Does a Smartphone Application Improve Medical Students and New ENT Junior Doctors Confidence when Dealing with ENT Clinical Scenarios?

Dr Sarah Akbar, MBChB, BSc., Dr Taranvir Karir, MBChB, Mr Paul Hans BSc (Hons), FRCS (ORL-HNS), Blackpool Teaching Hospitals NHS Foundation Trust, Blackpool Victoria Hospital

ABSTRACT

Introduction: The development of an electronic ENT application may improve medical students' and junior doctors' confidence in approaching common ENT scenarios if they have had little prior experience in this surgical subspeciality.

Methods: A cohort of medical students and junior doctors based at Blackpool Victoria Hospital were asked to rate their confidence in approaching five common ENT scenarios before and after being granted access to a locally-developed ENT application.

Results: Every participant showed an increase in their confidence score in dealing with each ENT scenario following access to the application. Junior doctors' confidence scores showed an overall average confidence increase of 148% and medical students demonstrated an increase of 124%.

Discussion: ENT smartphone applications have been shown to be successful in increasing medical students' and junior doctors' confidence in approaching common ENT clinical scenarios. The provision of such a resource for surgical subspecialties promotes a further step towards a paperless NHS as well as a standardised way of approaching patient care.

INTRODUCTION

With continuing advancements in technology and information-sharing since the development of the smart phone, there is no doubt that the use of electronic aids within the medical profession has become commonplace.[1,2] Through the use of online applications, doctors can efficiently access an abundance of medical resources all in one place, providing a more environmentally-friendly method of accessing information as compared to conventional paper records. Essential guides for doctors such as the British National Formulary (BNF), NICE guidelines and e-applications compiling commonly used decision-making tools are all available at the tip of our fingers. Over the past decade there has been an exponential rise in these modalities, this is not surprising as currently 98% of doctors in the United Kingdom (UK) confirm that they possess a smart phone.[3] Electronic applications have been shown in the literature to aid inductions into new rotations for doctors,[4] as well as being an efficient means of providing information for doctors commencing new jobs in which they may have little clinical experience.[5] With the implementation of the European Working Time Directive (EWTD) such tools have become valued in providing a comprehensive breadth of knowledge for doctors in a clear and accessible manner, whilst also providing a standardised approach to patient care. Recent studies revealed that 96% of surgical trainees desired a smartphone application containing their local trust surgical guidelines.[6]

Feedback from junior doctors and medical students show that the use of an electronic application outlining guidelines, important elements of history-taking, examination findings, diagnosis and management plans for commonly occurring ENT (Ear, Nose and Throat) scenarios has improved their confidence in their job and moreover, improved their learning experiences.[7] Although many surgical ENT applications may have been constructed across various trusts in the UK, few have been tested for effectiveness.[8] Prior to further development of a comprehensive electronic application within the ENT speciality, it is imperative to show that access of this resource improves doctors' ability to tackle tasks of the daily job that they may not have been able to approach without the use of an electronic application.

METHODS

A cohort of 20 medical students and junior doctors based at Blackpool Victoria Hospital were asked to rate their confidence in approaching five common ENT scenarios (see Figure 1). These questions were written by the departmental consultant lead at the hospital and sent to participants as an online survey. Responses were recorded on a 10 point Likert scale (1 = no confidence and 10 = most confident) indicating how confident they would feel when dealing with a particular clinical situation relating to ENT, should it arise within their daily jobs. The constructed scenarios were designed to align with specific local protocols and guidelines contained within the application. These questions were deemed important aspects of the ENT junior doctor role, and were discussed by the consultant ENT surgeons at the trust prior to sending out the survey to participants.

Figure 1: Likert-Scale questionnaire used to subjectively assess junior doctors' confidence level before and after access to ENT application.

Student participants were in their 4th year of medical school and in most cases, had less than one week's experience or teaching in ENT. The majority of junior doctor participants were core surgical trainees and GP trainees in their first year of training. All participant doctors provided on-call cover for ENT and were new in starting their ENT jobs at the hospital; all participants had little prior experience in working in ENT surgery, with few having as little as five days teaching in the field during medical school. The ENT smartphone application was compiled by an ENT consultant within the Trust and included local protocols and guidelines, antimicrobial formularies, clinical pathways, links to useful educational YouTube videos and national guidance relevant to ENT (Figure 2). The creation of this e-application did not require formal coding.

