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Live streamed ward rounds – a tool for clinical teaching during the COVID-19 pandemic

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Abstract: (300 words)

The emergence of coronavirus disease 2019 (COVID-19) has resulted in unprecedented challenges to hospitals, the community and society. Although the necessary focus has been to care for patients and communities, COVID-19 has disrupted medical education and requires intense and prompt attention from medical educators. It poses unique challenges to the clinical clerkship model that is fundamental to medical student education.

Telehealth is now a common field, implemented and researched in most disciplines, especially to provide access to care in rural and remote areas. Currently, during the pandemic, it is being used in all areas as an infection control measure. Less common is the use of Telehealth or videoconferencing the heath team and patient encounter for teaching.

In the form of Telehealth for education, we have developed 'Live streamed ward rounds' as an alternative to face-to-face ward rounds for medical students during the pandemic when clinical access to hospitals has been limited.

'Live streamed ward rounds' have three phases: 1) the student observation phase where 'one student is engaged via mobile phone to observe the live stream; 2) the student preparation phase where the student formulates case presentations; 3) the student case presentation phase where the student sequentially presents each patient to a group of 3-20 students who are engaged simultaneously via secure videoconferencing software. A clinician educator is present to facilitate nuanced clinical discussion around specific cases as well as core skills required for the transition from medical student to the junior medical officer.

'Live streamed ward rounds' have been utilised with great success at John Hunter Hospital. This teaching strategy can be applied to all areas of medicine and many clinical encounters,

including ward rounds and clinical handover rounds in areas of acute medical care to facilitate student learning at a time when many clinical placements have been cancelled.

Main text: (1546 words)

The emergence of severe acute respiratory syndrome coronavirus 2 has resulted in unprecedented challenges to hospitals, the community and society. Although the necessary focus has been to care for patients and communities, the profound effects of coronavirus disease 2019 (COVID-19) have disrupted medical education and require intense and prompt attention from medical educators. COVID-19 poses unique challenges to the clinical clerkship model that is fundamental to medical student education and has the potential to change forever how future physicians are educated[1].

For more than a decade, medical schools have been working to transform pedagogy by reducing live face-to-face didactic lectures; using technology and simulation; implementing team-facilitated, active, and self-directed learning; and promoting individualised and interprofessional education[2,3]. However, as described by the father of modern medicine, William Osler, clinical teaching of medical students at the bedside remains vitally important: "to study the phenomena of disease without books is to sail an uncharted sea, while to study without patients is not to go to sea at all"[4]. Medical graduates must function in a team-based, collaborative work environment; have sound knowledge and clinical skills and have a capacity for lifelong learning[5].

In response to COVID-19, there has been rapid development of the 'Bootcamp' model of accelerated learning for final year medical students to support their swift transition to Assistants in Medicine. It is, however, unclear how medical schools will manage students from the middle years of medical school where clinical exposure is a vital part of clinical education. Typically, during years three and four of the University of Newcastle (UON) MD degree, students spend approximately 50% of their time attached to wards, clinics, operating theatres and other clinical exposure opportunities. How can this clinical education continue while medical students are not allowed in the clinical environment due to the COVID-19 pandemic?

Further, given that social distancing is anticipated to last many months, possibly beyond six months, clinical teaching rounds with multiple medical students are unlikely to be able to occur soon.

The clinical teaching team from the UON at John Hunter Hospital have developed the concept of *Live-Streamed Ward Rounds* to address the challenge of maintaining the clinical clerkship model of education while students are excluded from the hospital for several months during the vital early years of clerkship training. This model of education has three phases (Figure 1), which broadly align to more advanced cognitive levels of learning expected of senior medical students.

