tool for depression) are associated with suicidal ideation;²² and 3) A 12-week open-labeled study on nine bipolar patients with subsyndromal depression shows that varenicline reduces cigarette use but increases hypomanic symptoms.²³ **Table 2** lists these observational studies.

There are two clinical trials in subjects taking varenicline. The first trial shows that varenicline can exacerbate psychiatric symptoms in patients with probable history of major depression,²⁴ whereas a more recent trial shows that varenicline-treated participants with depression have higher smoking abstinence rate versus placebo.²⁵ **Table 3** lists these clinical trials.

Discussion

Despite some inconsistencies, the current literature review provides insights that can guide clinical practice. Clinicians should closely monitor varenicline users with a history of depression for any changes in mood or behaviour. Psychiatric side effects that have been reported include anxiety, paranoia, irritability, restlessness, hallucinations, hypomania, depressive symptoms, suicidal thoughts or acts. Although a case report suggests the use of

Year	Age	Gender	Varenicline Dose	Short Description of the Case	Country	Reference
2008	75	Male	Day 1-3: 0.5 mg twice daily, day 4-7: 0.5 mg twice daily, from day 8: 1 mg twice daily	A patient, with a history of recurrent major depressive disorder, experienced an acute exacerbation of depressive symptoms, which resolved after he stopped his varenicline treatment.	United States	13
2008	50	Female	Unknown (starting ~three months prior to admission and continuing until the day of admission)	A patient with a history of depression experienced mood and psychotic disturbance, which resolved after discontinuing varenicline.	United States	14
2008	33	Male	Day 1-3: 0.5 mg twice daily, day 4-7: 0.5 mg twice daily	A patient with a history of major depression and alcohol abuse experienced severe anxiety, which resolved after discontinuing varenicline.	United States	15
2008	35	Female	According to the manufacturer's instructions, to a final dose of 1 mg twice daily	A patient with a history of major depressive disorder, took varenicline twice, and became paranoid each time after initiation of varenicline.	United States	16
2009	61	Male	Unknown	A patient with a history of post-traumatic stress disorder, depression, and alcohol dependence, experienced visual hallucination after initiation of varenicline.	United States	17
2011	51	Male	0.5 mg daily	A patient with a history of depressive symptoms experienced irritability and restlessness when he was on varenicline, and then experienced maniac episodes after discontinuation of the therapy.	United States	19
2010	49	Female	Unknown in the 1 st episode (for two weeks); 1 mg twice a day in the 2 nd episode (for three weeks)	A patient with a history of depression and anxiety felt more depressed and had suicidal thoughts both times after she was started on varenicline. The addition of bupropion to varenicline alleviated her depression and suicidal ideation.	United States	18

Table IA: Case reports that showed varenicline was associated with exacerbation of psychiatric symptoms.

Year	Age	Gender	Varenicline Dose	Short Description of the Case	Country	Reference
2009	47	Female	Days 1-3: 0.5 mg/day, days 4-7: 2 x 0.5 mg/day, from day 8: 2 x 1 mg/day	Varenicline improved the affective symptoms and abstinence of a smoker who developed depression and suicidal tendencies during previous cessation attempts.	Germany	20

Table IB: Case reports that suggested varenicline was associated with improvement of psychiatric symptoms.

Year	Subjects	Methods	Interventions	Results	Country	Reference
2012	217 varenicline users	A 6-18 month follow-up questionnaire	Standard dose varenicline (0.5 mg daily for three days, 0.5 mg twice daily for three days, then 1 mg twice daily to complete 12 weeks). An opportunity to take varenicline for an additional 12 weeks if patients were successful during the initial 12-week period.	Depressive symptoms at the time of varenicline initiation (measured by Patient Health Questionnaire-2) were associated with suicidal ideation.	United States	22
2013	Nine bipolar patients with subsyndromal depression	A 12-week open-labeled study	Varenicline dosed per package insert guidelines in addition to self-help booklets and cognitive behavioral counseling	Significant reduction from baseline to end point in the number of cigarettes smoked per day (-2.4), urge to smoke (-45.9), and CO levels (-2.5 ppm). No significant change in depressive symptoms as measured by the Montgomery-Åsberg Depression Rating Scale. A statistically significant but clinically insignificant increase in hypomanic symptoms was observed.	United States	23

Table 2A: Observational studies that showed varenicline was associated with exacerbation of psychiatric symptoms.

Year	Subjects	Methods	Interventions	Results	Country	Reference
2011	110 outpatient smokers with persistent depressive symptoms	An eight-week, open-label study	Varenicline (started at 0.5 mg daily and titrated to 1 mg twice daily) in addition to stable doses of the patients' regular psychotropic medications	Significant improvement in Quick Inventory of Depressive Symptomatology starting in week two	United States	21

Table 2B: Observational studies that showed varenicline was associated with improvement of psychiatric symptoms.

Year	Subjects	Methods	Intervention/ Comparator	Results	Country	Reference
2009	1117 varenicline users	A three-month, randomized trial	Varenicline side effects and outcomes were compared between participants with and without probable history of major depression.	Subjects with probable history of major depression were more likely to report agitation, anger, confusion, depression, and anxiety.	United States	24
2013	525 adult smokers with stably treated current or past major depression and no recent cardiovascular events	A phase 4, multicentre, parallel, 1:1 allocation, double-blind, randomized trial	Varenicline, 1 mg twice daily, or placebo for 12 weeks, with 40-week non-treatment follow-up.	Varenicline-treated participants had higher smoking abstinence rate versus placebo at weeks 9 to 12, and 9 to 52. The study showed no clinical significant difference between groups in suicidal ideation or behavior, and no overall worsening of depression or anxiety in either group.	United States	25

Table 3: Clinical trials that showed varenicline was associated with exacerbation of psychiatric symptoms.

bupropion to treat exacerbation of depressive symptoms associated with varenicline, clinicians should be cautious about this information because it is not based on clinical trials. Health Canada recommends that patients should stop treatment with varenicline and contact their healthcare provider immediately if they have, or if their families or caregivers observe, psychiatric symptoms or behaviours that are not typical for the patient.⁹

Although the intention of this review is to investigate both the efficacy and side effects of varenicline among patients with depression, there is only one clinical trial that investigates the efficacy of varenicline. The case reports, case series, and observational studies in the current study are prone to having bias and confounding factors. For example, patients and clinicians may be aware of the association between varenicline and depressive symptoms from the media that lead to responder bias. The social histories and other mental illness of the subjects may be confounding factors that contribute to their depressive symptoms. Based on the double-blinded, placebo-controlled trial in the current review, at least we know varenicline could improve smoking abstinence in smokers with depression.

The current literature review has its limitations. There are inconsistent findings on whether varenicline improves or exacerbates depressive symptoms. Because the included studies report various outcomes, a meta-analysis could not be conducted. Although the majority of case reports

and observational studies show incidence of psychiatric outcomes associated with varenicline, they are prone to responder bias. One of the observational studies used the Patient Health Questionnaire-2, which is a screening rather than diagnostic tool for depression. In addition, the literature search was limited to English articles and PubMed search accessible in two university subscriptions, and thus might have omitted some important articles.

Conclusion

Despite some inconsistencies, the findings suggest that varenicline could worsen psychiatric symptoms in patients with depression. Clinicians should be advised to closely monitor patients with a history of depression on varenicline, although there are no clinical trials on how to treat those patients. There is one clinical trial that demonstrates the efficacy of varenicline in patients with depression, but clinicians should err on the side of caution and carefully weigh the potential benefits and harms on an individual basis.

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Social Science is the Backbone of Medical Education

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Abstract

India is known for its unique features like large populous country with burning issues viz poverty, illiteracy, ignorance, unemployment, underemployment maximum rural number of dwellers, unplanned urbanization, slums, migration, religion, customs, traditions, complex culture, indigenous health care system, faith healers and quacks, on the whole health for all is still mirage. A developing country like India has to opt for need based innovative strategies due to a large population and scarce resources. A country like India has to opt for education as one of the most important and useful tools to achieve national development. Present medical education system has to focus more on social and preventive aspect of health care, modifiable social determinants of health, social factors influencing health care, health care management and even regular follow ups and rehabilitation process.

Key Words

Health, Social science, Medical Education, Society, Community

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Introduction

Medical education leads to a noble profession which serves the sick and disabled whilst attempting to reduce human suffering in the society. Medical education aims at providing quality health care services to the general public. A developing country like India has to opt for need based innovative strategies due to a large population and scarce resources. Present medical education system has to focus more on preventive aspect of health care, modifiable social determinants of health, social factors influencing health care, health care management and even regular follow ups and rehabilitation process.

Medical education has to be modified to be more rational at providing need based health care services and such services should not be restricted to the remedial treatment at hospitals with drugs. The medical education curriculum should include preventive health education from an individual level to community levels if medical education intends to improve the quality life, which is the basis for overall development of a Nation. Medicine is often perceived as a profession for the altruists and is interpreted from the perspective of social mission. In collective consciousness, medical profession is associated primarily with the public service¹.

Health care is a complex phenomena. Health reflects the existing social, cultural, economical situation of individuals as well as of the community. Health cannot be separated by social determinants like educational level, housing conditions, income, food habits, cultural practices, religious background, political system, gender issues and also of individual's attitudes, perceptions, outlook, cultural practices, literacy status, family size, various psychosocial problems and issues viz bias about free and government facilities regarding health care.

Health care is a tough task in a developing country due to the pangs of poverty, illiteracy, ignorance & conservatism. Public healthcare professionals are striving hard to focus more on prevention rather than on curative & rehabilitative services as preventive services are simple, affordable, easy & more suitable techniques of handling health care. Common practices like healthy life style, vaccination, sanitation, hygienic practices (e.g. use of handkerchiefs), balanced diet, avoiding walking with bare feet, walking & washing hands have proved that these practices greatly contribute to a healthy life².

