

**A descriptive analysis of the role of a  
WhatsApp clinical discussion group as a  
forum for Continuous Medical Education  
in the management of complicated HIV/TB  
clinical cases in a group of doctors in the  
Eastern Cape**

**Joana Francisca Woods**

**Student Number: 3610418**

A mini-thesis submitted in partial fulfilment of the requirements for  
the degree of Master in Public Health at the School of Public Health,  
University of the Western Cape

The logo of the University of the Western Cape, featuring a stylized classical building with a pediment and columns.

UNIVERSITY *of the*  
WESTERN CAPE

**Supervisor: Prof. Lucia Knight**

**Co-Supervisor: Dr Michelle Moorhouse**

**September 2018**

## **KEYWORDS**

Continuing Medical Education

WhatsApp

Eastern Cape

HIV/TB

Clinicians

Mobile Instant Messaging

Rural



UNIVERSITY *of the*  
WESTERN CAPE

## ABSTRACT

**Background:** As South Africa's HIV programme increases in size, increasingly complex HIV/TB cases occur that are often beyond the clinical scope of primary health care clinicians. In the Eastern Cape (EC) province, health facilities are geographically widespread, with a discrepancy of specialist availability outside of academic/tertiary institutions. The use of WhatsApp, a Mobile Instant Messaging (MIM) application, could facilitate learning and mentoring of primary healthcare clinicians in peripheral facilities. The aim of this study is to describe this app and its use as an alternative learning tool to improve clinician access to specialized management of complicated HIV/TB cases, as part of Continuing Medical Education (CME).

**Method:** A an observational, descriptive cross-sectional study was conducted among a group of clinicians from the EC province that formed part of a Wits RHI WhatsApp HIV/TB clinical discussion group from January 2016 to July 2017. Data was collected using a structured anonymous internet questionnaire, distributed to the clinicians that formed part of the WhatsApp group, informed consent being obtained from participants prior to completion. Data was analysed with Epi Info, using descriptive and analytic statistics. Frequency distributions and cross tabulations were generated and bi-variate analysis was done to determine significant associations between relevant variables.

**Results:** The analysis found the majority of participants reported having internet connectivity and following the group regularly. A majority of participants reported using the group as guidance to manage other patients, and referred back to old chat discussions. The participants also reported that the group gave them new clinical insights, helped them to practically apply pre-existing knowledge and that guidance was according to international/national guidelines. Furthermore, most responders agreed that they had gained new clinical confidence from group participation. Bivariate analysis found that there was a statistically significant association in participants who followed [OR 48.13 (CI 4.99 - 464.49)] and posted questions in the group [OR 3.81 (CI 1.02 - 18.48)] to their improved clinical confidence in managing complicated cases. A statistically significant increase in clinical confidence was also reported in those clinicians that reported gaining new clinical insights [OR 23.75 (CI 3.95 - 142.88)],

referred to old case material [OR 21.42 (CI 4.39 - 104.84)] and used the peer guidance [OR 48.13 (CI 4.99 - 464.49)]. Participants were 4.79 times more likely to recommend the group to colleagues if they had followed it regularly (CI 1.19 – 21.10). However there was a discrepancy in participant’s knowledge and actual use of informed consent when posting patient details on social media.

**Conclusions:** Our study findings support the use of WhatsApp in a medical setting as an effective means of communication, long distance learning and support between peers and specialists. Adjuncts to its success in learning include: active engagement of participants; a case-based learning approach and differing levels of clinical expertise in the group. This mobile platform offers an alternative CME solution that can be easily and successfully implemented in various health fields. Caution needs to be taken to maintain patient confidentiality when posting in social media, but does not negate WhatsApp’s usefulness in a clinical learning setting.



## LIST OF ABBREVIATIONS

ART	Anti-retroviral treatment
BZ	Beyond Zero
CI	Confidence Interval
CME	Continuing Medical Education
EC	Eastern Cape
HIV	Human Immunodeficiency virus
HPCSA	Health Professions Council of South Africa
ICT	Information and Communication Technology
ID	Infectious disease
MIM	Mobile instant messaging
OR	Odds Ratio
SA	South Africa
TB	Tuberculosis
WITS RHI	Wits Reproductive Health Institute



## DECLARATION

I declare that **A descriptive analysis of the role of a WhatsApp clinical discussion group as a forum for Continuous Medical Education in the management of complicated HIV/TB clinical cases in a group of doctors in the Eastern Cape**, is my work, it has not been submitted for any degree or examination in any other university and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: Dr Joana Francisca Woods

Date: September 2018

Signed



## DEDICATION

I would like to dedicate this dissertation to my Lord, in whom all things are possible; to my wonderfully supportive husband, Andrew, who was an ever present encourager; and to Sammy and David, my beautiful children. David, your arrival in this world coincided with data collection but was ever more momentous!



## ACKNOWLEDGEMENTS

I would like to acknowledge my supervisor, Prof. Lucia Knight, for the extensive time and effort she put into my dissertation. Without her assistance I doubt I would have complete this work timeously, she was a great encourager and very diligent in her input and corrections. I would also like to thank Dr Michelle Moorhouse, my co-supervisor and employer at Wits RHI, for allowing me to conduct this research as part of my key performance areas, and for her expertise in the field of research.

I am indebted to the UWC higher degrees committee, for accepting my proposal, and for Human Research Ethics Committee (HREC) from the University of Witwatersrand and Biomedical Research Ethics Committee (BMREC) from UWC, for ethics approval.





## TABLE OF CONTENTS

<b>KEYWORDS</b> .....	2
<b>ABSTRACT</b> .....	3
<b>LIST OF ABBREVIATIONS</b> .....	5
<b>DECLARATION</b> .....	6
<b>DEDICATION</b> .....	7
<b>ACKNOWLEDGEMENTS</b> .....	8
<b>CHAPTER 1: INTRODUCTION</b> .....	12
<b>1.1 Background</b> .....	12
<b>1.2 Problem statement</b> .....	14
<b>1.3 Purpose</b> .....	15
<b>1.4 Aim and objectives</b> .....	15
<b>1.5 Outline of thesis</b> .....	16
<b>CHAPTER 2: LITERATURE REVIEW</b> .....	17
<b>2.1 Introduction</b> .....	17
<b>2.2 The role and reach of smartphones and Mobile Instant Messaging (MIM)</b> .....	17
<b>2.3 The role of ICT in primary healthcare as part of CME in inequitable health settings</b> .....	18
<b>2.4 Use of MIM as a learning platform</b> .....	19
<b>2.5 Use of WhatsApp in clinical practice</b> .....	21
<b>2.6 Patient confidentiality and medico-legal considerations of using smartphones and MIM</b>	23
<b>2.7 Summary</b> .....	24
<b>CHAPTER 3: METHODOLOGY</b> .....	25
<b>3.1 Introduction</b> .....	25
<b>3.2 Study design</b> .....	25
<b>3.3 Study setting</b> .....	25
<b>3.4 Study population and sampling</b> .....	26
<b>3.5 Data collection tools and pre-test</b> .....	27
<b>3.6 Data collection</b> .....	28
<b>3.7 Data management and analysis</b> .....	29
<b>3.8 Internal validity</b> .....	30
<b>3.9 Reliability</b> .....	30
<b>3.10 Generalisability</b> .....	31
<b>3.11 Ethical considerations</b> .....	31
<b>CHAPTER 4: RESULTS</b> .....	33
<b>4.1 Introduction</b> .....	33
<b>4.2 Sample description</b> .....	33

4.3 Analysing clinicians' use of the WhatsApp group .....	33
4.4 Clinicians' confidence in managing complicated HIV/TB patients.....	37
4.5 Perceived usefulness of the chat group as a learning tool .....	37
4.6 Clinicians' knowledge and use of informed consent in the group .....	39
4.7 Bivariate analysis .....	40
4.8 Summary.....	44
<b>CHAPTER 5: DISCUSSION .....</b>	<b>45</b>
5.1 Introduction.....	45
5.2 Group engagement and its usefulness as a learning tool .....	45
5.3 Clinical confidence in managing complicated HIV/TB cases.....	47
5.4 Clinician's knowledge and use of informed consent .....	48
5.5 Generalisability .....	49
5.6 Limitations.....	50
<b>CHAPTER 6: CONCLUSION AND RECOMMENDATIONS .....</b>	<b>51</b>
6.1 Conclusion .....	51
6.2 Recommendations .....	52
6.3 Concluding comments .....	53
<b>REFERENCES.....</b>	<b>54</b>
<b>APPENDIX.....</b>	<b>58</b>
Appendix 1: Participant Online Questionnaire.....	58
Appendix 2: Participant Information Document for use of anonymous internet questionnaire .....	62
Appendix 3: Ethics approval from Human Research Ethics Committee (HREC) from the University of Witwatersrand.....	64
Appendix 4: Ethics approval from Biomedical Research Ethics Committee (BMREC) from University of Western Cape .....	65

**LIST OF TABLES**

<b>Table 4.1 Use of group in managing participants own patients (n=89).....</b>	<b>37</b>
<b>Table 4.2 Usefulness of the group as a learning tool (n=91).....</b>	<b>39</b>
<b>Table 4.3 Obtaining patient consent when posting patient related images (n=91) Error! Bookmark not defined.</b>	
<b>Table 4.4 Increased clinician confidence in managing patients and levels of group engagement</b>	<b>41</b>
<b>Table 4.5 Increased clinician confidence in managing patients based on their perceived usefulness of the group as a learning tool .....</b>	<b>41</b>
<b>Table 4.6 Clinician recommendation of the WhatsApp group based on their perceived usefulness of it as a learning tool .....</b>	<b>42</b>