PHASE 1 – Student Remote Observation (Assess & Analyse)

Every day clinicians undertake ward rounds with medical students in attendance as part of routine inpatient care. During *live-streamed ward rounds*, a medical student is engaged securely (password protected) via mobile phone to participate in all elements of the ward round, including discussion before and post patient visit. In addition to participating in discussions, similar to face-to-face teaching, the student can be shown clinical records (e.g. pathology results, observation charts, medical imaging, intraoperative photographs) on video via platform-agnostic streaming software (e.g. Skype for business, Google Hangouts, MS Teams, Zoom) to broaden engagement with the clinical interaction. When the patient is visited, they are asked by the lead clinician if they are happy for a medical student to participate in the *live streamed round*. After obtaining verbal consent, student introduction occurs by turning the phone around so the patient can see the student and vice versa.

After the introduction, the phone is turned back to the clinician so the student can see the clinician holding the phone to observe non-verbal cues. No streaming of the clinical examination occurs during the patient encounter. When the consultation is complete, the phone is turned briefly to the patient to facilitate eye contact when the student thanks them for

permission to participate in the encounter. This process is repeated with each patient on the routine clinical ward round following which the student is verbally engaged in the post-round clinical discussion that occurs routinely as part of multidisciplinary patient care. The phone is muted or disconnected during the patient encounter if the patient declines student involvement at the bedside, depending on the patient's request.

PHASE 2 – Student Preparation (Evaluate & Synthesise)

During the *live-streamed ward round*, the student is directed to take detailed notes so they can formulate a series of case presentations for the subsequent *Student Case-Based Ward Round*. The aim is to prepare the student for the role of a junior medical officer (JMO) in the ward environment. This phase can be augmented with student access to sets of patient case notes, in a suitable format, still requiring the student to analyse and synthesise the patient details in order to make cogent case presentations.

PHASE 3 – Student Remote Case-Based Ward Round Presentation (Construct & Justify)

This element of the learning cycle is typically held later in the day of the 'live streamed clinical round' at a time when 3-20 students can be engaged simultaneously through videoconferencing software. The student who attended the 'live streamed clinical round' presents each patient sequentially to the group as if they were the JMO in a face-to-face ward round. A clinician educator is present to facilitate clinical discussion around the specific cases as well as core skills required for the transition from medical student to JMO. After each patient is discussed, the student presents what 'actually' occurred on the clinical round and presents the plan for ongoing care with justification. This element of the interaction is designed to bring the education back to the patient and to teach ongoing care for patients who may spend a period as an inpatient. These sessions typically run for 60-90 minutes.

Clinical teaching is a fundamental component of medical education. It is in this setting where most of the tangible and intangible skills of medical students are formed[6]. One of the essential settings where these skills can be acquired is by the patient's bedside where medical students, with the presence of the medical teacher, learn many aspects of medical knowledge as well as history taking and physical examination skills. Learning medicine at the bedside through interactions among the healthcare team with patients fosters the medical students' ability to perform physical examination skills. Further, it also helps students to gain more experience when it comes to clinical data gathering and clinical decision making[7]. While students cannot participate in the clinical examination component of the patient interaction during *'live streamed ward rounds'*, they can hear the relevant history taking. Evidence indicates that physicians can collect 60-80% of the information relevant for a diagnosis just by taking a medical history, leading to a final diagnosis in more than 70% of cases[8].

Previous studies investigating factors that are most important in creating an effective learning environment for medical students found that the level of participation students are afforded in the workplace is vital in clinical practice learning[9]. Greater participation in the workplace facilitates greater confidence and competency, especially in clinical practice[9,10]. A recent Australian study[11] of final year medical students found the top six responses as to why students found clinical venues the most educationally useful include: i) the amount of patient contact; ii) various patient presentations; iii) being part of the clinical team; iv) the opportunity to ask questions and receive useful information; v) the high level of supervision in training, and vi) the amount of formal bedside teaching. Tutorials in a clinical setting also allow for topics relevant to professional development to be taught, such as ethical issues, communication and teamwork[12]. Students require teaching in real clinical settings as these experiences encourage skills required in the real clinical environment.