There is an urgent need to change the health culture of people to achieve the goal, 'Health for

AIP. A popular quote, “Health is Wealth” is an ancient Chinese quote which stands ever green³.

“If the national plan is one year – Grow Rice
If it is for 25 years –Grow Trees
If it is for 100 years- Do Health Education”

Authorities concerned with present medical education policy makers’ perspectives has to be replaced by a multidisciplinary approach, with a view to change health status of the general public, to render quality health care and also to plan people friendly health care system . Overnight it is tough to implement. There is an urgent need to teach Medical students about the society, social realities, exposure to social situations, social change and social problems in general social phenomena. The process of becoming a doctor and a member of the medical profession is a social one. Professional socialization requires a medical curriculum, which would include training in communication skills, medical ethics, health economics, consumer’s right besides clinical skills and subject knowledge⁴.

Introducing social sciences only in curriculum will not help as it will not change health culture instantly. Sociology introduces medical students to existing social realities and its impact on health and disease, psychology will help them to understand human behavior and influence on health, economics reveals the standard of living and its direct relationship with healthy living and social psychology will teach about all psychosocial issues relevant to life. This is the foundation of an individuals development as well as it reflects in National development.

Most of the Indian universities in undergraduate MBBS course in first phase syllabus have included sociology and other social sciences as part of community medicine subject. Number of hours of theory and practical (field visits) are also prescribed . Topics are also specifically mentioned to reveal briefly it starts with introduction of Sociology its relevance to medical profession, Social factors, Habits, Culture influencing health and disease, Social structure, individual, Family, Community, and Society, Urban and rural communities ,Urbanization and its impact, Social problems etc, under the title Psychology and its utility in health care viz art of communication with patients, points to remember while conducting clinical interview.

Field visits are also specifically recommended like visit to Village, Primary health center, Sub center, Anganwadi, Hospital, OPD and IPD, different useful functioning units CSSD , Incinerator, Medical record section etc, and such topics are taught by Medical

social workers who are qualified with masters degree in professional social work, as per MCI (Medical council of India) they are non teaching staff members of department of community medicine. They are paid less, they are not eligible for promotion, Why this discrimination. Is it not inhuman and humiliating?

When students learn that attending sociology class and field visits taught by less important non teaching staff naturally such formality does not attract students as there is no use, because there is no need to study sociology, specific marks for oral or written test is not made compulsory, there is no exam, no internal assessment marks. They are not taking it serious. This careless attitude towards sociology will continue in their professional life too, when medical students are not encouraged to understand importance of social sciences and its relevance to Medical profession in developing country like India.

How and why they will be peopling friendly Doctors!

Why such issues are neglected?

Why socially useful topic is neglected in medical education?

Why social scientists are not considered as teaching staff members?

It is high time that developing country like India , which is crippling to attain ‘Health for All’ has to understand importance of social science subjects in curriculum of medical education. It is more urgent to consider social workers as teaching staff members as they are contributing valuable knowledge which can change health scenario of the nation, who can teach medical students how health is a complex social phenomena, and how social science is the back bone of medical profession. Let medical social workers come to the main stream of teaching staff who can enrich the quality of Medical education by making it need based and people friendly. In one of the SEARO publication (1998) Dr. Myatu had mentioned that ‘if doctors are to remain relevant to the changing needs of the society they have to shape their roles within the context of total human development’⁵.

Can anybody practice medical profession without society? Then why does medical education lack systematic study of society and social sciences?

Key role of Medical education department

It is the need of the hour that Medical education departments have to focus on need based, community based, curriculum, Effective utilization of social sciences can make miracles. Technical knowledge of health care has to reach the poor, and to the darker corner of the society.

The Medical Education Units should pay attention to the development of this collateral curriculum. The role of MET unit or department is to train the trainers so that a need based curriculum can be formulated, implemented and revised from time to time. It should plan a curriculum for 'Tomorrow's Doctors' where 'core and options' curricula are exemplified. Communication, patient autonomy and doctor - patient relationship must underpin the whole educational process⁶.

Today, in the world of knowledge explosion, emphasis should be on the processes for retrieval of information and its appropriate use. One needs to use criterion referenced evaluation to find out whether the graduate is competent to serve the society needs. Teachers should be taught to evaluate objectively, reliably and without losing the insight for relevance⁷.

The common criticisms against the present medical curriculum are that it fails to inculcate appropriate skills and competence among learners to serve the community effectively. Developing a societal need-based and feasible medical education system is a challenging task⁸.

Following the recommendations of the Bhore Committee report in 1946, the Government of India, after independence, adopted the three-tier system of healthcare: primary, secondary and tertiary. We needed appropriately trained human power to man these three levels of care. Somewhere over the years we lost this objective and our goals. Health oriented training became more and more urbanized, doctor centered and technology driven rather than care driven, rural and poor oriented and equity conscious for the common man. The medical graduates are urban oriented and their mindset and training prepares them for service in urban areas or equips them for further training in their chosen fields of specialization.

The National Education Policy in Health Sciences, however, remained a draft. It is therefore, not the intention of this report to address the problems without taking into consideration previous committees that have attempted to address these very distortions in the system. There have been many such committees that produced good reports. With reference to medical education and its aims, the Bhore Committee (1946) and Mudaliar Committee (1961) spoke of a "social physician", Patel's report (1971) spoke of a "basic doctor", Srivastava's report (1975) spoke about the "family

and community oriented practitioner" with social responsibility and, finally, the Bajaj report (1989) spoke of the "Community Physician". Whenever feasible relevant quotes from earlier expert groups have been included⁹.

There are areas in the curriculum, viz., medical ethics, behavioral science, communication skills, managerial skills which do not receive due attention in the existing curriculum as they should. Changing needs of the society advances in scientific knowledge and innovations in the educational field necessitate constant changes in medical school curricula.

Teaching innovation should also target the development of ego-free attitudes, medical euphoria, communication skills and public dealing with humbleness. Making Undergraduates and Postgraduates prescription competent and confident. Developing their preventive and referral insight, basic record keeping, medico legal aspects, administrative skills, competence in dealing problems of hospital, handling of funds, media handling & VVIP handling should also be stressed upon in teaching curriculum. Keeping them updated about newly emerged health problems, developing their leadership qualities, determination, dedication, discipline, making them focused, learn to earn with dignity, feel honored to be part of this profession & making them competent for self employment should be the ultimate goal and target of medical teaching/ education in present scenario¹⁰.

Conclusion

The multifaceted, powerful, economical handy weapon that is the current existing medical education should include social science effectively while imparting quality medical education. Medical students are to be exposed to social realities and trained to render health information, health education, and creating awareness which can be utilized as a catalyst to create social action to fight the battle for 'health for all' leading to social welfare.

- Alternative and affordable new techniques to tackle social aspect of health problems should be initiated
- Medical social workers have to liaise between policy makers, health care providers & public to formulate need based health care activities
- Can anybody practice medical profession without society? Then why does medical education lack systematic study of society and social sciences?

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A Career in Oral and Maxillofacial Surgery

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Key Words

Oral and Maxillofacial surgery, Maxillofacial surgery, Cranio-facial surgery, OMFS, Aesthetic facial surgery

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Introducing Oral and Maxillofacial surgery

Facial soft tissue and skeleton forms an integral part of various vital body functions such as respiration, mastication, swallowing, taste and speech. Oral and Maxillofacial surgery (OMFS) is one such specialty that deals with hard and soft tissues of the facial skeleton as well as teeth. Historically, OMFS is considered to be a dental specialty requiring medical education but it is now open to medical graduates who want to pursue their career in this specialty. OMFS is not taught to medical undergraduates hence they have very little experience and knowledge about the scope of this specialty. The information provided in this article should give an overview of the specialty to make an informed career choice.

OMFS deals with medical and surgical treatment of conditions affecting head and neck structures. In Head and neck surgery there is considerable overlap between other specialties like ENT, Plastic surgery and Dermatology but Oral surgery is exclusively dealt in by oral maxillofacial surgeons as they are dually qualified with extensive knowledge and expertise.

Scope of Oral and Maxillofacial surgery¹

- Oral and maxillofacial trauma and management.
- Temporo- mandibular joint disorders and management.
- Disease affecting oral mucosa and jaws like infections, cysts and jaw tumours.
- Pre-Prosthetic surgeries for the replacement of lost dental structures with implants, Implant supported dentures.
- Salivary gland pathologies.
- Head and neck oncology and reconstruction specifically dealing with oral cancer.
- Cranio-facial surgery which deals with congenital

and traumatic deformities of the cranio-facial skeleton and soft tissues like cleft lip and palate, facial clefts etc.

- Aesthetic facial surgery: orthognathic surgeries, rhinoplasty, ear reconstruction, botox and face lift procedures.
- Skin cancer and dermatological procedures.

Life as a maxillofacial surgeon

A typical week for maxillofacial surgeon is a mix of outpatient clinics, day case surgery, theatre sessions, inpatient management and administrative work. The day starts with ward rounds followed by theatre list or clinics. Day case surgery comprises treatment provided under sedation and or short general anaesthetic for wisdom teeth extractions, pre-orthodontic procedures and soft tissue pathologies. Elective inpatient theatre procedures include maxillofacial trauma and reconstruction, head and neck oncology resection and reconstruction, orthognathic surgery and reconstruction of cranio-facial deformity. Depending on the size of the unit, the outpatient clinic ranges from 1 - 3 clinics a week. Out-patients clinic is a case mix of dental and maxillofacial patients. Time is also spent in weekly or bi-weekly multidisciplinary meeting depending on the subspecialty interest of the clinician. These are usually head and neck oncology and cranio-facial deformity correction where input is required from other health professional and specialties.

On call commitments for consultant is comparatively less and depends on the type of unit that the work is undertaken. Junior doctors deal with most of the out of hour's referral from accident and emergency, hence number of days where consultants are called for advice can be counted in single digits. These referrals include dento-facial trauma, facial lacerations, dento-alveolar

infections, skin infection and post surgical complications. The other part of the on call commitment is providing advice for referrals from dental as well as medical specialties.