<b>Table 4.7 Clinician recommendation of the WhatsApp group based on their level of engagement in the group.....</b>	<b>43</b>
<b>Table 4.8 Clinician access to internet and their following the group .....</b>	<b>43</b>

**TABLE OF FIGURES**

<b>Figure 4.1 Internet accessibility (n=91).....</b>	<b>34</b>
<b>Figure 4.2 Followed group (n=91) .....</b>	<b>34</b>
<b>Figure 4.3 Number of cases posted per participant (n=90) .....</b>	<b>35</b>
<b>Figure 4.4 Group engagement in posting responses (n=91) .....</b>	<b>35</b>
<b>Figure 4.5 Satisfaction at timeous case response (n=91).....</b>	<b>35</b>
<b>Figure 4.6 Satisfaction of content of case response received (n=91).....</b>	<b>36</b>
<b>Figure 4.7 Types of cases discussed (n=81).....</b>	<b>36</b>
<b>Figure 4.8 Gained greater clinical confidence in managing complicated HIV/TB cases (n=91)..</b>	<b>37</b>
<b>Figure 4.9 Awareness of HPCSA regulations in obtaining patient consent when posting in social media (n=91).....</b>	<b>40</b>



## CHAPTER 1: INTRODUCTION

### 1.1 Background

Many nations face problems of inequitable access to health services and an acute shortage of suitably qualified doctors, nurses and allied healthcare professionals that constitute the primary healthcare team. This decreases healthcare providers' ability to provide the services required to achieve Universal Health Coverage. It is estimated that by 2035, the world will have a shortage of 12.9 million healthcare professionals, yet an additional 1.9 billion people will require healthcare. Recruiting, educating and retaining members of primary healthcare teams is therefore fundamental in order to meet ongoing health demands (World Health Organization and Global Health Workforce Alliance, 2014). In South Africa, 46% of the population live in rural areas but only 19% of the nursing workforce and 12% of physicians practice in those areas (Buchan *et al.*, 2013).

South Africa (SA) also has the biggest and highest profile Human Immunodeficiency Virus (HIV) epidemic in the world - the estimated overall HIV prevalence rate is approximately 12,6%. The total number of people living with HIV was estimated at approximately 7.1 million in 2017. For adults aged 15–49 years, an estimated 18% of the population is HIV-positive (Stats SA, 2017). The country accounts for one third of all new HIV infections in Southern Africa. SA also has the largest antiretroviral therapy (ART) programme in the world and these efforts have been largely financed from its own domestic resources. In 2015, the country was investing more than \$1.34 billion annually to run its HIV programmes (UNAIDS, 2017).

SA has the world's sixth largest tuberculosis (TB) epidemic, with a TB incidence cases of 438,000 in 2016 (SANAC, 2017). Tuberculosis is the leading cause of death in the country, with HIV further fuelling this epidemic, as people living with HIV are at a far higher risk of developing TB due to weakened immune systems. It is estimated that 60% of people living with HIV in South Africa are also co-infected with TB. In 2016 there were 73,000 HIV/TB deaths (SANAC, 2017). The TB burden is also driven by poor living conditions and late presentation to health facilities. Although this has improved, the TB prevalence rate has not reduced much since 2010 (SANAC, 2017). In SA's National Strategic Plan (NSP) for HIV,

TB and STIs for 2017-2022, the Minister of Health, Dr Aaron Motsoaledi, emphasised the need to have an increased effort in governmental and societal responses to these two epidemics in the next five years. This would include ensuring improvement in coverage of health services for prevention, as well as treatment, care and support of HIV/TB (SANAC, 2017).

The Eastern Cape (EC) has a population of seven million with an HIV prevalence of 12.1% (StatsSA, 2017). The province has an estimated HIV-positive population of 772,491 from the Thembisa model 2016, with a total of 310 166 people currently on treatment (almost half of the HIV-positive population in the province) (SANAC, 2017). The province is estimated to contribute approximately 16% of the country's new HIV infections (SANAC, 2017).

This province has dense concentrations of rural and peri-urban settlements occurring throughout its six districts (around 4.1 million of the population living in rural communities) (HSRC, 2012). In this predominantly rural setting, district hospitals and community public health clinics are often geographically widespread. There are approximately 771 public clinics in the province with 65 district hospitals, with around 1631 medical practitioners that work in this public health setting (Gray and Vawda, 2017). There are, however, only three academic/tertiary centres servicing these primary/secondary healthcare facilities (Gray and Vawda, 2017). Added to this, there are currently only four infectious disease (ID) specialists in the province, leading to limited access to specialised clinical care of infectious diseases (specifically HIV and TB).

HIV treatment and care is often complicated with the emergence of drug resistance, multiple drug-drug interactions and complex disease presentation and aetiology. SA also currently treats the third highest number of drug resistant TB patients globally, after India and Russia (Gray and Vawda, 2017). Given the above burden of HIV/TB in the province and lack of ID specialists, it is the responsibility of medical doctors working in the district hospital/public clinics to manage these complicated cases, with very little academic support.

In response to the above gap in services for complex HIV/TB cases, in 2014, Beyond Zero (BZ), a non-governmental organisation (NGO) was awarded a grant by the Centres for Disease Control and Prevention (CDC), to improve the management of complicated HIV cases in the EC. As part of their objectives, BZ facilitated Wits Reproductive Health Institute's (Wits RHI) ten day advanced HIV clinical care course in the EC, to doctors working in the province. The aim of the course was to provide doctors with regional HIV

treatment knowledge and expertise, by developing clinicians' abilities to effectively manage HIV complications and provide leadership in HIV prevention, treatment and care. This course also provided the entrance requirements for the doctors to write the South African Colleges of Medicine's HIV Diploma (which would further improve their academic/clinical skills in HIV/TB).

A WhatsApp messenger chat group was then created for the doctors who attended the course to facilitate ongoing Continuing Medical Education (CME) and access to specialist academic input. This WhatsApp group included the four EC provincial ID specialists; some specialists from the District Clinical Specialist Team (DCST) in the province; clinicians from Wits RHI and clinical advisors from BZ. The medical doctors posted complicated TB/HIV cases, which they were struggling to manage, on the group. The medical specialists or peers would then respond to the case, a discussion would occur with references to national/international HIV guidelines and evidence-based clinical care, providing cumulative medical expertise that would assist the clinician in managing the case. This assisted in direct case management, and the other doctors in the group could learn from the case discussions as well. The group has been functioning since early 2016.

Primary health care professionals must continuously learn and up skill themselves in order to maintain current evidence-based best practices, in order to ensure patient safety and optimal patient outcomes (Lygidakis, McLoughlin and Patel, 2016). Given the predominant rural setting of the EC and lack of specialist presence, many of these clinicians cannot get this training or support onsite. Using a Mobile Instant Messaging system (MIM), such as WhatsApp, could facilitate learning and mentoring of these clinicians by providing quick and direct access to specialist and peer input. This intervention would support WHO's recommendation that countries can aid in the retention of health professionals by providing them with opportunities for career development, CME, motivation and support (WHO, 2013).

## **1.2 Problem statement**

As the HIV programme increases in size, increasingly complex HIV/TB cases occur that are often beyond the clinical scope of primary health care clinicians. There is a need to improve accessibility to clinical mentoring and advice on complicated HIV/TB case management as per best clinical practice principles, and as part of CME. Using a Mobile Instant Messaging system (MIM), such as WhatsApp, could facilitate learning and mentoring of these clinicians.

My research aims to understand and explore, from a user's perspective, the usefulness of such a group as a prospective learning tool.

### **1.3 Purpose**

The purpose of this study is to analyse and describe the participation of a group of EC doctors in a clinical WhatsApp discussion group, as an intervention to improve doctors' knowledge and clinical acumen in managing complicated HIV/TB cases. It will look predominantly at doctors' use of the group as a learning tool and their perceptions of the usefulness of the group as a learning forum. Given the discrepancy of specialist availability outside of academic/tertiary institutions and their widespread need at other facilities, it would be important to understand if this type of intervention is beneficial in equipping doctors to better manage complicated cases without onsite specialist support. The data obtained from this research can be used to motivate for the use of alternative platforms of learning and clinician support, such as Mobile Instant Messaging systems like WhatsApp, across different medical specialist modalities besides infectious disease care. Added to that, it would explore whether clinicians are aware of regulatory authority (Health Professions Council of South Africa) rules relating to patient confidentiality breaches when posting on social media. This would raise awareness of these important ethical and legal obligations in the medical fraternity.



### **1.4 Aim and objectives**

#### **Aim**

The aim of this study is to describe the use of a WhatsApp clinical discussion group as an alternative learning tool to improve clinician access to specialised clinical management of complicated HIV/TB cases, as part of Continuing Medical Education, and their knowledge of informed consent use when posting patient cases on social media.

#### **Objectives**

The specific objectives are:

- To analyse clinicians' use of the WhatsApp chat group as a learning tool
- To assess clinicians' confidence in managing complicated HIV/TB patients after participating in the WhatsApp case discussion group

- To describe the perceived usefulness of the chat group as a learning tool
- To understand clinicians' knowledge and use of informed consent when sharing patient case details on a public platform such as WhatsApp.