The structured *live-streamed ward round* stimulates student participation and effectively develops clinical knowledge; enhances depth and permanency of learning and enriches the

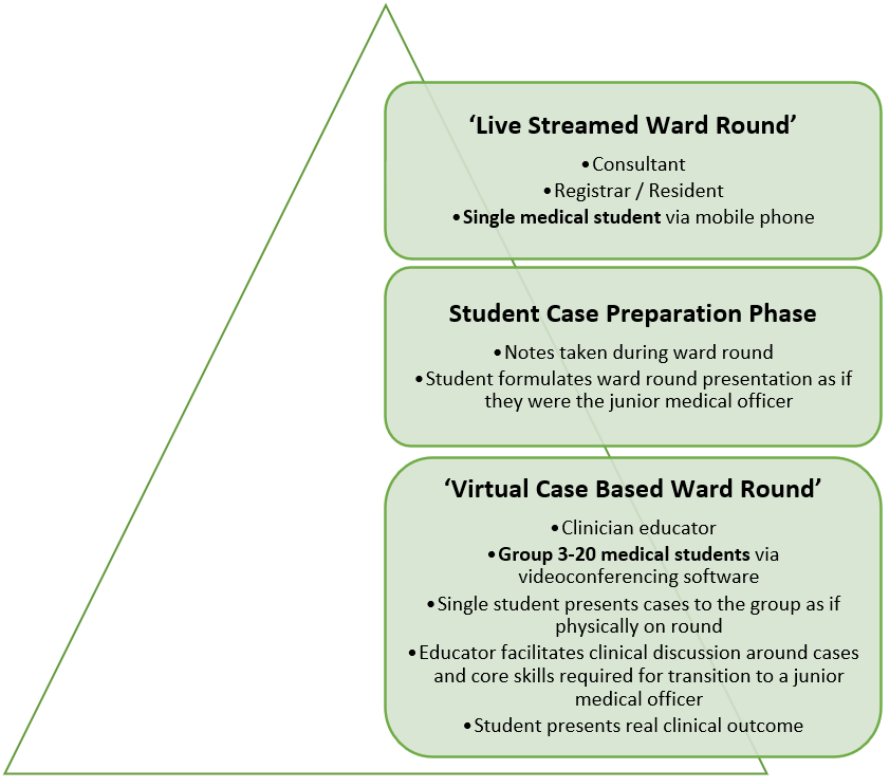
stability and dependability of knowledge attained. Being able to follow-up patients to discharge is the ideal ending to these scenarios where the student can see how effective the management plan was, its implementation and its results[11].

We identified quality supervision as a key factor for maximising the educational value of clinical learning in *live-streamed ward rounds*. Supervisors who are experienced and engaging make students more motivated to critically analyse patients' clinical conditions, to drive their learning about these presentations, and to utilise this work to formulate management plans[13 14].

Live-streamed clinical encounters should inspire us to revisit and prioritise the development of virtual clinical encounters created in virtual role play with scenarios of increasing levels of detail, for flexible delivery, always accessible, adaptive and individualised learning. There are many advantages to live-streamed clinical encounters, including their cost-effectiveness in both setup and maintenance; the possibility of increasing access and usability of streaming technology; and allowing for the nuance of expertise and immediate feedback. As demonstrated by the COVID-19 pandemic, they can be rapidly implemented and encompass the more social components of adult learning.

We have trialled *live-streamed rounds* at John Hunter Hospital (NSW) in obstetrics and gynaecology with great success. This teaching strategy can be applied to all areas of medicine and many clinical scenarios, including ward rounds and clinical handover rounds in areas of acute medical care. This strategy is one of the many that the UON plans to utilise to provide ongoing clinical teaching during the COVID-19 pandemic. Being adaptable and flexible, cognisant of costs, and driven by evidence are critical features of delivering medical education and contemporary medical practice[15].

Figure 1. The three phases of the 'Live Streamed' ward round



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