Medical student and junior doctor participants were requested to answer each scenario and rate their confidence (from 1 to 10) in dealing with each case (1-5) prior to using the ENT application, as well as attempt to answer the question asked in the specific cases 1-5. Following completion of the initial questionnaire, each doctor was invited to download the ENT application on their smart phone. The participants were asked to browse the application for up to an hour and then re-attempt the five ENT scenarios. The participants then re-scored their confidence in dealing with each case and provided an answer to each scenario having had browsed through the information on the application as an aid. Participants were asked to write their correct answers for each case; this was then marked at the end of completing the questionnaire.

RESULTS

The majority of participants did not provide answers for cases 1-5 prior to being granted access to the ENT application resource. However, after having browsed the information on the e-application, all participants correctly answered the questions presented in cases 1-5.

When approaching common ENT scenarios, the subjective confidence of all medical students increased following access to the ENT application, as shown by Figure 3. The average overall increase in confidence was 124%.

A similar result was observed in the junior doctor cohort, with every participant's confidence score increasing for every scenario following access to the ENT application, as evidenced by Figure 4.

An overall average increase in confidence score from 4.2 to 9.4 was observed in the medical student cohort (an average subjective confidence increase of 124%) and an overall average increase from a confidence score of 3.3 to 8.2 was observed in the junior doctor cohort (an average subjective confidence increase of 148%); this can be seen by Figure 5.

During the course of the study, all participants showed an increase in their confidence score in dealing with each ENT scenario following access to the application; this was true for both medical students and junior doctors. The highest medical student participant confidence score increase observed during the study was from an average score of 2.2 before use of
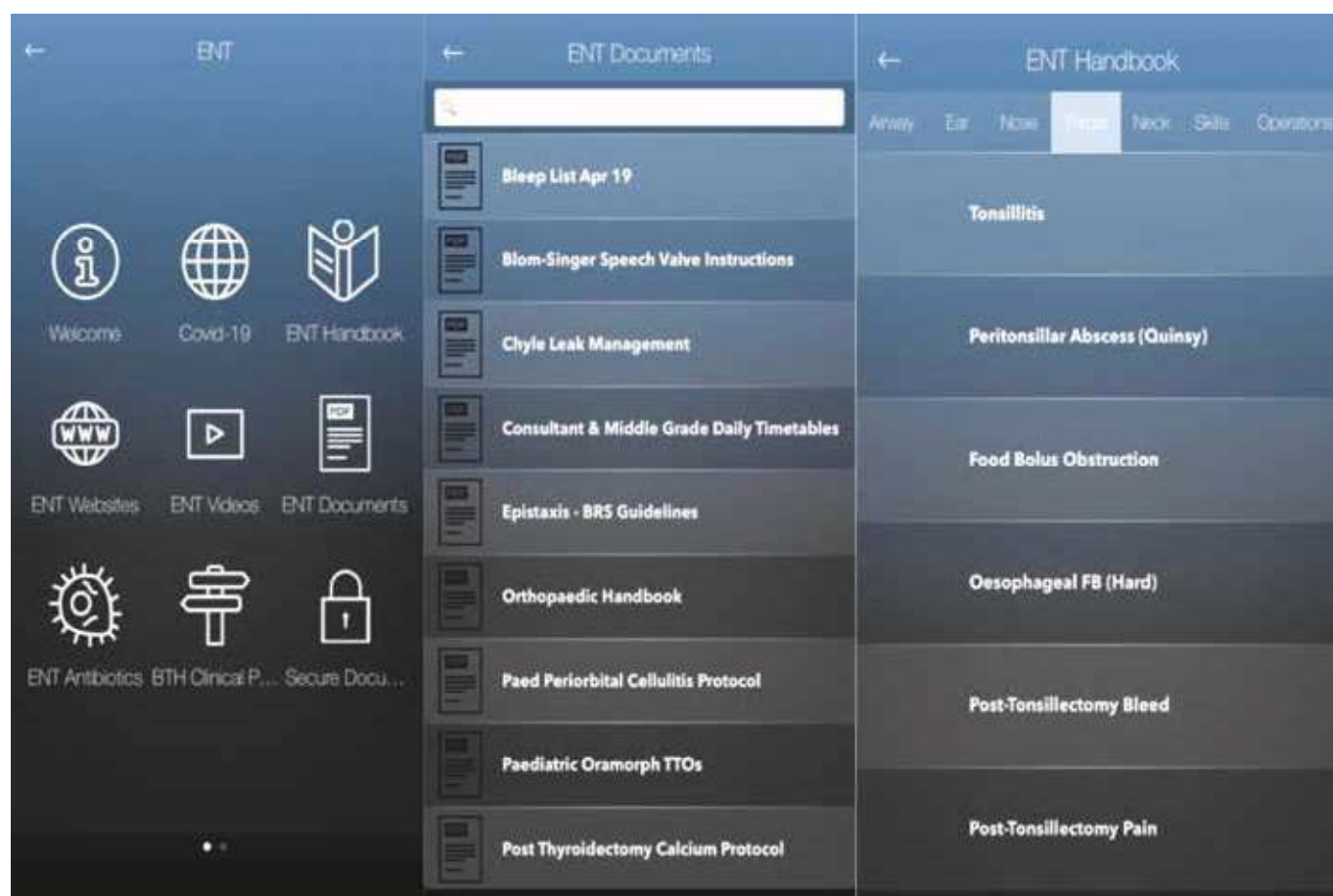
Figure 2: Screenshot images of ENT application developed locally at Blackpool Victoria Hospital.
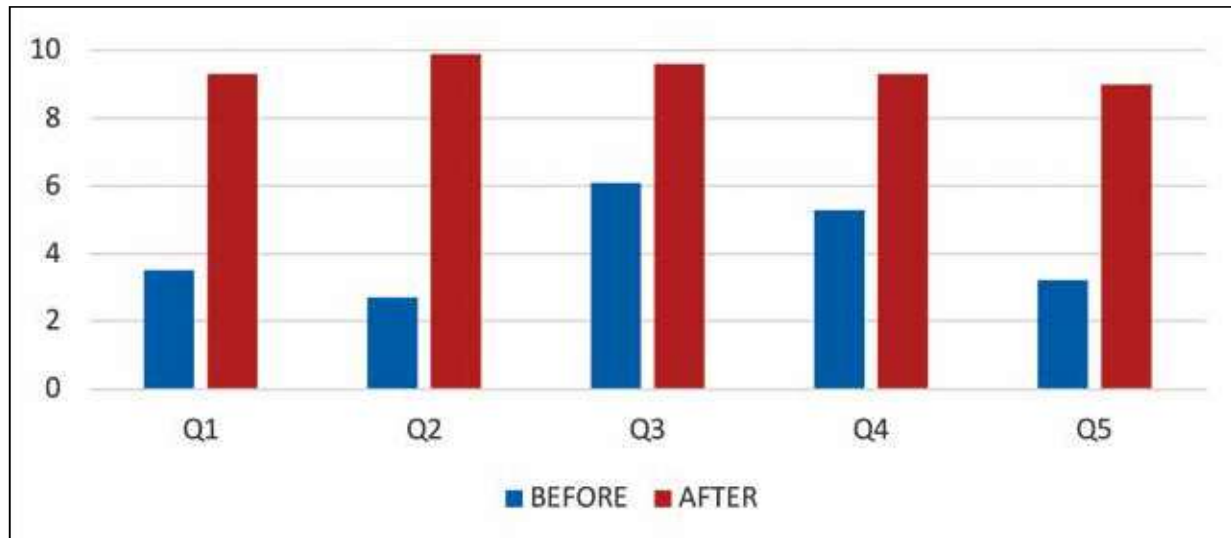
Figure 3: Medical students' average confidence scores before and after use of the ENT application.

