Article:
Tomlinson, F and Willis, TA orcid.org/0000-0002-0252-9923 (2019) What are medical students' attitudes to clinical risk-scoring tools? An exploratory study. Education for Primary Care, 30 (6). pp. 355-360. ISSN 1473-9879

https://doi.org/10.1080/14739879.2019.1653227

What are medical students' attitudes to clinical risk-scoring tools? An exploratory study.

Abstract:

Background:

Clinical risk-scoring tools are increasingly recommended for use in general practice. Yet adoption of the tools has been variable and often low. Reasons for this have been explored, but medical students' perspectives have not previously been sought.

Aim:

To explore medical students' attitudes towards clinical risk-scoring tools.

Methods:

Qualitative, semi-structured interviews were conducted with eight medical students. Interviews were recorded, transcribed and analysed thematically.

Results:

Participants had a good understanding of the use of risk-scoring tools. They would trust them to enable evidence-based practice; provided they are easy to use, not time-consuming and their results can help direct management. They were considered useful tools, especially for students and junior doctors. However, many believed the tools hold less value for experienced doctors. Their attitudes seem to have developed from discussions with clinicians, observation on placement, teaching received, and exam content.

Conclusion:

This research recommends that implementation of risk-scoring tools will be increased if they are easier to use and if the belief that they hold less value for experienced doctors is challenged. The role of targeted teaching in changing these perceptions should be explored further, both for students and clinicians, who act as role models.

Keywords: risk-scoring tools; risk scores; clinical prediction models; risk assessment; medical students

Introduction

At the heart of primary care is the art of making decisions in a setting of uncertainty. To support this integral process risk-scoring tools have been developed. These are also known as risk scores, clinical prediction rules or models (CPR or CPM) and decision rules [1].

A risk score is typically based on an algorithm, created from the data of thousands of people. It is calculated by considering predictors, such as the patient's individual characteristics and test results, to determine the probability that an outcome is occurring (a diagnostic score) or will occur (a prognostic score) [2]. They range from simple scores that require only a pen and paper, e.g. Well's criteria for deep vein thrombosis [3], to complex calculations completed by a computer, such as QRISK®2 [4], a cardiovascular risk scoring tool that calculates the probability of a person suffering from a stroke or heart attack in the next ten years.

A validated risk-scoring tool has some fundamental advantages over human decision-making. For example, it ensures a clinician's assessment of a patient incorporates a significant evidence-base and maintains a level of consistency. Furthermore, mechanical prediction, including risk-scoring tools, have been shown to be better at predicting clinical outcomes than doctors [1, 5-8].

The prominence of risk-scoring tools has increased significantly in recent years. As many as 58 risk-scoring tools are recommended for use in general practice guidance [9], and related publications doubled between 1995 and 2005 [10]. The application of some tools, e.g. QRISK®2, is explicitly stated in the United Kingdom (UK) Quality and Outcomes Framework (QOF), a pay-for-performance scheme whereby general practices are remunerated according to achievement of targets reflecting quality of care [11].

Uptake of risk-scoring tools into general practice has been variable. Plüddemann et al. [9] reported that many recommended tools are used by less than a quarter of general

practitioners (GPs). . Another UK study reported that 66% of GPs had used risk-scoring tools, 'less than a handful' of times (34%) or 'not at all' (32%) in the previous 12 months [12]. Similar variability has been reported across Europe [13-15]. For example, Muller-Riemenschneider et al. [14] reported that GPs' use of risk-scoring tools in Germany ranged from 7% for osteoporosis and fracture risk-scoring tools, to 60% for certain cardiovascular tools.

Research on risk-scoring tools predominantly focusses on the development of individual tools. There have been fewer attempts to explain why risk-scoring tools as a whole have not been effectively adopted by GPs in the UK. Some studies have evaluated the impact of individual tools [16, 17], another appraised the current guidance [9], and others have considered clinicians' views on risk-scoring tools in general [14, 18]. There remains a need to expand our understanding of the attitudes towards risk-scoring tools in the medical field, so that solutions and explanations may be offered for their variable adoption. The aim of this research was to explore medical students' understanding and perceptions of risk-scoring tools, to offer an insight into the views of tomorrow's doctors, an area yet to be explored.