### **1.5 Outline of thesis**

Chapter 2 will provide a literature review of different scientific sources regarding the role of Information and Communications Technology in clinical medicine, including its role in CME and clinical practice, as well as an exploration of ethical and legal implications of its use.

Chapter 3 will delineate the research methodology used in this research, including an overview of the study design, description of the study setting, the process of data collection, and a synopsis of the ethical considerations used for the study.

In Chapter 4, a summary of the results of the study will be described in both descriptive and analytical form.

Chapter 5 will focus on the discussion of the key study findings in relation to the existing research. Finally, in Chapter 6, the conclusions and recommendations from the study will be presented.





## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

The use of smartphone technology and Mobile Instant Messaging (MIM) platforms in clinical practice, is a research topic that is slowly and steadily gaining in momentum. This is likely due to social media and messaging app's relatively recent inception and popularity. However, the available literature shows that the use of this technology offers an efficient, unobtrusive, and portable mode of communication for medical staff (Nikolic *et al.*, 2018). Not only that, but medical images that are captured using smartphone devices, promote the delivery of medical care in a timely and resource-friendly manner ( Kirk *et al.*, 2014). Kankane *et al.* (2016), in a prospective observational study of Neurosurgery communication, found that using WhatsApp enabled quick decision making (4.06 minutes from image to registrar report) and was cost effective. As a result, this led to earlier diagnosis and more prompt treatment (Kankane, Jaiswal, 2016). Nikolic *et al.* (2018) suggests that by using these technologies, there is potential for improvement in the management and provision of education to patients. This would then have a significant impact on health provision as a whole (Nikolic *et al.*, 2018). WhatsApp is a widely used technology - it is low cost and is a simple to use application. This makes it an attractive option for telemedicine services in countries that have resource constraints (Mars and Escott, 2016).

In this chapter, the literature relating to the following concepts and issues are reviewed: the role and reach of smartphones and MIM; the role of Information and Communications Technology (ICT) in primary healthcare as part of Continuing Medical Education (CME) in inequitable health settings; use of MIM as a learning platform; use of WhatsApp in clinical practice; patient confidentiality and medico-legal considerations of using smartphones and MIM.

### 2.2 The role and reach of smartphones and Mobile Instant Messaging (MIM)

Smartphones are an important part of modern life, as access to the internet and network coverage has improved, with the increased ability to share pictures and videos using instant messaging systems (Raiman, Antbring and Mahmood, 2017). According to Google's Connected Consumer survey 2017, approximately 60% of South Africans use smartphones (Analysys Mason Group, 2017).

MIM is an asynchronous communication tool that works on a wireless internet connection, and allows users to communicate in real-time (Rambe and Bere, 2013). For the purpose of this study we will be discussing WhatsApp, which is an example of this type of technology. There are currently 1.2 billion active WhatsApp users worldwide since January 2017 (Statistica, 2016). This MIM application has been in use since 2009. Users can send text messages, images and videos to their personal and professional contacts. It offers a chat group feature which can allow 256 users to share content simultaneously (Kamel Boulos, Giustini and Wheeler, 2016). However, its use in the public health sector is poorly investigated within the literature, with only a small number of research studies having been conducted (Veroni, Ferrari and Acerra, 2015).

### **2.3 The role of ICT in primary health care as part of CME in inequitable health settings**

As previously mentioned in Chapter 1, many nations face problems of inequitable access to health services and an acute shortage of the suitably qualified health care professionals that constitute the primary health care team. An insufficient number of medical graduates; scarcity of postgraduate education; migration of health professionals and critical shortage of teaching faculty, all clearly demonstrate a need for alternative approaches to improving retention of the health workforce (Lygidakis, McLoughlin and Patel, 2016). A possible contributing solution to this problem is found in CME.

Countries must retain health professionals by providing them with opportunities for career development, CME, motivation and support (Buchan *et al.*, 2013). The evidence shows that career development and CME strongly motivate health professionals to stay in their own countries and to practice in remote areas (Chen, 2010). In order to keep up-to-date with best practice and new health issues, primary health care professionals must continuously learn and upskill themselves. Continuous postgraduate education plays an important role in maintaining high quality standards, in order to ensure patient safety and optimal patient outcomes (Lygidakis, McLoughlin and Patel, 2016). Davis *et al.* (1999) did a systematic literature review looking at 14 studies and found evidence that interactive CME sessions (for example, as in conferences, lectures, ward rounds and so forth), that enhance participant activity and provide the opportunity to practice skills, can effect change in professional practice and, on occasion, healthcare outcomes. However, many health professionals struggle to access CME due to professional isolation, lack of locum relief and heavy workload, and this is seen

particularly in rural areas (Lygidakis, McLoughlin and Patel, 2016). Much CME traditionally happens through conferences, seminars and other face-to-face meetings, which can make attendance difficult (Lygidakis, McLoughlin and Patel, 2016). This is particularly applicable to clinicians working in the Eastern Cape, which is a predominantly rural province and where the clinicians enrolled in this study are working.

Information and Communication Technology (ICT) may be used to address recruitment and retention issues by providing easily accessible and good quality education to health professionals (Lygidakis, McLoughlin and Patel, 2016). Currently, ICT is used in medical education, clinical practice, for CME, and in developing professional social networks (Kinfu *et al.*, 2009). Mobile modalities such as Mobile Instant Messaging (MIM) can be used for this purpose.

Knowledge-sharing and face-to-face communication within a community of practice can be supported virtually (virtual communities of practice) and supplemented by social media platforms (Kinfu *et al.*, 2009). An example of this is WhatsApp, as demonstrated by the mCHW mobile learning project in Kenya, a collaborative effort between the London Knowledge Lab at University College London (UCL) and the African Medical and Research Foundation (AMREF). Here, WhatsApp facilitated communication between community healthcare workers (CHWs) and their supervisors, strengthened their link to the primary healthcare (PHC) system, and offered peer learning opportunities (Winters, 2016).

As discussed above, there is a gap in primary health care clinician retention in resource-constricted settings. Information technology, of which instant messaging applications form part, offer a potential solution in at least improving the medical training and support of clinicians, and therefore adding to their retention in these settings.

#### **2.4 Use of MIM as a learning platform**

WhatsApp is a readily available and widely used application, as discussed above. This application makes allowance for a more constant communication stream between a learner and a facilitator at any time. This improved availability between learner and teacher, make it a convenient teaching aide (Mars and Escott, 2016). Below are some examples of its application in this regard.

In terms of general learner support, Raiman and colleagues (2017) state that the use of mobile applications in medical and dental education has been shown to increase student

participation, enhance feedback processes and improve communication between student and tutor. They did a thematic analysis of six WhatsApp groups of students, started on clinical rotations for eight weeks, and reported on the following themes: organisational, educational and social aspects of use; the ease of use of instant messaging; benefit of instant messaging to foster understanding and learning; and the ability to access recorded discussions (Raiman, Antbring and Mahmood, 2017). The study participants reported that the instant messaging helped them better foster understanding and learning in the rotation. They also found the ability to access recorded discussions as a positive learning aspect.

Similarly, Willemse (2015) reviewed the experiences of undergraduate nurses at a university in the Western Cape, on the improvement of primary care education through the incorporation of WhatsApp as part of their learning support. Twenty one participants submitted electronic reflections of their experiences in the WhatsApp discussion groups. The study found that using WhatsApp Messenger in the primary healthcare education setting has demonstrated a number of benefits for these undergraduate nurses. Seven themes were identified that included: positive experiences using the WhatsApp group; the usefulness of WhatsApp for integrating theory and clinical practice; the availability of resources for test preparation; opportunity for clarification; anonymity; exclusion of students as a result of the lack of an appropriate device, and the application caused the battery of the device to run flat quickly (Willemse, 2015).

Besides learner support, as discussed above, a WhatsApp facilitated communication further supplemented student's improved learning experiences. In a paper by Rambe and Bere (2013), it was argued that MIM has the potential to create alternative spaces for communication in students and improve their collaborative engagement in informal contexts, which will transform teaching and learning. They used WhatsApp as an example of MIM in an information technology course, and found that: learners engaged more confidently with peers and educators; this platform afforded an individual expression of learners through information seeking, critical questioning, and information sharing practices. The authors argued that WhatsApp transformed pedagogy (methods and practice of teaching) by fostering a constructive learning environment for lecture-student and peer-based knowledge sharing (Rambe and Bere, 2013). Interestingly they also found an increase in resentment in older students with the academic and personal life overlap, with messages that were sent after hours.

Geiger (2016) looked at participants' perceptions of what they had learned in a blended learning course (of paediatric HIV/TB). A qualitative approach was used in this study. The author did in-depth interviews with the participants, and focussed her research on five themes: the learner's context; technology as a learning and teaching medium; professional growth; community of learning; and learning beyond the clinical content. She found that the course participants experienced the use of the WhatsApp group as a very good communication and learning tool. Her findings also noted that ongoing learning was sustained amongst the learners by their continued use of the WhatsApp group (Geiger, 2016).

The use of WhatsApp and its facilitation in long distance learning, has had some limited assessment in literature. A study at a Cyprian university looked at the use of WhatsApp as a tool for distance learning in students attending the university. The participants were given a questionnaire after having been given a lesson via WhatsApp. The researchers found that user friendliness, accessibility and cost effectiveness were reasons given by the students as to why WhatsApp was found to be an acceptable form of learning. In fact, 91% of the students want the university to use this application as a regular form of distance learning (Nawaila and Bicen, 2018). Students studying in an open distance learning programme at an Indian university in Timal Nadu, used WhatsApp to further obtain their course content. Investigators found that females in this group utilised the application more, as well as those students that were employed, but overall 74% of students regularly used the application to supplement their studies (Arockia, 2017).