Typical inpatient referrals are from medical specialties like, Cardiology inpatients with suspected endocarditis, Neurosurgery in-patients with brain abscess and Haemato-oncology inpatients all requiring dental assessment. They also work in close association with specialists like Orthodontists and Neurosurgeons providing joint care for patients requiring orthognathic and cranio-facial surgery, with Prosthetists and Restorative dentists they provide dental implantology services for patients with dento-facial deformity, with ophthalmologists they provide valuable hands on input for patients requiring orbital reconstruction.

As for work outside NHS there are consultants who dedicate their time both to NHS and private practice splitting responsibilities between the two. The private practice deals with different procedures elaborated under the scope of the speciality. Teaching and training is also incorporated into the weekly schedule. Most units provide post-graduate training and some hospitals are attached to dental school. As a consultant regular undergraduate and post-graduate student teaching commitments are included in the job plan. For training and continuing medical education there are different courses organised by Royal College of Surgeons and international courses to update and gain experience.

Training and Finance²

OMFS specialty requires both medical and dental degrees. Graduate entry courses are available for medical and dental trainees. These courses are sometimes shortened to three or four years. However medical graduates need to be aware of European directive suggesting Dental degree should be full time five year course and for new entrants this could mean extending the shortened course pending UK commission's final decision three. Both degree holders should complete FY1, FY2, CT1 with MRCS, dental foundation and one year of OMFS training to achieve OMFS core competencies before entering ST3 (Specialty trainee year three).

Downside of the career is monetary loss during the second degree. Essential financial support is lost due to inability to do regular work. University fee along with living expenses is an additional burden on the trainee. It is advised that medical or dental students

interested in maxillofacial surgery to become a member of British Association of Oral and Maxillofacial Surgery (BAOMS). Bursary is available from BAOMS for at least 10 students undertaking second degree that year. An essay or project on topic suggested for that year should be submitted hence will need a bit of hard work. The amount for the year 2011 has been £2000. There are many other scholarships and funds available but all would require little search and motivation.

Recruitment

National recruitment for ST3 process is undertaken by Severn deanery during spring and autumn. As per the 2012 figures the competition ratio was about 1.2 applicants per post and about 60% of substantive posts are filled in round one. Number of training posts were up to 20 in August 2012 and in round two there were up to 13 vacancies advertised in February 2013^{3,4}.

Post training fellowship

Post training fellowship is offered in the following sub-specialties⁵:

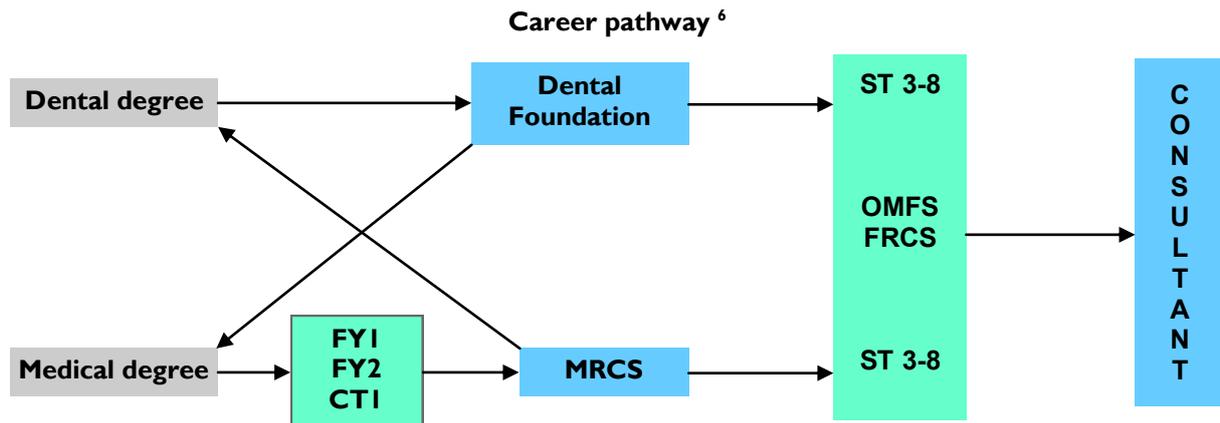
- Cleft Lip and Palate Surgery
- Cosmetic Reconstructive Surgery and Ocular-Plastic Surgery
- Head and Neck Surgical Oncology

These fellowships are also offered to ENT and plastic surgical trainees so tough competition exists to get into these posts.

Newer developments in the field of Oral and Maxillofacial Surgery¹

Distraction osteogenesis: This technique though not new has been evolving and have found place in correction of cranio-facial deformities. The technique involves cutting the bone and stretching the callus formed in the healing bone to produce lengthening of the bone. This can reduce the need for bone graft in facial deformities, cancer reconstruction and implants.

Stereo-lithography Navigational technology: Three dimensional models of facial structure can be made using computer assisted technology using information obtained from Computed Tomography (CT). This CT modelling helps to position the bones or prosthetic implants of the facial skeleton during the time of surgery. This accuracy at the time of surgery can optimise the final result and reduce the complications and the need for further surgery.



(MFDS/MJDF: not mandatory, In addition to General Medical Council registration from 2014 it is required to be eligible for full registration with the General Dental Council),FY: Foundation year, CT: Core Training, MRCS: Membership of the Royal College of Surgeons, FRCS: Fellowship of the Royal College of Surgeons.

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A Career in Clinical Anatomy

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Key Words

Clinical Anatomy, Surgical training, MRCS, Anatomy, Cadaver

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Introducing Clinical Anatomy

An understanding of the structures in the human body is one of the key pillars of knowledge fundamental to clinical practice. It is imperative for the surgeon to know exactly where to make their incision, the radiologist needing to identify what is abnormal, and the physician needing to know where pain is coming from.

There is no clear-cut career path to becoming a clinical anatomist. A medical graduate may follow an academic path to become one, or perhaps a junior doctor may take on a role as an anatomy demonstrator at medical school and then decide to follow a career path in clinical anatomy and take up a university teaching post. Alternatively, a surgeon may go into education to share their knowledge and experience later on in their career. Clinical anatomists can find themselves teaching anatomy to both under- and post- graduate medics, and also contributing to relevant anatomical research.

Life as a Clinical Anatomist

A popular job for medical graduates, which may encourage a graduate to pursue a career as a clinical anatomist, is demonstrating anatomy to medical students. After foundation years, doctors may use the opportunity to enhance their anatomy knowledge to aide in surgical training applications and MRCS examinations, or to increase their understanding of medical education if following an academic career pathway.

As an anatomy demonstrator, you may be expected to teach topographical anatomy exclusively. However, in some positions, but not all, you might be required to teach topics such as neuroanatomy

not only to medical students, but also to students in biological sciences and other professions allied to medicine. Teaching may involve using cadaver dissection, prosections, small group tutorials, lectures and radiological images. Additionally, demonstrators may be required to take part in examining students.

There are many benefits to teaching anatomy for a year, including developing teaching and presentation skills, which are fundamental for most career choices. This role often attracts individuals wishing to follow a surgical career path. It not only improves their personal knowledge of anatomy, but also helps in everyday clinical situations. Although these posts can be very rewarding, they can be challenging. You are responsible for keeping students enthused and interested, and also for introducing dissection to students who may not have seen a cadaver before.¹

The working hours and salary vary dependant on the individual medical school. However, on average a demonstrator would be expected to teach around 22-36 hours per week. Additional time is taken for learning and preparing material for sessions. With free time demonstrators can utilise the facilities provided by the medical schools, such as cadavers and prosections that are invaluable when preparing for examinations. Additionally, in free time some may find the time to do some clinical locums. An approximate salary for demonstrating anatomy is £24,000 per annum. However, not all roles are necessarily paid.

A medical graduate who wishes to develop a very detailed understanding of anatomy may also

consider applying to postgraduate masters courses in clinical anatomy. Just one example of this is Birmingham University's functional and clinical anatomy MSc. These courses are often part time, which may be ideal for working clinicians. Not only can they develop an individual's knowledge of anatomy but they also teach on aspects such as understanding and applying research literature.

Individuals who have a passion for anatomy and teaching often take up a post at a university either in a traditional role, a teaching focussed role or as a clinical teaching fellow. People who are interested in teaching anatomy while developing their research career may wish to consider the 'Anatomy Training Programme.' This programme is a two-year programme co-sponsored by the anatomical society and the American association of anatomists. This involves self-directed learning under the guidance of a mentor who teaches anatomy in their institution and a one-week intensive course. The programme includes modules on limbs, head and neck, trunk and neuroanatomy.²

The way in which anatomy is taught and who should teach anatomy has been of some debate over many years. Whether teachers of anatomy should be clinically qualified has been one of these arguments. Individuals with a background in subjects such as zoology for example, can provide a rich and diverse level of expertise to the teaching environment. Therefore, the teaching of anatomy in universities is not exclusively carried out by the clinically qualified. An argument that is frequently discussed is that researchers and clinicians who are highly specialised

may be interested in teaching in their particular area of expertise and not in others.³ However, an advantage of clinically qualified anatomy teachers might be that they can provide a bridge between anatomy as a subject and the clinical environment.

Clinical anatomists may find themselves teaching internationally. A benefit with anatomy is that the language is international. There are very few clinical anatomists worldwide and so the opportunity for collaborating with colleagues from different countries is extensive and can be a very appealing aspect of the job. A clinical anatomist may also find themselves writing medical textbooks. Often, clinical anatomists are now also becoming involved with hi-tech modalities such as Apps, e-learning books and 3D computer presentations.

In terms of research, clinical anatomists tend to contribute to areas depending on their interests as well as their areas of expertise. Examples of specialist areas might include basic anatomical research, surgical clinical anatomy, medical education, or a subject in which they have gained particular experience in. The scope for what a clinical anatomist may be involved in during their career is expansive. Clinical anatomists can be involved in a vast range of projects from trying to protect cadaver dissection in British medical schools to working with artists to produce anatomical artwork bringing the anatomy of the human body closer to the public eye. Other areas might involve working in fields such as trauma analysis whereby they observe how the body copes in traumatic injury.