Methods

Participants for this qualitative study were recruited using convenience sampling, via an email sent to all medical students at the University of Leeds, UK. The email invited fourth and fifth year students to take part, as they were most likely to have had exposure to risk-scoring tools in practice (Table 1). Interviews were conducted on the University campus over a two-week period in Spring 2018.

Before the interview, participants had the opportunity to ask questions and provided written consent to participate. An interview topic guide was adapted from a study that explored attitudes to risk tools in GPs [18]. The guide was refined following discussions with

stakeholders (two GPs, an employee of Public Health England, and two junior doctors) and a pilot interview to ensure questions were appropriate for addressing medical students. Participants were aware that the project related to Primary Care and during the interview they were encouraged to refer to risk scoring tools used in General Practice.

Interviews lasted between 30 and 45 minutes. They were recorded using an encrypted audio device and transcribed verbatim immediately after the interview by XX, before being analysed thematically. Specific events, meanings and behaviours were highlighted in the transcript and labelled using appropriate codes. These codes were grouped into themes and sub-themes by XX, which were then discussed with YY and a consensus reached. This was a student-led study and no more than eight interviews were able to be completed due to limited time and resources.

The study was granted ethical approval by the University of Leeds School of Medicine Ethics Committee (AHREC 17-016).

Findings

Eight participants completed interviews. The sample's demographic characteristics are presented in Table 2.

Following thematic analysis three key themes were identified: features of risk-scoring tools, practicalities and context around their use, and educational factors. These were further divided into seven sub-themes (Table 3).

Features of risk-scoring tool

The first theme concerned participants' views on the features and benefits offered by risk-scoring tools.

Potential to be acted upon. Risk-scoring tools were considered valuable if they could inform a clinical decision, direct management or facilitate communication. However, the tools must be more than just stand-alone and should be provided alongside instructions on their use.

> You can say, 'well you've got an x % chance of having a heart attack, or heart disease in the next 10 years' and then that can kind of be quite useful for [patients] (P4)

> Without any guidance on how to interpret the score in terms of management… it's not all that useful (P1)

Ability to guide history. Students believed risk-scoring tools ensure doctors ask the necessary questions. This was considered especially important for less experienced doctors, typically in relation to issues around patient safety.

> …a score can cut to the heart of the issue, and get you to ask the pertinent questions, which might guide your management (P1)

> …[risk-scoring tools] make sure [junior doctors] act safely and don't miss anything too serious (P2)

Evidence Base. The evidence-base that underpins risk-scoring tools was identified as a key feature, enabling a consistent approach towards patient care.

> …[a risk-scoring tool] is evidence based, so it's providing you with a solid grounding rather than just your previous experience. (P2)

> They're for enabling an objective measure of how dangerous, or how ill somebody is… so that everyone can be assessed in the same way. (P1)

However, it was recognised that an over-reliance upon risk tools may threaten a doctor's ability to consider the clinical situation and provide personalised care.

> …it sometimes doesn't afford the flexibility that you would want it to and it can give you tunnel vision… instead of maybe taking a step back and considering the clinical situation (P7)

Practicalities

This theme outlined some of the practical reasons that risk-scoring tools may or may not be used in practice.

Ease of use: It was agreed that 'ease of use' and a 'minimal time requirement' were vital if a risk-scoring tool is to be adopted into practice. New technology, automated

prompts, electronic templates and phone applications were innovations suggested that could promote ease of use.

> …even if something is fantastic, if it takes too long, then I feel that probably a lot of the people wouldn't use it (P3)

> …having everything on an app, to open it up.. do your normal clinical assessment then… go tick tick tick tick (P8)

Practical motivators: Financial incentives and the duty to comply with clinical guidance were among the main reasons that a doctor would use a risk-scoring tool.