The abovementioned studies are predominantly qualitative in nature, but the same positive thematic reviews occur from participants using MIM such as WhatsApp, to enhance their learning experiences. It facilitates communication, improved learning, and long distance learning within student groups.

## **2.5 Use of WhatsApp in clinical practice**

The WhatsApp application is currently being used as a form of communication between clinical heads and their subordinates in medical fields. It enables improved clinical oversight in those with different levels of clinical expertise, such as between students and qualified doctors, or between specialists and registrars, in clinical settings. A few emerging examples in literature will be discussed below.

Gulacti *et al.* (2016) looked at WhatsApp usage for communication between consultant and emergency physicians, to see if it would be a useful communication tool, especially for emergency department specialist consultants who are often offsite. The conclusion that the researchers reached was that WhatsApp was a useful communication tool between physicians, because of the ability to transfer large amounts of clinical and radiological data during a short period of time (Gulacti, Lok, Hatipoglu, 2016).

Nikolic *et al.* (2018) assessed the use of communication apps in Victorian hospitals in Australia. Their findings noted that there was widespread use of communication apps, from students to consultants, with WhatsApp being the primary app used. The median number of messages shared per day was 12, encompassing a range of patient information. All respondents viewed these apps positively, in regards to quickly communicating patient information in a clinical setting (Nikolic *et al.*, 2018). Similarly a cross-sectional study was conducted in a Malaysian public hospital. A self-administered questionnaire was administered to a large group of 307 health professionals comprising of nurses, medical assistants, medical residents, medical officers and physicians. The majority of respondents (68.4%) perceived WhatsApp as beneficial during clinical practice. This was significantly associated with usage characteristics and type of communication events - those who used WhatsApp for longer, and got quicker replies, rated its use more positively (Ganasegeran *et al.*, 2017).

There are two other descriptive studies that further evaluated the clinical effectiveness of WhatsApp in clinical settings. The first focused on dermatologists and assessed the general satisfaction and perceptions of using WhatsApp in the group. The majority of the participants reported that they found the app a good forum for case discussion and learning (Kaliyadan F, 2016). The second study looked at the use of WhatsApp as a communication tool amongst staff in plastic/reconstructive surgery at a tertiary hospital. They assessed whether episodes of patient management using WhatsApp, were handled effectively and in good time. The clinicians reported being satisfied with this form of communication and the authors concluded that the app was an effective, low cost and easy to implement learning tool for academic and clinical interaction (Wani *et al.*, 2013).

The main theme emerging in the studies discussed above is the ease of use of the application, and the improved and subjectively quicker mode of communication between clinicians and other health staff in clinical settings

## **2.6 Patient confidentiality and medico-legal considerations of using smartphones and MIM**

As demonstrated in the literature review above, the existing empirical evidence for the use of WhatsApp in clinical settings seems to be largely positive and shows the benefits of such a tool for learning and communication in a clinical setting. Despite this, there have been some concerns about possibilities of the breach of patient confidentiality in the use of this social media platform (Kirk *et al.*, 2014).

Online quantitative research by Kirk *et al.* (2014) to explore the dissemination of medical images using smartphones, show that clinicians had obtained consent for only a quarter of all pictures taken, mostly verbal. Of these, 82% shared the image with someone else, in order to get a colleague's input. The writers highlighted that it was inevitable that smartphones would be used in a clinical setting, but strict hospital policies had to be in place in order to protect patient privacy and confidentiality ( Kirk *et al.*, 2014).

According to international guidelines, patient confidentiality and guarding their personal health data, is a legal requirement under different laws such as the Health Information Portability and Accountability Act (HIPAA) in the USA, or the Data Protection Directive in the European Union (Denecke *et al.*, 2015). There are currently no Health Professionals Council of South Africa (HPCSA) guidelines that address the issue of clinicians specifically posting on social media. However, their guidelines address the issue of patient confidentiality, as well as ethical concerns using telemedicine (which have been extrapolated below to the use of social media). According to the HPCSA, patients have a right to expect that information about them will be held in confidence by healthcare practitioners (Klauman, 2016). Audio-visual records, such as photographs, videos and tape-recordings constitute a health record. Doctors who wish to publish details about specific medical cases or clinical experiences online, which identify or run the risk of identifying a patient, should ensure they follow the guidelines relating to patient consent and disclosure set out by the HPCSA (HPCSA, 2008). These state that a patient's express consent must be obtained before publishing case reports, photographs or other images in media that the public can access. This rule applies regardless of whether the patient can be identified or not. Health workers need to ensure that they have documented consent for taking photographs and making recordings (Klauman, 2016).

Klauman (2016) further iterates that the patient's right to confidentiality means more than simply refraining from divulging information – practitioners are also responsible for ensuring that all records containing patient information are kept securely. Dangers may arise when sharing images with other colleagues and their devices (Klauman, 2016). For instance, WhatsApp automatically saves photographs on a smartphone and these could transfer to other cloud savers.

Although WhatsApp has improved its end-to-end encryption policies and does not store chat data in a virtual cloud (like Facebook), this form of protection has not been conclusively tested in clinical environments. Patient confidentiality is therefore still at risk, and clinicians need to take steps to protect that (Kamel Boulos, Giustini and Wheeler, 2016). As Denecke and colleagues (2015) state, in the increased use of medical social media use, data and information can be very useful but the abuse of data needs to be prevented. They suggest a careful reflection on the roles and responsibilities of those in healthcare that make use of these applications (Denecke *et al.*, 2015).

## 2.7 Summary

The reviewed literature shows that the use of WhatsApp and other MIM technologies are a widespread form of communication worldwide, and include medical professionals as regular users. In the preceding literature review there are a few examples of its use in subjectively enhancing clinicians' and medical students' learning experiences. WhatsApp is currently used in clinical practice as a quick method of communicating patient information to colleagues and also in getting clinical advice from superiors. This is important especially in inequitable health settings, where it is essential to support/train primary health care clinicians in order to promote their retention. However, there is a concern that clinicians are not aware or adhering to the ethical and legal obligations that govern the use of these technologies.



## CHAPTER 3: METHODOLOGY

### 3.1 Introduction

This section looks at the overall study design, setting, population group and sampling, data collection and analysis, reliability and generalisability as well as ethical considerations pertaining to the study.

### 3.2 Study design

An observational, descriptive cross-sectional design was used. An anonymous internet questionnaire, distributed to the clinicians that formed part of the WhatsApp group, was used as the data source. A quantitative approach was chosen for the study as the responses from the questionnaire were graded and therefore easily quantifiable.

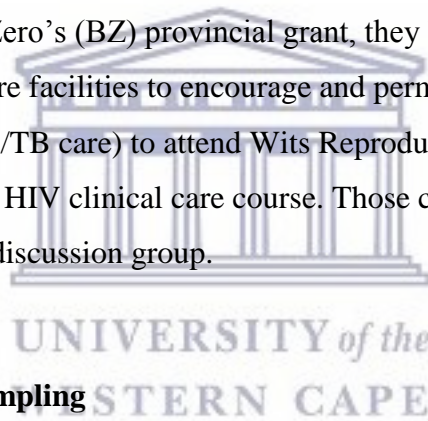
The advantages of using a cross-sectional design in this study was that one could measure “prevalence of the disease” (in this case the regularity of group usage), as well as the other factors that were being investigated (Sedgwick, 2014). It can also be used to describe health service provision (in this case, the subjective usefulness of the group to the clinicians who use it). Most importantly, data on all variables in this study design are collected only once (outcome and the exposures in the study participants are collected simultaneously), which was ideal in this study with the use of the internet survey (Setia, 2016). It also allowed for data to be collected anonymously, and from a remote distance, making the study more feasible as the participants were widely spread throughout the Eastern Cape (EC) province. This type of observational design further suits this study, as the investigator is simply recording the responses of participants and not intervening in any other way (Sedgwick, 2014). The cross-sectional survey also lends itself to this form of retrospective data review (Cresswell, 2014).

### 3.3 Study setting

The study was conducted amongst doctors who form part of the clinical discussion WhatsApp group and that work in public health facilities in the Eastern Cape (EC). Of these health facilities three are regional/academic hospitals, 65 are district hospitals, 41 are Community Health Centres (CHC) and 674 are primary healthcare clinics (Gray and Vawda,

2017). In the South African public health system, primary healthcare clinics are the first line of access for people needing healthcare services, providing their services for free. They offer services such as immunisation, family planning, antenatal care, treatment of common diseases and treatment and management of TB/HIV. The next tier of the public healthcare system are the district hospitals to which patients are referred from primary healthcare clinics when they need more complicated treatment or care. Clinical services at this level include Surgery, Obstetrics and Gynaecology, Out-Patients Department, Medicine, Paediatrics, Mental Health, Geriatrics, Casualty and Clinical Forensic Medical Services amongst other services. Academic hospitals/regional hospitals form part of a third tier of care - this is where patients who require more advanced diagnostic procedures and treatments are referred (Jobson, 2015).

Medical officers (MOs) are the health practitioners responsible for patient management in all tiers, but medical specialists are predominantly only found in academic and regional hospitals. As part of Beyond Zero's (BZ) provincial grant, they liaised with district and facilities managers at healthcare facilities to encourage and permit their MOs (especially those directly involved in HIV/TB care) to attend Wits Reproductive Health and HIV Institute (Wits RHI) advanced HIV clinical care course. Those clinicians that did were then invited to join the WhatsApp discussion group.