An example of a clinical anatomist's working week is shown below.

DAY	MORNING	AFTERNOON
MONDAY	Clinical work	Preparing lectures for medical students
TUESDAY	Proof reading a new text book and scholarly work	Working on 3D anatomy project in laboratory
WEDNESDAY	Lectures/tutorials with medical students	Meeting with module leaders for curriculum
THURSDAY	Basic anatomical research	Anatomy OSCE for medical students
FRIDAY	Postgraduate teaching on a course on new shoulder surgery replacements	Postgraduate teaching on a course on new shoulder surgery replacements

Facts and Figures

Medical schools that currently allow their medical students to dissect include:

- Belfast
- Brighton and Sussex
- Cambridge
- Cardiff
- Dundee
- Glasgow
- Imperial
- Keele
- King’s College London
- Leeds
- Leicester
- Manchester
- Norwich
- Nottingham
- Sheffield
- St Andrews
- University College London

Example of approximate numbers for applicants for anatomy demonstrator posts 2012-2013

UNIVERSITY	TOTAL APPLICANTS	POSITIONS
KING’S COLLEGE LONDON	115	12
ST ANDREWS	35	5

The Future

As there are a very number of clinical anatomists it is hard to say what future developments for the career may be. However, with the increasing development of medical technology such as imaging, it is evident that clinical anatomists will embrace this, incorporating technology into their teaching

and research, presenting the structures of the human body in novel and innovative ways. An example of this is a clinical anatomist of old producing an anatomical textbook. Now and in the future clinical anatomists will embrace technology and may provide this information in the form of a medical app or online medical videos. However, it can be argued that there is no better way of learning anatomy than from cadaveric dissection.

Over recent years there has been an increase in concern that medical students are graduating with a lower level of anatomical knowledge than what is required and expected of them by the medical profession. Reflecting this, there has also been an increase in the number of post-graduate courses being run in anatomy at the Royal Colleges. An example of this is the Royal College of Surgeons of Edinburgh, who offer many courses such as the clinical anatomy of practical procedures, basic surgical anatomy of the head and neck and anatomy revision for FRCS (Tr and Ortho), which are just a few examples.⁴ As there are very few clinical anatomists, they are becoming more and more in demand and it is likely that the need for doctors who can teach anatomy will increase in the years to come.

It is clear there is no set career path to becoming a clinical anatomist. One clinical anatomist teaching in a university may be from a very different background and follow a very different career in clinical anatomy to the next. However, what clinical anatomists have in common is a passion for anatomy as a subject and for teaching. If a person shares this, it is an exciting time for the subject and a career as a clinical anatomist offers much diversity and potential to follow different interests.

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A Career in Global Health Medicine

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Key Words

Global Health, Humanitarian, Medicines sans Frontiers, Red Cross, International
Public Health

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Introducing Global Health

Global Health: exciting, challenging, and diverse, the specialty can be largely broken into two forms. Firstly, working in Humanitarian Aid with an international aid organisation such as the WHO. This side of Global Health involves large volumes of patient contact and a large opportunity for travel. International public health, on the other hand, is more research and academically focused. This branch is often referred to as "Global Health".

Humanitarian aid

Humanitarian aid encompasses aid relief for those affected by natural disasters, conflicts and other emergencies. In 2010, there were an estimated 210,800 people working in humanitarian aid globally.

Coordinating a humanitarian aid response is complex; the team will consist of a myriad of professionals ranging from physicians and surgeons, midwives to logisticians. The role of the doctor is to assess the health needs of the population and coordinate the appropriate response, providing medical care and working with the government, other organisations and lawyers.

Most of humanitarian aid support is supplied through agencies such as Médecins Sans Frontières, Merlin, Doctors of the world, and the Red Cross.

Life as a Humanitarian doctor

High exposure and the opportunity to work abroad in challenging environments are what draw so many doctors to choose to work in Humanitarian Aid. Working within a close-knit team, doctors work to provide healthcare in areas of resource limitation. In

addition to their role as a medic, doctors may also serve a role as coordinators, managers, educators and supervisors. Due to the intense and stressful nature of the work, placement periods are usually restricted to between nine and 12 months.

Some doctors enter into Humanitarian aid having trained in a specific specialty, some of which are in particularly high demand. These include GPs, Paediatricians, A&E consultants, Infectious/Tropical disease specialists, Epidemiologists and Psychiatrists. Anaesthetists and surgeons are always in high demand, and are often recruited for shorter missions of only a few months. Other doctors will spend a year or two working overseas with projects and will then return to the UK to continue their careers. Some may use their experiences in working with the "bigger picture" and specialise in Public Health, others will continue to work with disadvantaged groups such as refugees, the homeless or prisoners back in the UK. Alternatively, they may choose to continue to work in a resource-limited setting by practicing in very remote areas of Scotland. Aid work can also be done in addition to a primary specialty in the UK, through international exchange programmes, shorter aid missions during holiday periods or charitable links.

The work is primarily on a voluntary basis, although living costs, accommodation, insurance and security when on placement are usually covered by the agency.

Facts and figures

The majority of the different agencies have similar requirements. Doctors must have full GMC

registration and a minimum of two years practicing experience, although this is extended to three if following Foundation Training.

For the projects to run successfully, doctors must be available for 9-12 months (this is usually shorter for surgeons and anaesthetists), and they must be available at very short notice. In addition, applicants are expected to have at least three months experience working abroad. Language skills in French, Spanish, Portuguese, Russian or Arabic are very strong assets.

Some of the agencies require some experience in tropical medicine or infectious diseases; a Diploma in Tropical Medicine is advantageous. In addition, many of the large medical agencies recruit doctors from these courses, and so it is also a great place to make contacts. Minor surgical and obstetrical experience, as well as managerial and supervisory experience is well regarded.

International Public Health/Global Health

A career that is varied, exciting, and gives the opportunity to spend lengthy periods working in different environments both in the UK and abroad, Global Health is an increasingly popular career path.

Career opportunities are numerous, but not clearly defined. Examples include working in International organisations such as the WHO or UNAIDS, within the UK at International agencies, or working at a University or Institute such as Manchester's HCRI. Within these organisations, doctors can fulfil a

variety of different roles such as specialist experts in a particular area (e.g. HIV/AIDS or Neglected Tropical Diseases), or take on a more Public Health and management role as a Director, working in a specific project area.

Global Health is a career pathway not only confined to those with a Medical degree, resulting in a highly multidisciplinary work environment combining professionals from many different backgrounds (economic, political, sociological etc.). As a result, competition for posts is high.

Unlike more traditional specialties, Global Health has no clear training path; currently, those with a keen interest in Global Health must gain experience by their own accord. Doctors working in this field tend to already have specialised in a specific area, such as infectious/tropical diseases, public health, general practice or obstetrics. Experience in the Global Health can be gained either through internships with NGOs or International Health organisations, working abroad, or by completing further academic training such as the Diploma of Tropical Medicine.

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A Career in Military Medicine

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Key Words

Military Medicine , Armed Forces, Military Defence , Royal Army Medical Corps,
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Introducing Military Medicine

Military medicine is the practice of medicine within the Armed Forces. Medical Officers (MOs) go wherever the military are sent providing medical care when it is required to both service personnel and civilians. The armed services available in the UK are the British Army, Royal Air Force and Royal Navy. A successful medical officer must be organised, able to respond quickly and safely when under pressure and be flexible and able to adapt to service needs¹. The military offers a broad range of working environments, challenges every day and the opportunity to practice medicine in some of the harshest environments on earth, whether it is a jungle or desert, a submarine or airplane, or following a natural disaster where humanitarian aid is needed. Military medicine places you in an environment you would not otherwise get exposed to within the NHS. On a submarine somewhere under the sea; in the jungle or on an aircraft. You may be the only doctor for hundreds of miles and may not have access to all the equipment required to treat the patient.

Only three people have ever won the Victoria Cross twice, two were doctors. *The highest award for, 'Gallantry in the face of the enemy,'* was awarded to Noel Chavasse and Arthur Martin-Leake. They both served with the Royal Army Medical Corps during the 2nd Boer War and World War I.

Interaction with Other Specialities

Most of the secondary and tertiary health care is tri-service so there is plenty of interaction with your colleagues from the other two services. Military doctors usually work in Military Defence Hospital

Units (MDHUs) alongside their NHS counterparts treating military and NHS patients. These are based at NHS hospitals around the country so there is ample opportunity to work with your civilian counterparts. Injured personnel can require further rehabilitation so, once back in the UK, there is a mixed team of physio-therapists, surgeons, occupational health, dieticians etc. all working together to return the servicemen to full duties if possible. The military has numerous regional rehabilitation units but the main one is Headley Court in Epsom where complex rehabilitation and physiotherapy take place.

Emergency vs. Elective Work

While deployed, general practice or emergency work will be at the forefront of what you do, providing immediate and general healthcare to wounded or sick personnel. When not deployed, elective work may be undertaken on military personnel and civilians. On operation MOs are on-call 24/7 ready to respond to any crises that may develop. For example, if you choose to work on the Royal Navy's Trident submarines, you are on your own as regards treatment, with no contact to the outside world regardless of the condition the patient may be in.

Quality of Life, Pay, Job Satisfaction

Quality of life is good, working in an environment where people share the same ethos and values as yourself. You are afforded great respect by both the public and other doctors. Pay in the early years tends to be higher on average than those at junior levels in the NHS (on reaching full GMC registration - £52,225). Salaries rise by roughly £2.5k each year

regardless of rank so the NHS may begin to pay more when reaching senior levels. The military does provide subsidised accommodation and food. The cadetships whilst at university are individually arranged by each service and are worth roughly £14K, £16K, £18K for the last three years plus tuition fees paid, all in return for six years service (short commission) from the date of full GMC registration. While on a cadetship you will hold a junior officer rank and be expected to join your services university unit. This allows you to take part in weekend exercises and attend a training night each week to learn about the service, its role and to prepare you for military life.