Figure 4: Junior doctors' average confidence scores before and after use of the ENT application.

Figure 5: Comparison of average confidence scores for medical students and junior doctors before and after use of the ENT application.

the application to 9.8 after use of the application: an overall 345% increase in confidence score. The highest junior doctor participant confidence score increase observed dur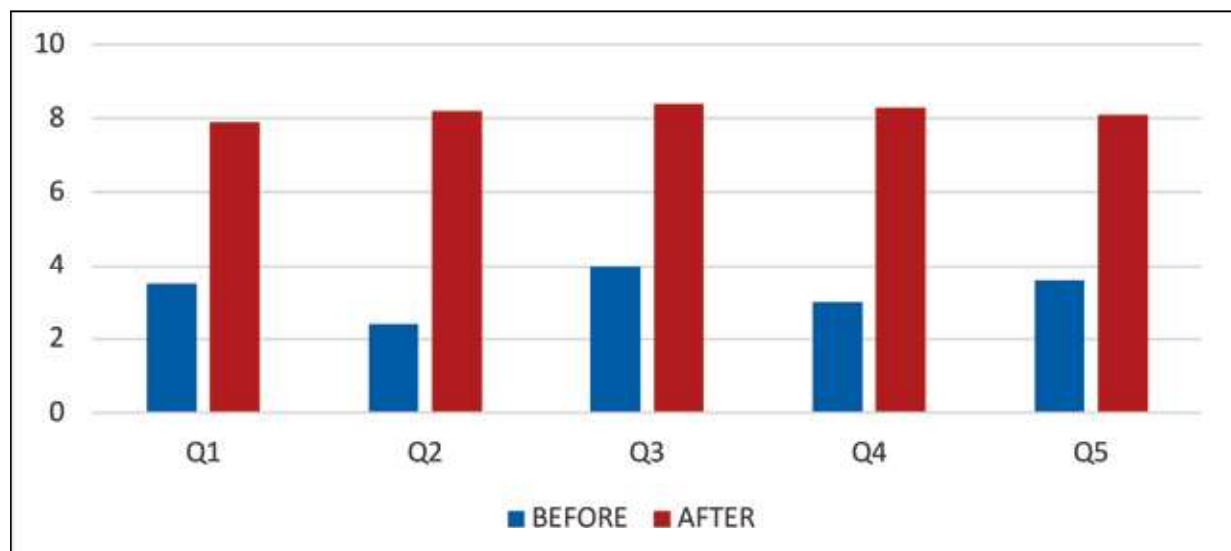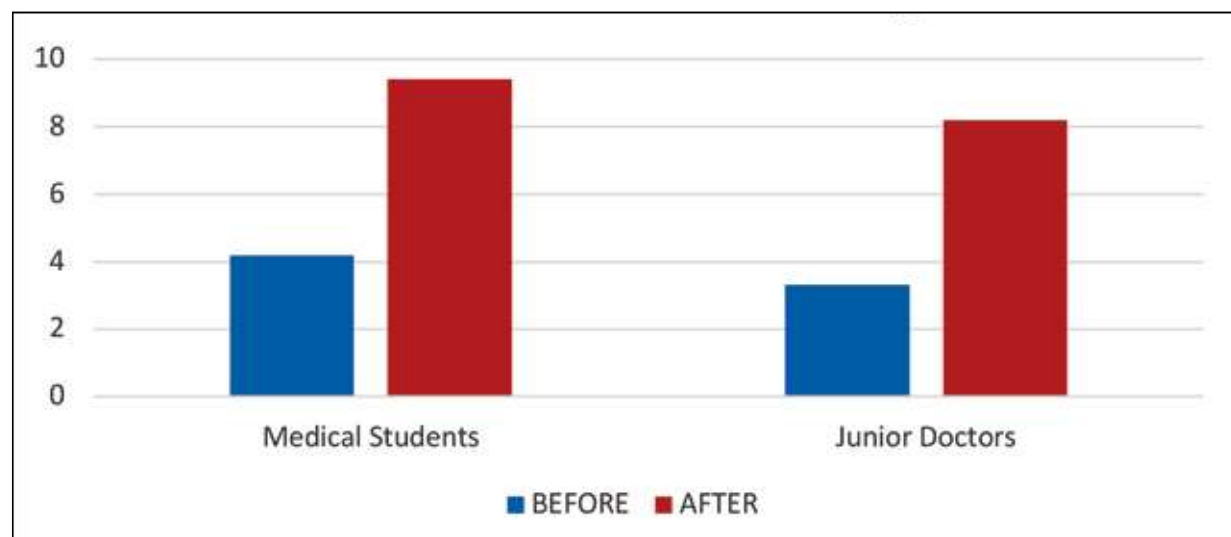ing the study was from an average score of 2.6 before use of the application to 9.0 after use of the application: an overall 269% increase in confidence score. Average medical student confidence scores before and after use of the application (4.2 and 9.4, respectively) was higher than that of their junior doctor counterparts (3.3 and 8.2, respectively).

DISCUSSION

This study demonstrates that in both medical student and junior doctor cohorts of participants there was a clear improvement in subjective confidence scores when dealing with common ENT scenarios following the use of an ENT smartphone application.

The use of electronic medical applications is valuable in sub-specialities such as ENT where junior doctors may have little to no experience of the field.[7] It is believed that by navigating the application to find the relevant protocols, users gain valuable familiarity with the electronic platform and this subsequently increases subjective confidence when approaching real-life clinical scenarios that would require reference to the protocols. The process could possibly serve as providing an informal induction on relevant local guidelines for new ENT doctors. This could furthermore have the potential to be modified for different hospitals to incorporate important local guidelines or information pertaining to that specific job role.