> …there's a certain financial and target hitting motivation for the GP to use risk scores to generate QOF points and whatnot (P6)

> …a lot of [risk-scoring tools] are in NICE guidance… and you don't really want to be deviating from that (P7).

Doctors were also thought to use risk-scoring tools to justify their clinical decisions to seniors, patients and for legal reasons.

> …it reduces their liability if they've shown they've calculated a score and their management has adhered to what that score would suggest (P1)

> I think… it will become quite, 'I need to calculate this risk-scoring tool to justify that I've prescribed this… [to] whoever might want to sue me, my seniors, the patients…' (P5)

Educational Factors

The third theme encompassed the experiential and structured education that students have received. This seemed to be the origin of their views and opinions.

Teaching and education: Every participant stated that they trusted risk-scoring tools, an impression which seems to have developed as a result of their teaching from respected clinicians, experiences on placement and through their presence in exams, such as the clinical assessment known as the Objective Structured Clinical Examination (OSCE).

> [my trust for risk-scoring tools is from]…having it presented by people I respect, saying you know, this is something worth doing and this is useful and is something you have to do in your OSCEs (P7)

Participants felt confident in using a risk-scoring tool, particularly if they were able to use the internet *'to look it up' (P8)* so they knew how to calculate it. Additionally, many thought learning about risk-scoring tools could supplement medical undergraduate teaching about risk factors, history taking and risk stratification.

> …it's useful to understand the reason behind using [a risk-scoring tool] and therefore understand the risk factors and to learn the process of risk stratification (P2)

Experience on placement: Although the tools were considered to have many potential benefits, many students were under the impression that risk-scoring tools are not regularly used in practice.

> …you don't see them being used as much as perhaps they should be, and as much as you perhaps hear about scores, you never really see them used in real life, beyond a couple of obvious ones (P2)

> I wouldn't say I've ever seen doctors overtly use a risk score, or calculator. Or it may be that they're at the point that they just know instinctively what it entails. (P6)

Some students were under the impression that many doctors found risk-scoring tools *'tiresome' (P1)*, which they attributed to the doctors' superior clinical acumen. Many believed that risk-scoring tools become *'less and less useful' (P2)* as a doctor gains more experience.

> …experienced GPs don't really rely on these kinds of scores, because they're able to do it intuitively through experience (P3)

Despite this belief, the tools were still thought to be helpful in general practice, especially for less experienced and junior doctors. This view seemed to originate from observation on placement.

> [Risk-scoring tools are most useful] as a junior doctor, because you're often making decisions that are a bit beyond your experience and knowledge so it's nice to have some backup (P4)

> I think they have the potential to be useful… as a learning tool and in younger training years they are complementary to your learning… but once you get to a certain level and you've taken thorough histories they shouldn't really be necessary (P2)

Discussion

This study offers the first insight into medical students' attitudes towards clinical risk-scoring tools. Participants reported a good understanding of the tools, including their practical application and the advantages, enablers and barriers to their use. They appeared to trust the tools and their evidence base, believing they have the potential to be advantageous to practice. First, they can help to support clinical decision making, ensuring safe practice within medicine. This is particularly helpful for junior doctors with limited experience, to help refine their history-taking skills, to prevent them forgetting important questions and to justify their clinical decisions to seniors, patients and if required for legal purposes. Second, they may provide an effective way of communicating clinical risk to patients, which has been cited as a major advantage of risk-scoring tools, such as QRISK®2 [18, 19]. Finally, risk-scoring tools may have a novel role in undergraduate medical education, as they complement learning about risk factors, history-taking and risk stratification. This area is yet to be explored and could benefit from further research.

Students identified several practical factors that currently motivate doctors to use risk-scoring tools. These were mostly consistent with the enablers to use found in previous studies, such as 'mandatory guidance' and 'financial incentives' [9, 15, 18]. Despite these

motivations to use the tools, many felt that they are often too time consuming to incorporate into practice. This concern has been documented elsewhere [15, 18, 20-22], highlighting the on-going challenge of integrating risk-scoring tools into everyday practice.