Sub- Specialities

Some specialities are unavailable to military doctors due to service requirements. These include geriatrics, paediatrics, obstetrics and gynaecology and oncology. However there is plenty of scope for undertaking training in the following specialist fields: Radiology, aviation, hyperbaric, occupational and of course the more traditional trauma based specialities: Emergency Medicine, orthopaedics, anaesthetics, and general surgery. Rehabilitation, plastic surgery, ophthalmology and reconstructive medicine are also increasing in stature.

Opportunities, Challenges, Thrills

There are many upsides to life in the military: shared values and ethos; leadership and management; the challenging environments in which to practice medicine, however it is not for everyone:

- a. You can be away from home for extended periods of time, often with little contact with family and friends.
- b. The general duties period, 2-3 years in general practice serving with a particular regiment, unit, ship, submarine etc, means that military doctors end up 2-3 years behind their NHS counterparts, i.e. it will take longer to reach a consultant post².
- c. When on deployment it can be stressful and tiring, as you are on call 24/7 in what may be cramped conditions.
- d. Some specialties are not available to military doctors, reflecting the needs of the service.
- e. As an officer in the armed forces it is important to note that the service always comes first regardless of your position, and leave can be withdrawn at any time.
- f. Due to improvements in body armour and medical care personnel are surviving with ever more complex problems. This can be extremely challenging when dealing with young, highly motivated people who may be unable to perform as they once did.

Application Process

In order to become a military doctor, you have to pass the normal officer selection process comprising of: numerical and verbal reasoning tests; fitness tests; interviews and a further weekend of tests with your desired service. This can be done while at university to become a cadet, or once qualified if you are considering a direct entry. Your foundation years will take place at one of the MDHUs, which are based at the following NHS hospitals: Plymouth, Portsmouth, Northallerton, Frimley Park (Surrey), and Peterborough. The Royal College of Defence Medicine is based in Birmingham, where you can also work. Because the MDHUs are spread out around the country, the Defence Postgraduate Medical Deanery (DPMD) was set up in 1996 to coordinate applications to the MDHUs. While in your final year as a medical student you will apply to the DPMD for the six hospitals mentioned. No interview is needed. On completion of your F1 and F2, you will go to RAF Cranwell, BRNC Dartmouth or RMA Sandhurst for your officer training. Postgraduate specialist training is undertaken with the NHS along the same pathways as civilian doctors. The forces do take a number of direct-entry medical graduates. This varies year to year and it is best to check with your local careers office. If you do not want to go full time in the services, there is plenty of scope to join up as a reservist. With this you will train alongside your regular counterparts for a few weeks each year and can be deployed operationally every few years. It is certainly very worthwhile considering if you are unable to commit full time.

Recent Advancements

Advances in military medicine can be as complex as use of telemedicine (employing information and communication equipment to deliver health care from a distance) and robotics or as simple as a restructure of ABC management to CABC: looking at controlling Catastrophic Haemorrhage as a priority over Airway. Shrapnel injuries pose an infection threat, which can compound any problems already suffered. Advances in military medical care have included a suction device placed over wounds allowing Topical Negative Pressure to be applied, which can increase bacterial removal and reduce inflammation.

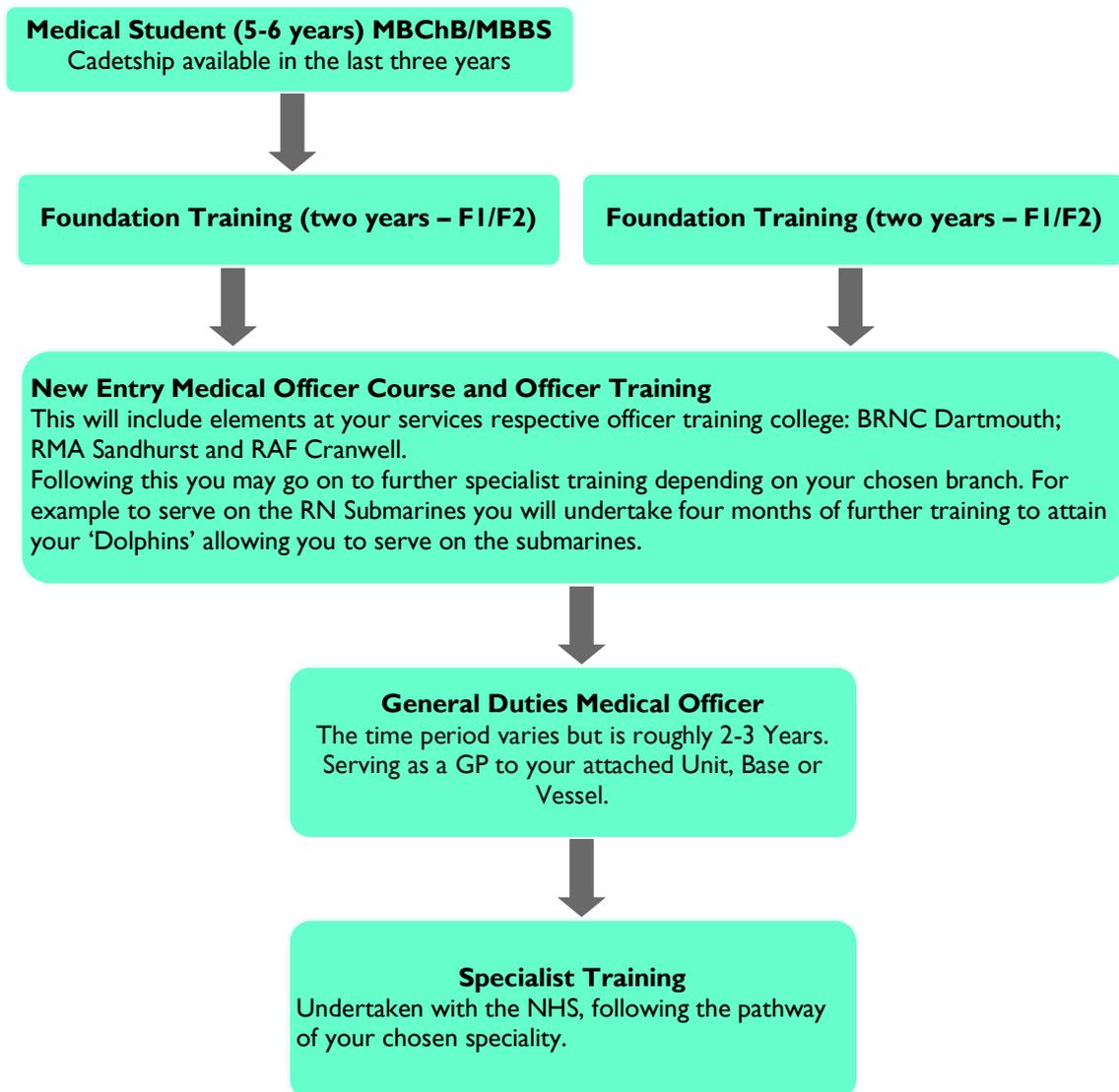
Maxillofacial injuries have been common since WWI; these can be treated by internal fixation with mini titanium plates rather than cumbersome external ones, allowing the recipient easier jaw movement along with aesthetic benefit, although there is an increased risk of infection.

Due to the variety of injuries sustained new techniques are being developed all the time

especially involving reconstructive surgery: In 2006 Pte. Neil McCallion had his wrist bones remodeled from three of his ribs and muscles from his right torso, after a 17-hour operation he can now perform most daily activities³. Another case involved Pte. Andrew Garthwaite who was severely injured in 2010; his 'bionic' arm will allow him to regain some sensory feedback⁴.

Camp Bastion, the main British base in Afghanistan, hosts the busiest trauma department in the world and brings together the expertise of NATO doctors

from around the world working together to perform life saving surgery. It is now thought that roughly 90% of battlefield injured personnel will survive. This is due to practices employed at Bastion. For example every seriously injured patient undergoes a full body scan while being admitted. There are also new 'one hand' tourniquets, which can be used by anyone, and the helicopter-based Medical Emergency Response Team, MERT, which allows early critical care management and rapid evacuation of field casualties to Camp Bastion for further treatment.



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A Career in Wilderness Medicine

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Key Words

Wilderness Medicine , Mountain Medicine, Antarctic Medicine, Pre-Hospital Care , Hyperbaric oxygen

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Introducing Wilderness Medicine

Stories of famous explorers have been around for centuries. Everyone's heard about Christopher Columbus' discovery of America, Ernest Shackleton's race to the South Pole and Neil Armstrong's first steps on the moon. Less well known but no less important is the job of the wilderness medic. The standard definition of wilderness medicine is 'When the patient is more than one hour from definitive care'. Clearly this covers a huge range of skills.

A twelve person team climbing Mount Everest will need a medic experienced in trauma, high altitude medicine and frostbite. A group of marine biologists however on a scuba expedition will need someone trained in diving medicine. Trying to give advanced life support halfway up a mountain or treat yellow fever during a trek through the Amazon rainforest is no easy task. Resources are low and there's no room in your backpack for an MRI scanner. There's no one around to ask for help – you are the help.

You need grit and the ability to take the initiative. You must be physically fit and experienced in the relevant sport – whether mountain climbing, sailing, scuba diving or jungle trekking. The ideal wilderness medic is something like a cross between Bear Grylls and Dr Gregory House.

Mountain Medicine

In mountain expedition medicine especially, the doctor patient relationship becomes blurred. You will live closely with the team for weeks or even months depending on the length of the expedition. Unlike working for the NHS, what is personal and what is professional become one and the same; which raises some interesting dilemmas.

For instance, it is the doctor's job to constantly assess the fitness of every team member. If there is even a slight suspicion of acute mountain sickness (a potentially lethal disease caused by low air pressure at high altitude) the climber must be sent down immediately.