Feedback attained found that junior doctors inducting into ENT jobs had completed from as little as 0 to an average of 5 days of ENT learning during medical school. This study found that there were similar differences found in both the medical student and junior doctor cohort when assessing confidence in dealing with common ENT scenarios before and after utilisation of the ENT smartphone application (see Figure 4). If conducted on a larger scale, these study findings could perhaps infer that medical students could act as surrogates for ENT junior doctors when assessing the effectiveness of new clinical resources/applications. This observation is important when considering the limited number of ENT doctors in a single department available to participate in the assessment and development of a new clinical resource, such as an e-application. New starters typically rotate 2-3 times per year and often have demanding workloads. Conversely, a large cohort of medical students are present at any one time in teaching hospitals, are often enthusiastic to participate in exercises aimed to enhance their learning and likely possess additional time to provide feedback. It is for this reason why the medical student cohort could prove exceedingly valuable in testing the effectiveness of new clinical resources aimed towards a junior doctor group.

In this particular study, both the medical student and junior doctor cohort possessed equivalent, albeit limited, previous clinical exposure to ENT. We postulate that medical student responses in this study are comparable to that of the junior doctor cohort. This notion, if generalisable and reproducible on a larger scale, could potentially have promising implications for teaching and training in the medical field.

Interestingly, the average medical student confidence score both before and after use of the application was higher than that of the junior doctor group. This could be due

to the fact that a shorter period of time had elapsed since ENT-related learning in medical school for the students as compared to the junior doctor cohort. On the contrary, these findings may indicate a heightened perception of confidence in medical students as compared to the junior doctors when approaching these clinical scenarios.

An abundance of literature exists in favour of online resources for junior doctors to aid their job roles. Quick-reference handbooks for ENT have been developed and found to have a promising effect on users; one such study showed that 80% of doctors stated they preferred a smartphone application for ENT-based guidelines compared to printed guides[5] and that there was an overall preference supporting use of e-applications amongst doctors as opposed to paper or computer based access.[9]

Furthermore, it is important to recognise the impact of the COVID-19 pandemic on the delivery of services within the NHS as a whole. The declaration of the pandemic in March 2020 brought about significant changes to medical practice in the UK. Strict adherence to social distancing protocols have led to difficulties in delivering face-to-face teaching, as well as induction programmes for doctors commencing new job roles. Online platforms for teaching and training such as Zoom[©] and Microsoft Teams[©] have become the norm, and there has been discussion regarding the continued utilisation of these modalities in future practice.[10] Large group face-to-face practical inductions may become a phenomenon of the past, with increasing emphasis being placed on the wealth of training materials available online. Such resources can be clearly signposted by a well-organised smartphone application and include an expanded list of clinical scenarios. The delivery of this information could supplement induction programmes for new doctors. This additionally highlights potential scope for using similar methods as described in this text to deliver virtual inductions for doctors amidst the confines of the pandemic, and potentially afterwards.

The use of smart-devices for teaching and training purposes during medical school have become increasingly prevalent, with many universities supporting the use of iPads[©] and tablets to record competencies and performance of students as they rotate through their placements and for documentation of portfolios.[11] Such devices have been shown to have a positive impact on medical students as they rotate through their clinical placements.[12] The introduction and encouragement of smart-devices in the clinical workplace supports the development of comprehensive e-applications to support new doctors into transitioning to new, potentially unfamiliar, job roles.

Analyses of the results of this study emphasise that an online platform is successful in providing relevant information to medical students and junior doctors to sufficiently improve their confidence in approaching common ENT clinical scenarios. This as a consequence, improves standards for delivering patient care in a speciality in which these medical personnel may have had little previous exposure. Similar results have been demonstrated with smartphone applications constructed for specialised disciplines such as plastic surgery,[13] orthopaedic surgery[14] and anaesthesia.[15] The provision of smartphone applications for subspecialties promotes a further step towards a paperless NHS as well as a standardised way in approaching patient care. It is suggested that a greater number of participants be recruited in a follow-up

study in order to draw inferences regarding usefulness of the application for ENT junior doctors on a wider scale.

KEY POINTS

- Smartphone applications are used widely in medical practice today and provide a vast array of knowledge in an accessible manner for doctors.

- ENT is a surgical subspeciality in which medical students and junior doctors may have little prior clinical experience in; the delivery of relevant and easily-accessible information through a mobile phone application is a valuable resource for junior doctors working in ENT.

- An ENT smartphone application has reliably increased subjective confidence in approaching common ENT scenarios for both junior doctors and medical students.

- The provision of information via smartphone applications for surgical subspecialties promotes a further step towards a paperless NHS as well as a standardised way of approaching patient care.

- The medical student cohort can potentially act as surrogates for junior doctors when assessing the effectiveness of new clinical resources, such as medical e-applications.

Correspondence to:
sarah.akbar@doctors.org.uk

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