### **3.4 Study population and sampling**

There are currently 1631 doctors working in public health facilities in EC (Gray and Vawda, 2017). The study population that was used in this study were 166 doctors, around 10% of doctors working in the province, who accepted Wits RHI's invitation to be part of the WhatsApp clinical discussion group from January 2016 to July 2017. The inclusion criteria for the study included doctors from the EC Department of Health (medical officers and specialists), as well as clinicians from Wits RHI and Beyond Zero, that were part of the above mentioned group. All the doctors in the group were included to allow for loss to follow up (ie. leaving the group during the period of investigation) and for those opting not to be part of the study. Therefore, all 166 doctors qualified, in order to minimise any non-response, and to improve representation of the clinicians in the group (Levin, 2006).

### 3.5 Data collection tools and pre-test

Data was collected using a structured, anonymous internet questionnaire - comprised of 17 statements/questions (each question with corresponding answer choices). The reason a questionnaire was used as a data collection tool in this study, is that it suited the chosen cross-sectional study design. Information on the frequency of the exposure variables (namely the various factors affecting the clinicians perceptions of the group) in the study population, was collected simultaneously with clinician responses (Hernández and Velasco-Mondragón, 1987). This questionnaire format worked well, as it could be sent to the whole study population, as it was easily accessible online, and only needed to be completed once (Levin, 2006). Also, its online availability mitigated the need for face-to-face investigator and clinician contact, which would have been problematic with the widespread distribution of doctors across the EC province.

The main themes for the questionnaire centred around: access to the WhatsApp/internet; usage of the group; aid in improving clinical confidence; usefulness as a learning tool; confidentiality of cases posted (doctors' perceptions). The above themes were chosen in order to best meet the objectives of the study, and were decided upon after discussion with Wits RHI experts. The questionnaire was kept as short as possible (while still being able to directly speak to the objectives), in order to maximise clinician participation. The questionnaire is attached as an addendum (see Appendix 1).

In order to analyse the usage of the WhatsApp group (objective one of the study), the questionnaire included questions that assessed participants' accessibility to the internet. It looked at their engagement in the group by asking questions surrounding posting of cases, responding to cases and regular following of group when cases were posted. Satisfaction at the relevance of responses received (by content and timing), was also assessed. Lastly participants were asked what types of cases they posted (Appendix 1).

The questionnaire also assessed the participants' perception of an increase in clinical confidence and perceived usefulness of the group as a learning tool in managing complicated cases after taking part in the group (Appendix 1). It further assessed whether they felt that information discussed in the group was according to best practice principles from national/international guidelines. Participants were therefore asked if they would recommend a similar learning platform (as a WhatsApp chat group) to other colleagues.

Lastly, the questionnaire assessed the current knowledge of participants of local health professional council guidelines governing patient consent when sharing patient information in social media, and if they had followed document consent when posting cases in the group (Appendix 1).

This questionnaire was in the format of a Google form, designed in the researcher's Google drive. A pre-test of the electronic questionnaire was initially administered to three clinicians/researchers from Wits RHI. After completing the questionnaire, these clinicians provided feedback to the researcher regarding the general format of the collection tool and its content, and further assisted in expanding the questionnaire design. This included the layout of the questionnaire; ease of use; clarity and relevance of the questions, and the appropriateness of the format. This feedback was taken into account, changes made to the questionnaire as deemed appropriate and then incorporated into a finalised tool. The tool was then reviewed by colleagues a final time before being adopted.

### **3.6 Data collection**

Data collection took part from the 01 November 2017 to 05 December 2017. A link to the questionnaire in the Google form was initially sent to each clinician in the WhatsApp discussion chat group via WhatsApp. When the clinicians clicked on the link, they were taken to the electronic Google form. Google saved each completely filled questionnaire in the investigator's Google drive. This form was completed by the respondent by them clicking on the most appropriate response. There were no open-ended or continuous questions, making the questionnaire simple and fairly quick to answer; the investigator estimated around five to ten minutes per form. Participants were able to answer the questions within their own time frame, enabling them to have privacy/choice of space.

All the completed forms were readily available to view on the drive, which was password protected, and could be downloaded when needed for analysis. The clinicians were also emailed the link. Emailing helped to collect data from the clinicians that may have at any stage left the group during the period under investigation. Their emails were available on a database kept by the trainers of the advanced HIV management course (of which the investigator is one). A WhatsApp follow up reminder was sent to clinicians one week after the initial WhatsApp posting. A last WhatsApp reminder was again sent after a month of posting the questionnaire link on WhatsApp.

### 3.7 Data management and analysis

The internet questionnaire results were captured by Google forms as the participants completed the online survey. The individual responses were then collected and transferred to an Excel spreadsheet. Data cleaning occurred in Excel. Any incompletely answered questionnaire were removed as a data source (there was only one questionnaire incompletely filled). Standardized responses were also allocated a numerical key for easier analysis. The data were then imported into Epi info statistical programme for analysis. Data were initially explored using basic frequencies for the categorical data.

Summary statistics were presented to give a general description of the above responses using analysis tables and graphs. These categorical variables were summarised as the number and percentage of responses in each category/exposure variable.

Further analysis was done by looking at other possible associations between clinical confidence to group engagement, and clinical confidence because of perceived usefulness of group as a learning tool. In the confidence variable like-like response options were recorded for ease of analysis. Responses of “agree” and “strongly agree” were combined as one affirmative “Yes” outcome variable. Outcome responses of “neutral”, “strongly disagree” and “disagree” were combined as a negative “No” variable.

Tests for association also explored the relationship between internet access, and regularity of group following and posting cases and recommendation. Other associations investigated include the recommendation of the group based on the perceived usefulness of the group as a learning tool.

For all the above associations, frequency distributions and cross tabulations of the abovementioned variables were generated. Bi-variate analysis was done to determine significant associations between the differing variables using *p*-values, odds ratios (OR) and 95% confidence intervals (CI). The assessment of any significant differences was conducted using a Mid- P Exact test. This was computed to show if any statistical significance. Type I error rate (alpha) for statistical tests was set at 0.05 and 95% confidence intervals (CI), and were provided when appropriate.

### **3.8 Internal validity**

In order to reduce information bias, the investigator took cognisance of a few issues. The questionnaire was a standardised tool, with seventeen questions. Each doctor received the same questionnaire. The questionnaire had been reviewed by Wits RHI colleagues (as mentioned previously), this consultation further aided in internal validation, before distribution to the doctors. The questionnaire was self-administered, so no measurement bias was introduced by a third party (Hernández and Velasco-Mondragón, 1987).

There was a threat to validity in terms of sampling bias when administering the questionnaire, with the potential of non-responders possibly skewing the results (Levin, 2006). 45 % (74/166) of the participants did in fact not submit responses. The investigator attempted to minimise this threat as much as possible by regular email and WhatsApp reminders (Levin, 2006). There was also an attempt to reduce any sampling bias by sending the questionnaire to all the participants in the group. The questionnaire was kept as short as possible and attempts were made to simplify access to it with an easy to use internet link being sent to the participants - all this to minimise non-responses (Levin, 2006).

In terms of reducing selection bias, there might have been some bias in the selection of participants, as although all the participants that form part of the group were included, not all responded. To try minimise any extra bias in this regard, the questionnaire was sent to all the doctors that had at any stage belonged to the group so that those that left the group discussions prematurely could also participate.

### **3.9 Reliability**

In terms of reliability, the study was investigating only one group of doctors, in a very specific setting (HIV/TB learning). This could decrease the reliability or replicability of the same results in another context in terms of content of the questionnaire. The investigator asked three or four questions surrounding a particular theme, to try to get a more consistent answer in the survey. For example, participants were not just asked if they had felt that the WhatsApp group was a useful learning tool. Rather, they were asked: “I used the clinical guidance posted on the WhatsApp doctors group to manage my patients care”; “I referred back to chats on the WhatsApp doctors group when complicated clinical cases presented at my clinic”; “I found the WhatsApp group useful in helping me gain new clinical insights on HIV/TB”. This increased the objectivity of the test, and therefore the reliability. Also, the

investigator attempted to make the statements as clear of ambiguity as possible in the questionnaire, and there were limited clearly laid out options from which clinicians could choose.

### **3.10 Generalisability**

To improve generalisability, a pre-test was done beforehand with clinicians/researchers involved in HIV fields to ensure improvement in validity. However, the doctors that participated in this WhatsApp discussion group, not only deal in HIV medicine, but also see a range of cases from other clinical disciplines. The intervention being investigated was looking at the provision of remote clinical support by using a WhatsApp mobile forum platform, in order to help clinicians deal with their clinical cases better. If the study aptly describes that the forum is indeed perceived as effective to distance learning and support, then other clinical disciplines (not only infectious diseases), from other health settings (private, district, provincial level) can apply this intervention. The target population groups that could use this intervention include, for example, doctors in other clinical disciplines that need expert advice/access regarding patient management, allied health professionals (such as nurses, physiotherapists, occupational therapists) that need clinical supervision and advice from senior consultants regarding patients they are managing.

The second outcome of the study was to assess if patient confidentiality breaches had occurred with the posting of cases, and if doctors were aware of the legal obligations they are under when posting patient case details on a social media platform. The findings of this study could definitely be generalised to any health profession. It would aid in raising awareness of the pitfalls of posting cases on social media, and in doing so, protect health professionals from any future litigation as well as protect their patient's confidentiality.