It should be remembered though that Mt. Everest takes two or three months to climb and costs up to £30,000. For many climbers it is a lifelong ambition on which they spend their entire life savings. Imagine being only a few hundred metres from the top of the tallest mountain on earth, only to send down a friend you have been sharing a tent with for the last three months. Imagine that you cannot be certain they are sick, that it is only a suspicion. Diagnostics are difficult at -40°C with everyone wearing thick thermals and goggles whilst the lack of oxygen at high altitudes can affect your ability to make sensible decisions. Can you say with complete honesty that your judgement would be purely objective and clinical?

On the other hand, a close relationship with the team makes mountain medicine all the more rewarding. In 'Doctor on Everest', the expedition doctor Ken Kamler fails to reach the summit due to contracting pneumonia. At a celebration party for those who did get to the top however, a banner was strung up in his honour: 'Ken Kamler: Expedition doctor and saint'. Later he recalls 'Everest was more than the mountain; it was who I climbed it with... the prolonged confinement compelled us to get to know each other... Bonds of friendship formed swiftly, strengthened by the hardships we endured.'

Dr Rosena Allin-Khan is in many the ultimate

wilderness medic. She qualified from Cambridge, then specialised in emergency medicine in London. She has climbed mountains, trekked the Antarctic, worked with the Royal Flying Doctors of Australia and carried out humanitarian work in Pakistan after the floods.

Where specifically did you travel to with mountain medicine?

Firstly the Himalayas - I went to a stretch in northern India, landing at the highest airport in the world, Leh, and then went along the Tibetan Plateau and then through a bit of Kashmir. We set up remote clinics to treat the mountain population living at high altitude inaccessible by road, only by foot. Spending weeks climbing over mountain ranges we took medical care to those who would not otherwise have any.

Secondly I climbed Mount Kilimanjaro and was the doctor on an expedition team.

How did the opportunity to go on the trip come up?

With the Himalayas, I was actually searching for something extreme to do and came upon an organisation that took me to do mobile medical camps with them. With Kilimanjaro, that was a personal little dream and I arranged a way to get on a team myself.

How would you describe the overall experience?

Incredible! Mountain medicine exhausts you emotionally, physically and mentally. You need to be fit, strong and prepared.

What was a typical day?

With any Mountain work that involves travelling and having to move at altitude from one place to another, you typically wake at 5am, have breakfast, pack away the camp and get moving by around 6.30am.

What's a typical week like?

There is no such thing as typical week in the mountains. Every day brings fresh challenges and terrain and in all honesty, no two days are the same.

What's the salary?

Negligible – you don't do this for the money usually. It's for the love of the experience and for shorter expeditions, the best you can get is a free expedition for yourself as the doctor (saving you up to a few thousand pounds). For longer projects e.g. research staying in one spot for months, each job comes with very different and varying salaries. It's impossible to generalise.

How much competition is there for the job?

Always steep. Bottom line is with anything cool, everyone wants to do it. Persistence and constantly searching for the right opportunity is the best way to go.

How does being away from home affect family life?

No doubt about it, it is tough. It can adversely affect relationships and these are important considerations to bear in mind before you go. Family may also worry about you a great deal.

What sort of challenges come up in mountain medicine? What were the two most testing situations that you had to deal with?

The main challenges are trying to treat others when you yourself may be feeling quite unwell. When you are at high altitude you cannot think as fast, you become breathless with minimal exertion and altitude sickness can strike anyone at any time. Adding in treating patients on top of this and you have some serious challenges!

One team member in the Himalayas was an army doctor, very fit and strong. As we started to ascend he became very, very unwell, developing symptoms of pulmonary and cerebral oedema. He had to be put into a Gamow bag to simulate a lower altitude immediately and then transported urgently down the mountain to a lower altitude. This was terrible for morale and we lost an excellent team member for the duration of the expedition. Everyone became anxious the night he became sick and many team members wanted to abort the expedition. Carrying on was a significant mental and physical challenge.

What was your lowest point?

I spent an entire day feeling nauseated and vomiting. I just could not shake it. We were at very high altitude and about to attempt an important summit climb. I had no choice but to push through. No doubt about it though, it was tough and took every ounce of extra strength I had.

What was your best moment?

My best moment was reaching the summit of Mt. Kilimanjaro with the team. We were all hypoxic and euphoric and it was amazing.

Any near death experiences?

Not for me but in the Himalayas, one doctor developed appendicitis and we had to drive off into occupied Kashmir in the middle of the night to try and find a hospital urgently. To be inconspicuous, we travelled at night and only the doctor and two other members of the team (myself included) went

with them. If we had not been able to find medical attention when we needed to, her appendix would have ruptured and her outcome on the mountain would have been extremely poor.

Any research interests?

I am particularly interested in the true effectiveness of medical teams travelling to remote areas. Conducting medical camps in remote areas is great but when they occur once every year (due to their remote nature and associated dangers), how effective is it really for the people we treat?

What characteristics do you need to work in the field?

Physical fitness, able to work effectively in a team, be able to know your weaknesses and be adaptable!

Advice for students wanting to get into this area?

Seek opportunities wherever possible. Go to travel exhibitions and try and find teams who would take you with them. Use your medical elective to do similar work and try and build your CV slowly but surely. Don't spend a lot of money on expensive courses. The main aim is just to get out there and live it! Plan your own trips to climb mountains to build experience. Keeping up fitness levels is key. Ask people who have gone before and know the environment you are going in to.

What do you do in your spare time?

I spend all my spare time travelling and searching for new opportunities. I have done a range of different expeditions and humanitarian missions. As well as this, I also scuba dive and sometimes just plain and simple...like sitting on a beach!

Antarctic Medicine

The British Antarctic Survey (BAS) investigates global warming, ozone layer destruction, polar bears and rising sea levels. During the winter season, the 20 person team are completely, 100% isolated and so must be entirely self-sufficient.

The team doctor – usually a GP – must be able to deal with any illness thrown at them. However, support can be accessed via radio from the UK. The conditions are harsh and frostbite is common, especially with scuba diving taking place all through winter. There are also psychological issues, gynaecological check ups and dental procedures that must be carried out.

Again, as part of a small team who you live with 24/7, there is no barrier between what is personal and what is professional. Employment can last between one to two years, meaning a long time away from family and friends. This is cabin fever in

its extreme.

Coldron, Joanna Mary. 2009 Antarctic medicine - the challenges of being a doctor in an isolated and confined environment. *Wilderness and Environmental Medicine*, 20 (4). 383-387. 10.1580/1080-6032-020.004.0383

On the other hand, this is a place that tourists usually pay several thousand pounds on a two week tour to get to see. You will instead get paid for the experience and come home to at least years worth of wages (up to £29,000 per year), since there's no pub in Antarctica to spend your money on.

You will get to set foot on a continent most people only ever get to see on David Attenborough's 'Frozen Planet'. Polar bears, 100ft high icebergs, penguins and killer whales. The antarctic is nature at its most awesome. To quote Ernest Shackleton: 'I called to the other men that the sky was clearing, and then a moment later I realized that what I had seen was not a rift in the clouds but the white crest of an enormous wave...We had reached the naked soul of man.'

Links: <http://www.antarctica.ac.uk/employment/vacancies/index.php>

<http://www.antarctica.ac.uk/employment/>

Pre-Hospital Care

The hour immediately after a serious accident is critical, often called the 'golden hour'. The aim of pre-hospital medicine is to get the patient to hospital within this time window, whilst giving the best care possible on the way. It combines emergency medicine, intensive care, anaesthetics and even sometimes emergency surgery – all whilst at the roadside after a car crash, in the back of an ambulance or in a helicopter. Working closely with the fire service to extract victims from car crashes is common.

There are several air ambulance services running around the country, with each team usually including a consultant (specialising in emergency medicine, intensive care, anaesthetics or trauma) and a specially trained paramedic. Work is busy and the London Air Ambulance service for example attends an average of seven missions every 24 hours. The LAA specialises in major trauma i.e. life-threatening injuries, typically caused by road traffic accidents, workplace injuries, falls, stabbings and shootings. They also played an essential role during the terrorist attacks of 7/7. They have pioneered procedures which have been adopted across the world, including thoracotomy (open heart surgery) by the roadside. Pre-hospital care is now formally

recognised by the GMC as a sub-specialty of anaesthetics and emergency medicine, with formal exams and qualifications (see below for details).

Understandably therefore, pre-hospital care has a strong attraction for many wilderness medics. For example, the executive director of LAA Dr Thompson first worked with the British Army in Afghanistan as well as leading mountaineering expeditions, even summiting Mount Everest.

Chris Humphries is a 5th year medical student at Manchester who worked with the LAA whilst on placement said, 'Pre-hospital care is completely unique. In no other specialty do you get to don a Kevlar vest and be the first medics on the scene at a shotgun shooting, or crawl under a bus to traction splint a woman's leg.'

Air-bourne medical services are not just confined to the UK. The Royal Flying Doctors of Australia gained international fame in the television series 'The Flying Doctors.'

Links:

www.prehospitalcareprogramme.org

www.fphc.info

www.londonsairambulance.co.uk

www.airambulanceassociation.co.uk

www.flyingdoctor.org.au

Scuba Diving Medicine

There are several ways to do this. Firstly, as an expedition medic where you dive alongside the people you are looking after. For instance, with marine biologists on the Great Barrier reef. Secondly, as doctor who carries out 'Fitness to dive assessments'. This could be in any setting, from tourists in Thailand to professional dive workers on oil rigs. To become an HSE Approved Medical Examiner of Divers (AMED), you must undertake a five day course with a recognised provider. You will learn how a wide range of illnesses can compromise diving safety, such as COPD, diabetes and inflammatory bowel disease.