If doctors are to adopt risk-scoring tools into regular practice, this study recommends that ease of use must be targeted. A user-centred approach could aid the design of the tools by encouraging a consideration for the system into which they will be integrated and their end users. This method has been effective in designing medical technology with improved usability, especially in enhancing patient safety [23, 24].

Drawing upon their experience of general practice placements, several participants considered risk-scoring tools to be used infrequently by experienced doctors, at least in relation to their own expectations. Many suggested that the scores become 'less useful' to doctors as they gain experience. These observations appear consistent with evidence that the tools are not used as often as recommended by guidance [9, 12]. This may reflect the impracticalities of the scores, or the fact that some GPs may prefer to rely on their own clinical judgement rather than a risk-scoring tool [18], but it would benefit from further investigation to explain their resistance to utilisation. For example, future research may use behavioural theory (e.g. the Theoretical Domains Framework [25]) to more systematically identify the reasons for the use (or not) of risk-scoring tools.

If experienced clinicians do not value risk-scoring tools this attitude will likely filter into the mind-set of learners. The danger is that a cycle will ensue, whereby these views are maintained by current students as they progress through their own medical career and the same outlook will be passed onto the next generation of medical students. If the tools are shown to be valuable to doctors at all levels of experience, as the literature would suggest [1, 5-7], then action would be warranted. We recommend that teaching might be most effectively directed at those experienced clinicians who appear not to value risk-scoring tools

(particularly those tools identified to be useful in general practice). Further teaching for medical students could increase appreciation for the advantages offered by a validated risk-scoring tool, throughout a medical career. This could alter perceptions and encourage the appropriate use of the tools, subsequently preventing students progressing through their career with the belief that the tools will hold little value when they become experienced clinicians themselves.

Strengths and Limitations

Limitations of this work must be acknowledged. First, the relatively small sample of students from one medical school may not be representative of the attitudes of medical students across the UK. Furthermore, the convenience method of sampling may have introduced bias in that participants may have been those with a particular interest in this topic. Fourth and fifth year medical students were interviewed to ensure adequate exposure to general practice (Table 1); however, their knowledge of when and how risk-scoring tools can be used in a practical sense may be limited when compared to practicing doctors. Saturation of findings was not achieved and thus further exploration of these issues with a larger sample would be recommended. Nevertheless, this study is the first to explore medical students' perceptions of and attitudes towards risk-scoring tools and the findings provide an insight into the views of this important group.

A potential strength of the study is that, as a medical student, the interviewer and lead author was well-placed to appreciate participants' perspectives, ask appropriate questions and gain honest responses. The use of a topic guide that drew upon existing work [18] and was refined following stakeholder input is a further strength of this study.

Conclusion

This research presents an insight into the views of medical students towards the use of risk-scoring tools in primary care, including their perceptions of the advantages and barriers to use. We recommend that implementation will be increased if they are easier to use and the belief that they hold less value to experienced clinicians is challenged. The role of targeted teaching in changing these perceptions should be further explored, both for students and clinicians, their role models.

Acknowledgements:

The authors wish to thank Catie Nagel (Course Director, Applied Health Suite and Programme Leader intercalated BSc Applied Health, Primary Care) for her helpful comments on an earlier draft of this manuscript.

The authors report no conflicts of interest.

References

1. Adams ST, Leveson SH. Clinical prediction rules. BMJ. 2012;344: d8312.
2. Ranstam J, Cook JA, Collins GS. Clinical prediction models. Br J Surg. 2016;103(13):1886.
3. Wells PS, Hirsh J, Anderson DR, et al. A simple clinical model for the diagnosis of deep-vein thrombosis combined with impedance plethysmography: potential for an improvement in the diagnostic process. J Intern Med. 1998;243(1):15-23.
4. Hippisley-Cox J, Coupland C, Vinogradova Y, et al. Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: prospective open cohort study. BMJ. 2007;335(7611):136-147.