### **3.11 Ethical considerations**

Ethics approval was received from: HREC (Human Research Ethics Committee) from the University of Witwatersrand; BMREC (Biomedical Research Ethics Committee) from the University of the Western Cape.

Doctors were initially added to the WhatsApp group upon completion of Wits RHI's advanced HIV clinical care doctor's course. This was a voluntary course attended; Beyond

Zero liaised with the EC Regional Training Centre to provide it. The WhatsApp group was managed by Wits RHI, and doctor participation in it was completely voluntary. The doctors were informed that the cases shared in the group would be discussed and seen by other group members and also used for learning purposes/case studies outside of the group. It was each clinician's prerogative to remain in the group and participate or not, once added by the administrator (in this case also the study investigator). Participation in the group could occur at any time, including outside of the doctor's normal clinical duty time. No additional permissions were sought for the study from any other stakeholders.

The data collection tool of an anonymous internet questionnaire was made available to doctors to complete. A participant information form, along with the link to this internet questionnaire was electronically available and posted on the WhatsApp group, as well as emailed to all participants who had at any stage belonged to the group within the reporting period. The participant information sheet was combined with participant consent. As it was anonymous, no participant name was requested. Date and time of agreement (consent) of filling in the questionnaire was automatically recorded by Google forms. A copy of the internet questionnaire and the patient information sheet is found in the appendices (Appendix 2).

There was no anticipated harm in the study, but there may have been some discomfort to the doctors in completing the online questionnaire. There was also the risk of identifying the locality of where the doctors worked (i.e. EC) but no risk of identifying individual doctors or patients/cases.



## CHAPTER 4: RESULTS

### 4.1 Introduction

This chapter gives a summary of the results of the study in both a descriptive and analytical form.

### 4.2 Sample description

A total of 92 participants submitted internet questionnaires, out of the 166 belonging to the WhatsApp chat group. These were doctors who had at some stage belonged to the group, and some may have left during the period of investigation. Consent was provided by participants in completing and submitting the form. One form was submitted with no answers and was therefore excluded from the analysis. In order to describe the usefulness of the WhatsApp group as a learning tool, the analysis examined: clinicians' use of the WhatsApp chat group; it examined their confidence in managing complicated HIV/TB patients after participating in group; it examined the perceived usefulness of the chat group as a learning tool; analysed clinicians' knowledge and use of informed consent in the group use; and looked to see if there were any other clinical significant associations obtained from the data set.

### 4.3 Analysing clinicians' use of the WhatsApp group

In order to analyse the usage of the WhatsApp group (objective one of the study), the questionnaire included questions that assessed the participant's access to the internet. It looked at their engagement in the group by asking questions surrounding posting of cases, responding to cases and regular following of the group when cases were posted. Satisfaction at the relevance of responses received (by content and timing) was also assessed. Lastly participants were asked what types of cases they posted.

Participants predominantly had access to a form of internet connectivity in the group, only 1% did not, and of the remainder, 29% had only occasional access (Figure 4.1). Internet connectivity and access is of course important in being able to receive and post questions on the app; it was good to note that 71% of participants had access all the time, especially as the Eastern Cape (EC) is a predominantly rural province (access to mobile connectivity could have been problematic).

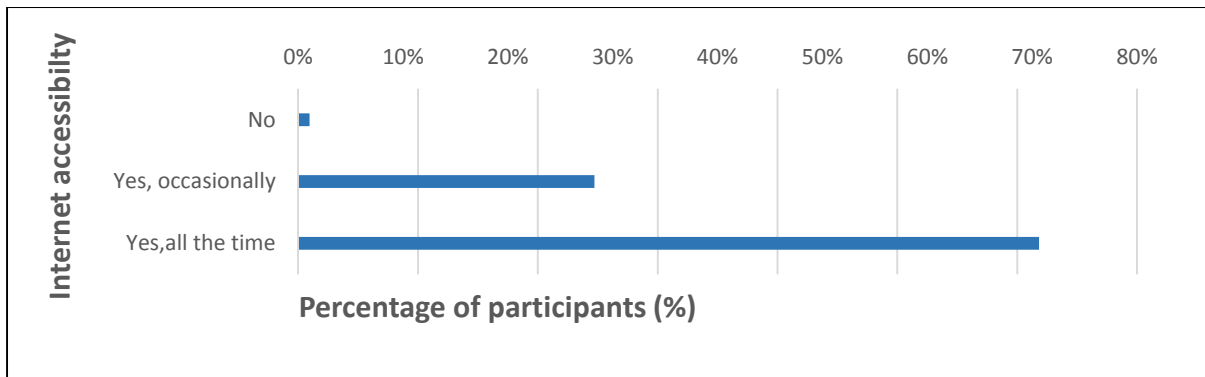


Figure 4.1 Internet accessibility (n=91)

Figure 4.2 is a graph showing how the participants followed the group. The majority (73%) looked on the app every time a case was posted, with only 2% ignoring the group completely (30% only checked infrequently).

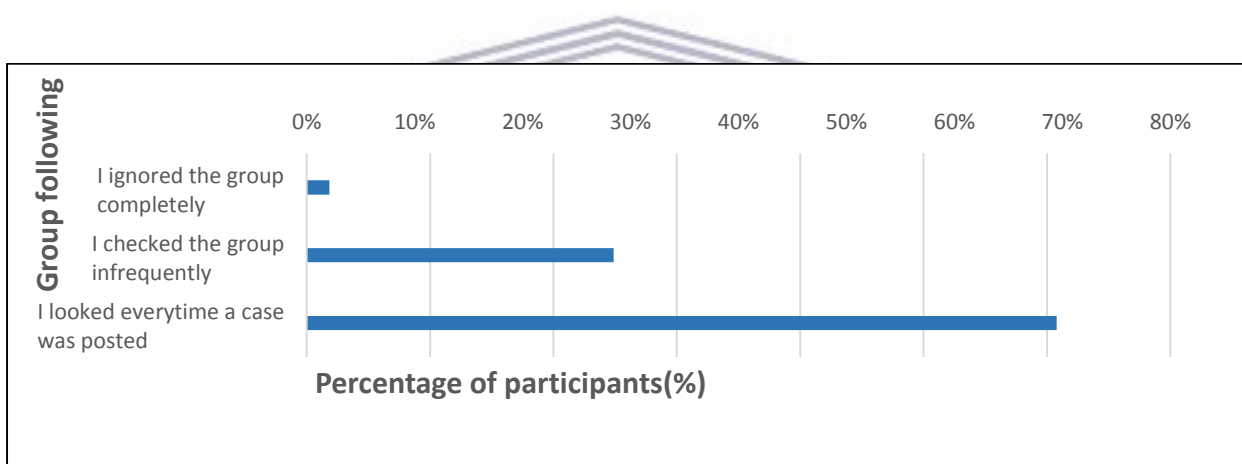


Figure 4.2 Followed group (n=91)

To further assess engagement in the group, participants were also asked how many times they posted cases in the group (Figure 4.3), and if they posted any responses to a case that had been posted by a colleague (Figure 4.4). Half of the participants reported to have never posted cases; 47% had posted at least 1-5 times; and 3% had posted 6-10 times. In terms of posting any medical advice or responses to another colleague's case, 52% posted occasionally, 4% all the time (Figure 4.4).

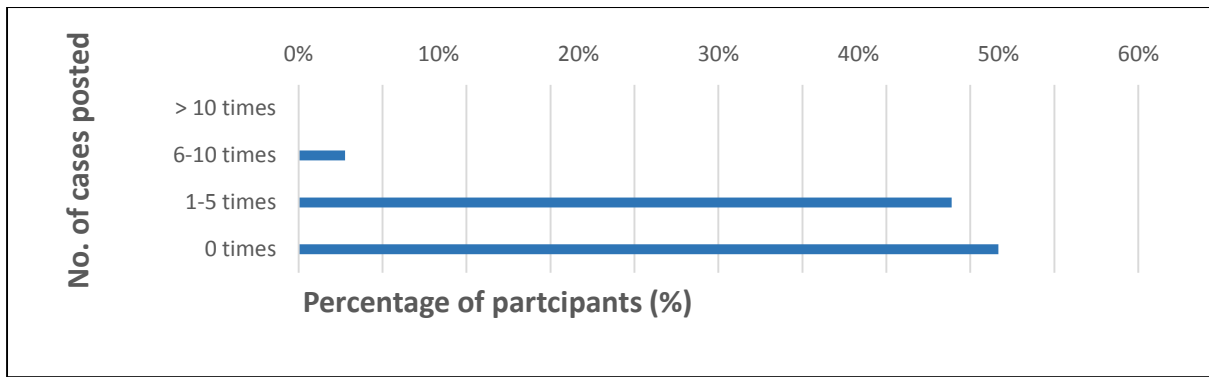


Figure 4.3 Number of cases posted per participant (n=90)

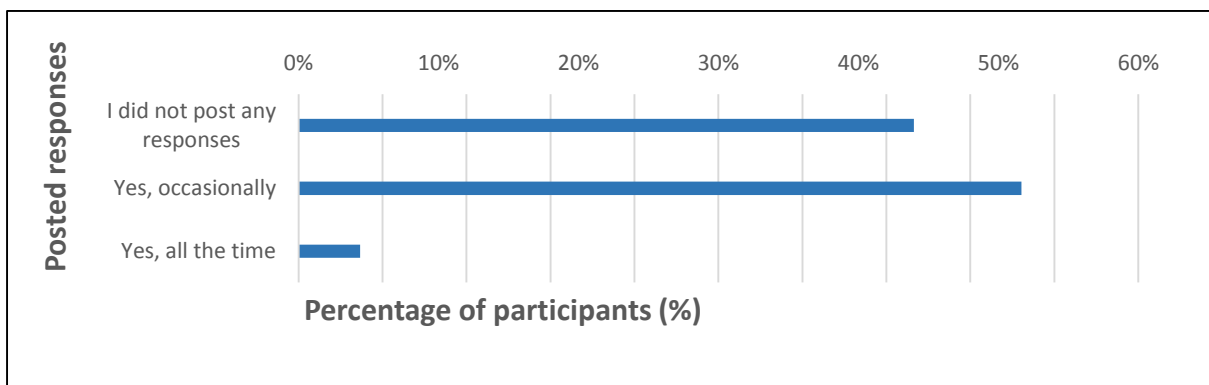


Figure 4.4 Group engagement in posting responses (n=91)

In order to determine the satisfaction of case responses received, participants were asked if the responses to the cases posted came timeously. Half of the participants had posted cases and felt positively about the timeous case response (Figure 4.5). The majority of participants that posted cases also stated that they were satisfied at the content of the case response received (Figure 4.6).