Thirdly, you could work with the Plymouth Diving Diseases Research Centre or London Hyperbaric chamber, which carry out medical treatment, training and research associated with diving diseases. They use hyperbaric oxygen therapy which involves patients breathing 100% oxygen while inside a pressurised treatment chamber. The most common disorder is decompression illness (DCI) also known as 'the bends'. This results from rapid decompression, as nitrogen that was previously dissolved in the blood forms bubbles, causing a variety of symptoms from joint pain to death.

However, the DDRC can also treat other conditions using hyperbaric oxygen therapy including carbon monoxide poisoning, smoke inhalation and cyanide poisoning. Working with the DDRC also means helping to run several training courses. Groups who have undergone training at DDRC include film crews, firefighters, recreational divers and coastguards. Training courses cater for basic first aid for divers, training doctors to carry out 'Fitness to dive assessments' and training for doctors in hyperbaric medicine as a specialty. The DDRC offer employment opportunities for FYI placements and also in medical diving research. The Divers Alert Network is an international organisation that also carries out a lot of research into medical diving, such as the effects of flying after diving.

With regard to research opportunities for doctors, how long do these placements usually last?

The clinical doctors working here spend their time on clinical duties rather than research. We do not have clinicians specifically employed for research but any of our clinicians are able to do research in their own time if they wish. This is with the exception of specific clinical trials which certain clinicians have clinical responsibility for. Research within diving and hyperbaric medicine occurs in much the same way as other medical specialties. Audits are done where either a need is identified through clinical governance or if someone has a specific interest in it. Research varies nationally, at the DDRC we have a research director who plans and co-ordinates research. There are several research projects and trials underway which involve collaboration with different groups e.g. Cancer research UK, Royal Marsden Hospital.

Clinical placement durations are as follows: one Junior doctor – six month post (see below). Senior doctors – varies between facilities but at DDRC there is one FT Director, one PT senior doctor, one sessional doctor, six self employed on-call doctors.

Whats a typical day like?

On a typical day we start with a morning meeting at 8.30am. This is attended by the doctors and nurses and the hyperbaric chamber team to discuss the plan for the day. We will then usually have a hyperbaric treatment starting at 9am, This will have anything from 4 – 9 patients in the chamber. These treatments are usually planned for our routine patients who we treat over a period of several weeks. These patients have conditions such as non healing diabetic foot ulcers and radiation tissue injury. It is the duty doctor's role to see these patients regularly and ensure they remain fit for the

treatment and are experiencing benefits from the therapy. A treatment lasts about 90 minutes and we will usually have between two and three of these running each day. On top of this there may be some patients who are being treated individually in our monoplace chamber. There can also be emergency patients arriving at anytime – usually divers with acute decompression illness, but possibly other patients with conditions such as carbon monoxide poisoning – who will need assessment and maybe treatment. There is a once weekly clinical MDT meeting which the doctor is expected to participate in.

The clinical part of the job role takes up about two thirds of the doctor's time. The remainder of the time the doctor can be involved in audit, research and providing teaching and training.

Where would your patients be referred from?

Hyperbaric patients can be referred by consultants (usually dermatologists, endocrinologists, or surgeons e.g. ENT) or their GP. Divers either self-refer or are referred by A&E departments or the coastguard.

What's the salary like?

Varies depending on the seniority of the role and the amount of on-call commitment and responsibility it entails. Broadly speaking it is in line with NHS salaries but does not include an NHS pension since hyperbarics is outside of the NHS. This therefore represents an approximately 14% drop in salary.

How high is the competition for the job?

This depends on the role applied for. We have a rotating six month junior doctor post which

includes a day a week working in A&E and time towards a Postgraduate Certificate in Remote Healthcare. We have approximately 10 applicants per year for two, six month posts. Minimum level is satisfactory completion of F2 training.

Senior diving and hyperbaric physician roles are a different process altogether and depend on achievement of CCT and level of past experience. These roles do not come up as frequently. At the DDRC, we insist on all clinicians maintaining an NHS role with separate appraisal and revalidation.

Diving research: <http://www.diversalertnetwork.org/research/index.asp>

Research Opportunities

IDRN #'Hot' research topics atm DDRC WMJ

Further Reading

The Journal of Wilderness Medicine (online)
Doctor on Everest
Expedition Medicine's book (on their website)
Oxford Handbook of Wilderness Medicine

Job postings

www.medicstravel.com

Courses/Training

Expedition medicine – the Royal Geographical Society
Diploma in Tropical Medicine and Hygiene – LSHTM / LSTM
Diploma of Underwater Medicine – University of Aberdeen
Diploma in mountain medicine - http://medex.org.uk/diploma/about_diploma.php
Pre-hospital care training for junior doctors and medical students - www.wildernessmedical.co.uk

MULTIPLE CHOICE QUESTIONS

QUESTION I:

Regarding the treatment for bedwetting:

1. Enuresis alarms are the first-line treatment in motivated children over the age of seven
2. Enuresis alarms are associated with a higher relapse rate than drugs
3. Reward system is an effective form of non-drug treatment
4. Desmopressin has much higher efficacy than tricyclic anti-depressants
5. Compared to alarm systems, drugs have a higher relapse rate once treatment is stopped

EXPLANATION:

Enuresis alarms are the first-line of treatment in motivated children over the seven years of age. They have an initial success rate of 65–80% but the relapse rates are about 30–50%. However, enuresis alarms are associated with a lower relapse rate than drugs, although alarms are slower to take effect. Alarms are usually needed for 3–5 months. The alarm can be discontinued when there have been 14 consecutive dry nights. Drugs can be used as a short-term treatment to allow the child to recover confidence or as a temporary measure to tide the child over nights spent away from home (e.g., during school trips). Drug treatments may also be useful as an adjunct to alarm treatment, as a way of easing the initial week of alarm treatment. The relapse rate is higher once drug treatment is stopped. Oral desmopressin has a response rate of about 70% and has a rapid onset of action. However, the symptoms recur in 50–95% after stopping treatment. Tricyclic anti-depressants such as amitriptyline, imipramine and nortriptyline are licensed for use in nocturnal enuresis in children over 7 years of age. Their mode of action is related to their antimuscarinic activity. Compared with desmopressin, tricyclic anti-depressants have similar efficacy and are less expensive, but cause more adverse effects.

QUESTION II:

Signs of raised intracranial pressure in children include:

1. Falling or depressed level of consciousness
2. Abnormal posturing
3. Pin-point pupils
4. Focal neurology
5. Tachycardia

EXPLANATION:

Some recognized signs of raised intracranial pressure in children include: (i) Falling or depressed level of consciousness (ii) Abnormal posturing - decorticate or decerebrate (iii) Dilated pupils or unequal pupils (iv) Focal neurology (v) Bradycardia and Hypertension (known as Cushing's reflex) (vi) Abnormal pattern of breathing (Cushing's triad consists of bradycardia, raised blood pressure and abnormal breathing), and (vii) Papilloedema.

QUESTION I: ANSWERS: 1 - T, 2 - F, 3 - T, 4 - F, 5 - T.

QUESTION II: ANSWERS: 1 - T, 2 - T, 3 - F, 4 - T, 5 - F.

MULTIPLE CHOICE QUESTIONS

QUESTION III:

Regarding meningococcal septicaemia:

1. Meningococcal vaccine is effective against both Group B and Group C infections
2. Infection rates are low in children under the age of five
3. The development of the non-blanching rash is an early sign
4. Compartment syndrome is a recognized complication of the disease
5. Amputation of the affected limb(s) should be carried out early to avoid progression of the disease

EXPLANATION:

Vaccination against Group C meningococcus is part of the standard immunisation programme in most of Western Europe and North America. Although this is effective in the prevention of meningococcal meningitis and septicaemia due to Group C meningococcus, it is not effective in the prevention of the disease caused by other bacterial forms such as Group B meningococcus. The infection rates are highest in children under the age of five, with a second infection peak in the 15 to 24 age group. The development of the non-blanching rash is a late sign. The development of compartment syndrome is a recognized complication of the disease (which may be caused due to the combination of microvascular thrombosis and muscle ischemia). An early amputation does not avoid progression of the disease, and, as such, amputation becomes necessary in the early stages only if infection supersedes the gangrene leading to sepsis.

QUESTION IV:

Concerning the management of cardiac arrest in children:

1. Ventricular fibrillation is the most common arrest rhythm
2. Asystole is a shockable rhythm
3. Adrenaline is the drug of choice in the management of asystole
4. Trauma is often associated with a reversible cause of Pulseless Electrical Activity
5. Pulseless ventricular tachycardia can be treated by administering an asynchronous electrical defibrillation of 4 Joules/kg

EXPLANATION:

Asystole is the most common arrest rhythm in children. Asystole is not a shockable rhythm (ventricular fibrillation and pulseless ventricular tachycardia are shockable rhythms). Adrenaline is the first-line drug in the management of asystole. Adrenaline should be administered in asystole in conjunction with effective chest compressions and ventilation. Trauma is often associated with a reversible cause of Pulseless Electrical Activity. Some other recognised causes of Pulseless Electrical Activity in children include hypovolemia, hypothermia, hypoxia, hyper- or hypokalemia, hypoglycaemia, tension pneumothorax, cardiac tamponade, thrombosis (e.g., due to pulmonary embolism) and toxins (e.g., drug overdose). When ventricular fibrillation or a pulseless ventricular tachycardia is identified in the cardiac monitor, an asynchronous electrical defibrillation of 4 Joules/kg should be carried out.

QUESTION III: ANSWERS: 1 - F, 2 - F, 3 - F, 4 - T, 5 - F.

QUESTION IV: ANSWERS: 1 - F, 2 - F, 3 - T, 4 - T, 5 - T.

Extended Matching Questions

EPONYMOUS SYNDROMES IN PAEDIATRICS

Options:

- A. Sotos syndrome
- B. Noonan's syndrome
- C. Laurance Moon Biedl syndrome
- D. Klinefelter syndrome
- E. Turner's syndrome
- F. Down's syndrome
- G. Neurofibromatosis
- H. Tuberous sclerosis
- I. Fallot's tetralogy
- J. Lesch-Nyhan Syndrome

For each clinical scenario, please choose the single most likely diagnosis from the list of options above. Each option may be used once, more than once, or not at all.