5. Grove WM, Zald DH, Lebow BS, et al. Clinical versus mechanical prediction: a meta-analysis. Psychol Assess. 2000;12(1):19-30.

6. Liao L, Mark DB. Clinical prediction models: are we building better mousetraps? J Am Coll Cardiol. 2003;42(5):851-3.

7. Marchese MC. Clinical versus actuarial prediction: a review of the literature. Percept Mot Skills. 1992;75(2):583-94.

8. Stiell I, Wells G, Laupacis A, et al. Multicentre trial to introduce the Ottawa ankle rules for use of radiography in acute ankle injuries. BMJ. 1995;311(7005):594-597.

9. Plüddemann A, Wallace E, Bankhead C, et al. Clinical prediction rules in practice: review of clinical guidelines and survey of GPs. Br J Gen Pract. 2014;64(621):e233-242.

10. Toll DB, Janssen KJ, Vergouwe Y, et al. Validation, updating and impact of clinical prediction rules: a review. J Clin Epidemiol. 2008;61(11):1085-94.

11. The National Institute for Health and Care Excellence. NICE Quality and Outcomes Framework indicator. The National Institute for Health and Care Excellence; 2019. [Accessed 2019 Jan 29] Available from: https://www.nice.org.uk/standards-and-indicators/qofindicators

12. Wilcock M, Hughes P and Gibson N. Do you think patient deicision aids are a useful tool? Presrib. 2015;26(10):11-14.

13. Eichler K, Zoller M, Tschudi P, et al. Barriers to apply cardiovascular prediction rules in primary care: a postal survey. BMC Fam Pract. 2007;8:1

14. Muller-Riemenschneider F, Holmberg C, Rieckmann N, et al. Barriers to routine risk-score use for healthy primary care patients: survey and qualitative study. JAMA Intern Med. 2010;170(8):719-24.

15. Sarazin M, Chiappe SG, Kasprzyk M, et al. A survey of French general practitioners and a qualitative study on their use and assessment of predictive clinical scores. Int J Gen Med. 2013;6:419-426.

16. Kirby M, Machen I. Impact on clinical practice of the Joint British Societies' cardiovascular risk assessment tools. Int J Clin Pract. 2009;63(12):1683-1692.

17. Van Oort LM, Verhagen AP, Koes BP, et al. Evaluation of the Usefulness of 2 Prediction Models of Clinical Prediction Models in Physical Therapy: A Qualitative Process Evaluation. J Manip Physiol Ther. 2014;37(5):334-341.

18. Brown B, Cheraghi-Sohi S, Jaki T, et al. Understanding clinical prediction models as 'innovations': a mixed methods study in UK family practice. BMC Med Inform Decis Mak. 2016;16:106.

19. Ahmed H, Naik G, Willoughby H, et al. Communicating risk. BMJ. 2012;344e3996

20. Dallongeville J, Banegas JR, Tubach F, et al. Survey of physicians' practices in the control of cardiovascular risk factors: the EURIKA study. Eur J Prev Cardiol. 2012;19(3):541-550.

21. Graham IM, Stewart M, Hertog MG, et al. Factors impeding the implementation of cardiovascular prevention guidelines: findings from a survey conducted by the European Society of Cardiology. Eur J Prev Cardiol. 2006;13(5):839-845.

22. Hobbs FDR, Jukema JW, Da Silva PM, et al. Barriers to cardiovascular disease risk scoring and primary prevention in Europe. QJM Int J Med. 2010;103(10):727-739.

23. Gurses AP, Ozok AA, Pronovost PJ. Time to accelerate integration of human factors and ergonomics in patient safety. BMJ Qual Saf. 2012;21(4):347-351.

24. Middleton B, Bloomrosen M, Dente MA et al. Enhancing Patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. JAMIA. 2013;20(e1):e2-8.

25. Cane J, O'Connor D and Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implement Sci. 2012;7(1):37