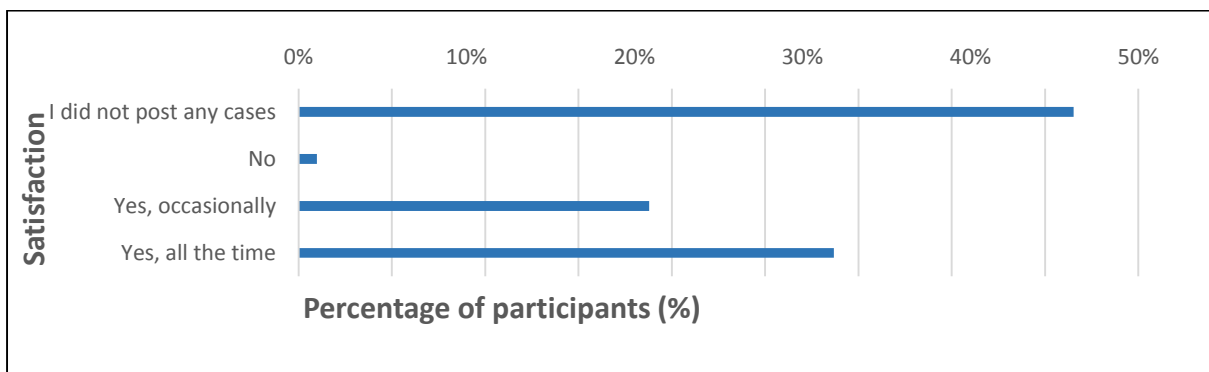


Figure 4.5 Satisfaction at timeous case response (n=91)

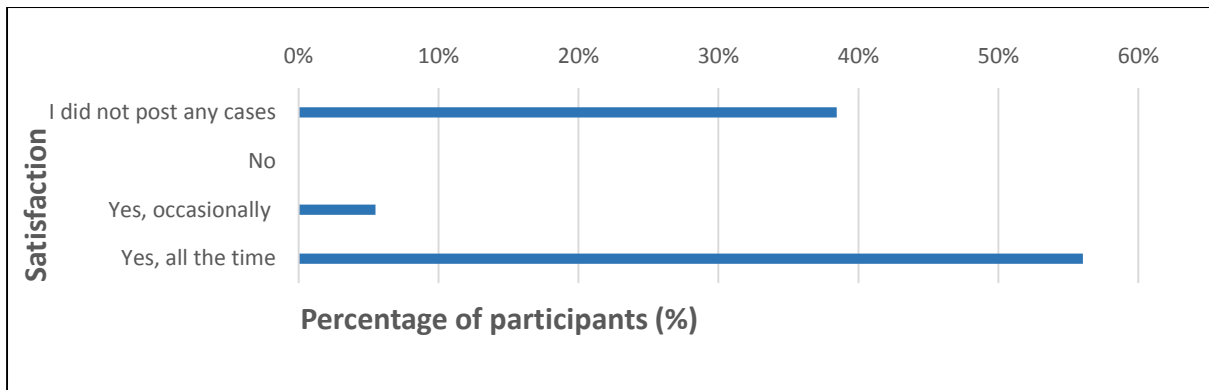


Figure 4.6 Satisfaction of content of case response received (n=91)

Lastly, the participants that posted cases were asked what type of cases they presented (Figure 4.7). There was a very similar distribution in reporting paediatric, adult cases (including opportunistic infections (OI)), and cases of unsuppressed viral loads (VL) – making up the bulk of cases at 65% collectively. Maternity cases and prevention of mother to child (PMTC), managing adverse events (AE), and dermatology made up the remainder of the cases reported. There were 3% of other cases posted which included third-line regimens and etravirine usage.

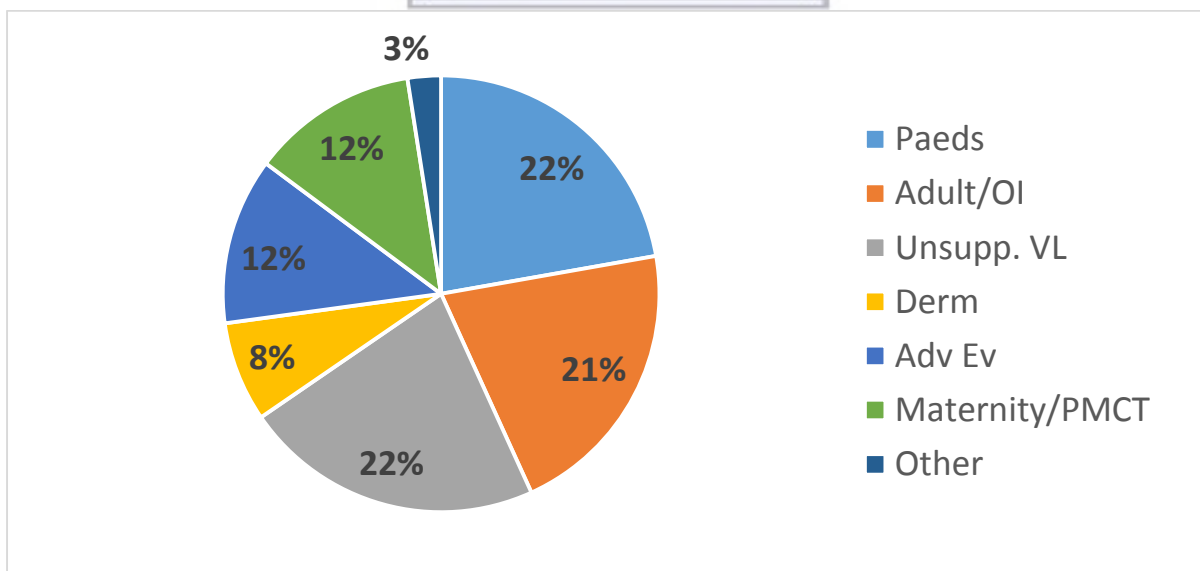


Figure 4.7 Types of cases discussed (n=81)

#### 4.4 Clinicians' confidence in managing complicated HIV/TB patients

Figure 4.8 is a graph of the participants' perceptions of having obtained greater clinical confidence in managing complicated HIV/TB cases (study objective two). None of the participants disagreed, with the majority (50%) strongly agreeing, while 36% agreed, that it did increase their confidence.

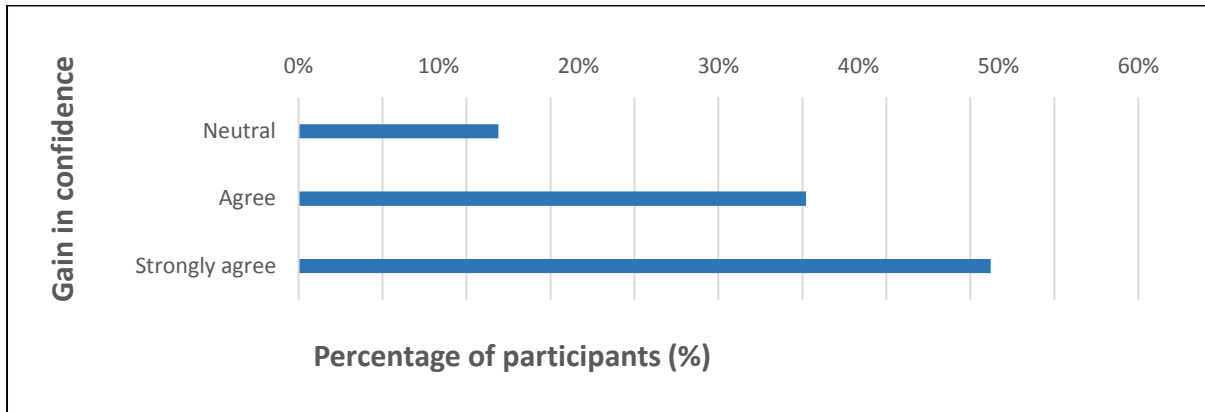


Figure 4.8 Gained greater clinical confidence in managing complicated HIV/TB cases (n=91)

#### 4.5 Perceived usefulness of the chat group as a learning tool

The questionnaire also assessed the participants' perception of the usefulness of the group as a learning tool in managing complicated cases after taking part in the group (study objective three), and whether they would recommend this case discussion platform to other colleagues.