Questions:

1. A 14-year-old girl who has always been among the shortest in the class presents to the growth clinic distressed because she has grown very much and has not developed secondary sexual characteristics. Both her parents had reached puberty at an early age and are of average height. In her notes, it is recorded that she had swollen feet at birth but she was lost to follow-up.
2. A 15-year-old boy with learning difficulties and a known epileptic develops some facial angiofibromas (previously known as adenoma sebaceum). A careful inspection reveals 5 hypopigmented macules on his body.
3. A 4-year-old boy with developmental delay has developed a habit of lip biting and head banging. He is also noticed to have writhing motions and spasmodic movements of the limbs.
4. A 7-year-old boy with learning difficulties and short stature is found to have pulmonary stenosis when investigated for a murmur. He has some dysmorphic features including webbed neck, widely set eyes and low set ears.
5. A chubby 3-year-old girl presents to the general practitioner with an infection in the left ear. She has slanted eyes, prominent epicanthic folds, a protuberant tongue and she is developmentally delayed in motor function.

Explanations

1 – Turner's Syndrome is a chromosomal abnormality where affected individuals only have one X chromosome (45XO karyotype) as opposed to normal females who possess 2 X chromosomes (46XX karyotype). Common features of Turner's syndrome include short stature, lymphoedema of the hands and feet at birth, widely-spaced nipples, amenorrhoea, characteristic facial features, webbed neck, poor breast development, wide carrying angle of the arms. There may also be associated cardiac problems such as coarctation of the aorta with this syndrome.

2 – Tuberous sclerosis (TS) is a rare autosomal dominant condition that affects multiple systems in the body. The physical manifestations of the disease are due to the formation of hamartomas in different organs. Learning difficulties and epilepsy is commonly associated with TS and the kidneys, heart, lungs, skin and eyes can be affected. Adenoma sebaceum (patches on the face), Shargreen's patch (connective tissue naevi) and more than 3 hypopigmented macules are suggestive of TS.

3 – Lesch-Nyhan syndrome is a rare genetic disorder affecting males and is due to a deficiency in the hypoxanthine-guanine phosphoribosyl transferase enzyme which is required to prevent uric acid accumulation. Self mutilation as evident in lip biting and head banging is a distinctive feature of this disease. Hypotonia occurs during infancy and overtime, these children develop writhing motions (athetosis) and spasticity. These children may also develop mental retardation and kidney problems.

4 – Noonan's syndrome is a congenital condition with several features which are similar to Turner's syndrome. The clue in the stem is the male gender as patients with Turner's syndrome are invariably female, and 50% of patients with Noonan's have pulmonary valvular stenosis whereas Turner's is more commonly associated with coarctation of the aorta and aortic stenosis.

5 – Down's syndrome is a disorder characterized by an extra chromosome (trisomy 21). Patients with Down's syndrome are typically short and chubby and have characteristic features such as upslanting palpebral fissures, thick epicanthic folds, Brushfield spots, single palmar crease, tongue protrusion, and flat nasal bridge. Down's syndrome is associated with many conditions including atlantoaxial instability, increased risk of acute leukaemia (especially AML), atrial-ventricular septal defects, Hirschsprung disease, duodenal atresia, visual and hearing difficulties, developmental delay, respiratory infections, hypothyroidism and umbilical hernia.

ANSWERS: 1 - E, 2 - H, 3 - J, 4 - B, 5 - F

Extended Matching Questions

FAILURE TO THRIVE

Options:

- A. Giardia
- B. Coeliac Disease
- C. Neglect
- D. Renal disease
- E. Cystic Fibrosis
- F. Crohn's Disease
- G. Hypopituitarism
- H. Congenital Hypertrophic Pyloric Stenosis
- I. Congenital Heart Disease
- J. Prematurity

For each clinical scenario, please choose the single most likely diagnosis from the list of options above. Each option may be used once, more than once, or not at all.

Questions:

1. A 3-week-old infant boy is brought to the general practitioner because he has been bringing up his feeds in a projectile manner. The vomit is white in colour, with no blood or bile and occurs after every feed. His mother is also concerned as he is not gaining any weight.
2. A 6-week-old bottle-fed infant of a 18-year-old single mother is not gaining weight. The infant was 3.2kg at birth, on the 50th centile, but is currently weighing only 3.6 kg at 6 weeks.
3. A newborn infant has a distended abdomen at birth, brings up bilious vomit and has not passed meconium 48 hours after delivery. Immunoreactive trypsinogen (IRT) is raised and the sweat test is positive.
4. A 6-month-old infant is brought to the general practitioner because of recent bouts of diarrhoea and has not been putting on weight. On further questioning, the infant had recently been started on solid food namely cereal and pasta.
5. An 8-week-old infant is brought to the general practitioner because he has developed a slight bluish tinge, is becoming increasingly short of breath, is feeding very poorly and has stopped gaining weight in the last week.

Explanations

1 - Congenital Hypertrophic Pyloric Stenosis is a common condition which occurs more commonly in boys usually presenting between 1 – 18 weeks of life. There is hypertrophy and hyperplasia of the muscle layers at the pylorus of the stomach. As the pylorus becomes thickened, the pyloric canal becomes increasingly narrower resulting in the inability of food to enter into the duodenum. Consequently, feeds are regurgitated often in a projectile fashion, leaving the infant hungry after the emesis.

2 - The social circumstances of the mother coupled with the normal weight of the infant at birth makes this case sound very suspicious of neglect. The health visitor should visit the mother at home, check whether the mother is mixing the feeds correctly, the amount and frequency as well as the technique of feeding.

3 - The newborn infant is presenting with meconium ileus, which is the earliest presentation of cystic fibrosis (CF). Not all infants with meconium ileus have CF, and meconium ileus does not correlate to the level of severity of the disease in babies with CF. Immunoreactive trypsinogen (IRT) is a pancreatic enzyme that can help diagnose CF in neonates with meconium ileus, and will be raised in CF and the sweat test will be positive.

4 - Coeliac disease is an autoimmune reaction to the small intestines caused by a reaction to gliadin in wheat. It commonly presents around the age of 6 months, when infants are introduced to solid foods. Clinical presentation includes diarrhoea, failure to thrive and fatigue. The classical picture of abdominal distension, wasted buttocks, hypotonia and malnutrition is becoming historical in developed countries as children are being diagnosed and treated at an earlier stage.

5 - Cyanosis, shortness of breath and failure to thrive is very suggestive of congenital heart disease although these symptoms may also be attributed to respiratory causes. Respiratory causes may also have additional symptoms such as coughs and wheezes.

ANSWERS: 1 - H, 2 - C, 3 - E, 4 - B, 5 - I

Extended Matching Questions

CHILDHOOD SEIZURES

Options:

- A. Tonic-clonic epilepsy
- B. Simple partial epilepsy
- C. Febrile convulsions
- D. Reflex anoxic seizure
- E. Rolandic epilepsy
- F. Infantile spasms
- G. Absence seizures
- H. Myoclonic fits
- I. Panayiotopoulos syndrome
- J. Complex partial epilepsy

For each clinical scenario, please choose the single most likely diagnosis from the list of options above. Each option may be used once, more than once, or not at all.

Questions:

1. A 12-year-old boy is referred by the general practitioner because he has been experiencing seizure-like episodes with 3 prior episodes in the last 2 years. His mother reports that during these episodes, her son is unable to speak properly, producing a strange gurgling noise and the muscles around his right eye twitches rapidly. An episode typically lasts for about 3 minutes, with is no urinary incontinence or tongue biting, and the boy is fully conscious throughout. He is otherwise healthy, with no past history of epilepsy, or major illnesses to date. An EEG detected centro-temporal spikes during one of these episodes.

2. A 16-month-old girl is brought into the A&E by very worried parents because she had a fit this morning lasting for about 10 minutes. She had been unwell with a bad cold with a runny nose for the last 24 hours, spiking a temperature of 41°C in the early hours of the morning. Her parents were woken up by a strange banging sound and found their daughter's whole body being stiff and shaking. There is no past history of seizures or any family history of epilepsy. Physical examination reveals a tired-looking child with no neck stiffness and no rash present.

3. A 7-year-old girl is constantly told -off in school for not focusing during class-time, constantly blanking out and staring into space. She also blanks out during P.E. lessons, stops what she is doing for about 10 - 20 seconds, not responding when the teacher calls her name, then she resumes what she was doing exactly where she left off. The EEG show sudden onset of 3-Hz generalized symmetrical spike and wave complexes.

Explanations:

1. Rolandic epilepsy is one of the most common types of epilepsy in children, and has a good prognosis. This type of epilepsy is characterized by brief partial fits with unilateral facial or oropharyngeal sensory-motor symptoms such as tingling of the tongue, speech arrest, hypersalivation or twitching of one side of the face. On the EEG, this type of epilepsy is characterized by centro-temporal spikes which give rise to its other name -Benign Epilepsy with Centro-Temporal Spikes (BECTS).

2. Febrile seizures occur most often in children between 6 months to 5 years of age when the body temperature rises rapidly during a febrile illness. Seizures are typically tonic/clonic where the child's limbs stiffen and then jerk forcefully accompanied by loss of consciousness. No focal features should be present, no signs of CNS infection or previous history of epilepsy.

3. An absence seizure is a benign form of epilepsy occurring most often between the ages of 4 to 8 years of age. Children typically "go blank" for 10 - 20 seconds during which the child is unresponsive and is unaware of what is happening. The child's eyes may roll up briefly and these episodes can occur between 1 to 50 times/day. The child's intelligence and development is not affected, but their learning can be disrupted. The EEG patterns show a typical spike and wave discharges at 3.0 Hz.

ANSWERS: 1 - E, 2 - C, 3 - G.

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