When participants were asked if they used the clinical guidance posted on the WhatsApp doctors group in their own patient management, 52% responded that they used the clinical guidance all the time, 44% used the guidance occasionally. Only 4% felt that the guidance given on the group was not relevant to their current patient case management (Table 4.1).

About a third of the participants reported that they actually referred back to old cases discussed all the time when a complicated clinical case presented at their clinic (Table 4.1). Out of the remainder, 64% used the previous discussions occasionally, and 8% felt that felt that the guidance given on the group was not relevant to their current patient case management.

Table 4.1 Use of group in managing participants own patients (n=89)

	<b>Guidance not relevant</b>	<b>Used occasionally</b>	<b>Used all the time</b>
<b>Used guidance to manage patients</b>	4% (4)	44% (39)	52% (46)
<b>Referred to old chat cases</b>	8% (7)	64% (57)	28% (25)

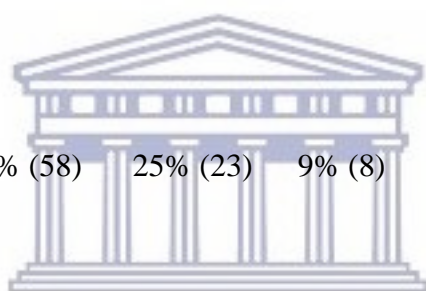
Again, the majority of the participants, strongly agreed that the WhatsApp group was useful in helping them gain new clinical insights on HIV/TB, only 1% disagreed (Table 4.2). Similarly, 91% responded that they found the WhatsApp group useful in helping them to practically apply any pre-existing knowledge they had learnt about HIV/TB; the remainder remaining neutral (Table 4.2).

In terms of the standard of responses/group discussions posted on the group, 97% strongly agreed/agreed that the information discussed in the group chat was according to national guidelines and international best practice principles of HIV care (Table 4.2).

Lastly, when asked if they would recommend a similar case discussion platform to other colleagues, 64% strongly agreed that they would recommend it, 25% agreed and only 2% strongly disagreed (Table 4.2)

Table 4.2 Usefulness of the group as a learning tool (n=91)

	<b>Strongly agreed</b>	<b>Agreed</b>	<b>Neutral</b>	<b>Disagreed</b>	<b>Strongly disagreed</b>
<b>New clinical insights</b>	56% (51)	35% (32)	8% (7)	1% (1)	0%
<b>Practical application of pre-existing knowledge</b>	54% (49)	37% (34)	9% (8)	0%	0%
<b>Guidance according to national/international guidelines</b>	63% (57)	34% (31)	4% (4)	0%	0%
<b>Recommend to colleagues</b>	64% (58)	25% (23)	9% (8)	0%	2% (2)



UNIVERSITY of the  
WESTERN CAPE

#### 4.6 Clinicians' knowledge and use of informed consent in the group

The last objective was understanding the clinicians' knowledge of informed consent when sharing patient information on social media. From the responses, 89% of the participants reported that they were aware that according to Health Professionals Council of South Africa (HPCSA) regulations, they needed to obtain documented patient consent when posting a patient-related image on social media (Figure 4.9). However of those that reported posting questions, only half obtained consent (52%) versus 48% not obtaining consent, when posting patients' photographs or other medical images on the group (even if patient identity was not revealed). When asked if they obtained documented patient consent when posting patients' laboratory results on the group (even if patient identity not revealed), around two thirds (68%) of participants that had posted said they had in fact not obtained consent, less so than when posting other medical images.

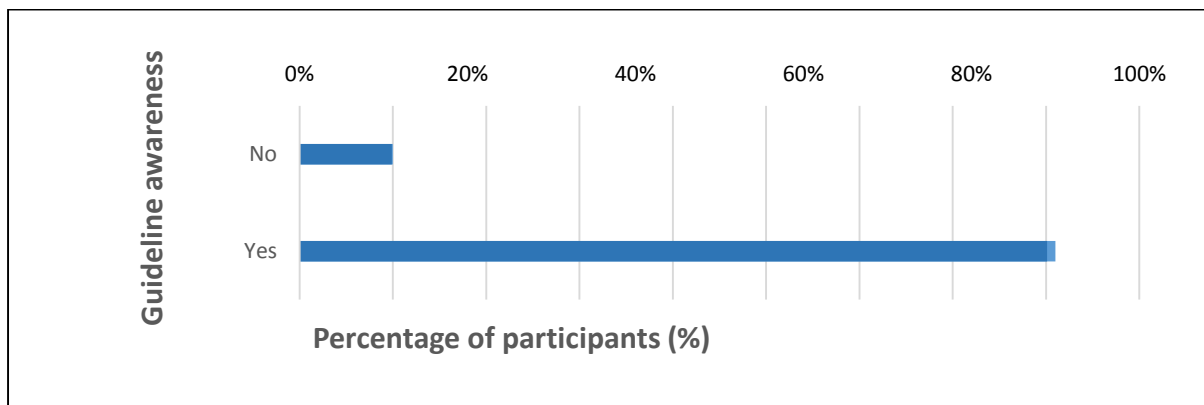


Figure 4.9 Awareness of HPCSA regulations in obtaining patient consent when posting in social media (n=91)

#### 4.7 Bivariate analysis

Using a bi-variate analysis, with cross tabulation in Epi Info, any statistically significant associations were looked for in those clinicians who reported feeling more confident in managing their patients after group participation and whether they would recommend the group as a learning platform to other colleagues. Statistical significance, in the below discussion, is reported if the p value < 0.05, a Mid-P Exact probability test being used to determine this.

Table 4.4 looks at any association between group engagement as an exposure variable, and increased clinician confidence as an outcome. In doctors who followed the group regularly, there was a clinically significant increase in OR (8.44 CI 2.33 - 35.23), participants being 8.44 times more likely to have increased confidence in managing their patients. Those that posted questions also had an increase in OR, 3.8 times more likely to have an increase in their clinical confidence (CI 1.02 - 18.48).

Other associations were found in increased clinician confidence in managing patients as an outcome, cross tabulated with participant perceptions of the usefulness of the group as a learning tool (Table 4.5). Of statistical significance: participants that used the chat group guidance to manage their patients were 48.13 times more likely to be confident afterwards (OR 48.13 CI 4.99 - 464.49); those that referred to old chat cases were 21.42 more confident (OR 21.42 CI 4.39 - 104.84); there was also an increase in confidence in participants who reported that they had gained new clinical insights while participating in the group (OR 23.75



CI 3.95 - 142.88). Confidence intervals in this analysis are quite wide due to the small sample size being used.

*Table 4.3 Increased clinician confidence in managing patients and levels of group engagement*

<b>Variable</b>	<b>Greater clinical confidence (%)</b>	<b>OR</b>	<b>95 % Confidence interval</b>	<b>P value</b>
<b>Followed group</b>	93%	8.44	2.33 – 35.23	< 0.05
<b>Posted questions</b>	93%	3.8	1.02 – 18.48	0.02
<b>Posted responses</b>	92%	3.36	0.96 – 13.55	0.03

**\* Mid-P Exact**

*Table 4.4 Increased clinician confidence in managing patients based on their perceived usefulness of the group as a learning tool*

<b>Variable</b>	<b>Greater clinical confidence (%)</b>	<b>OR</b>	<b>95 % Confidence interval</b>	<b>P value</b>
<b>Used guidance to manage patients</b>	91%	48.13	4.99 – 464.49	< 0.05
<b>Referred to old chat cases</b>	91%	21.42	4.39 – 104.84	< 0.05
<b>New clinical insights</b>	90%	23.75	3.95 – 142.88	< 0.05
<b>Practical application of pre-existing knowledge</b>	94%	Undef.	Undef.	< 0.05

---

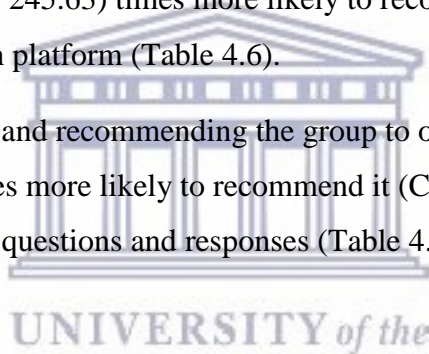
<b>Guidance according to national/international guidelines</b>	89%	Undef.	Undef.	< 0.05
----------------------------------------------------------------	-----	--------	--------	--------

---

**\* Mid-P Exact**

When looking at recommending the group to colleagues as an outcome, there were some statistically significant associations with the exposure variables of participants' perceptions of the group as a learning tool. Participants who report gaining new clinical insights were 17.33 times more likely to recommend the group (CI 3.13 - 96.01). Those that reported that the group helped them to practically apply pre-existing knowledge and felt that the guidance given was according to national/international guidelines, were also respectively, 12.82 (CI 2.55 - 64.56) and 20 (CI 1.63 - 245.63) times more likely to recommend the group to other colleagues as a case discussion platform (Table 4.6).

In terms of group engagement and recommending the group to others, those that followed the group regularly were 4.79 times more likely to recommend it (CI 1.19 – 21.10). There was no difference in those that posted questions and responses (Table 4.7).



*Table 4. 5 Clinician recommendation of the WhatsApp group based on their perceived usefulness of it as a learning tool*

<b>Variable</b>	<b>Recommend group (%)</b>	<b>OR</b>	<b>95% Confidence interval</b>	<b>P value</b>
<b>Used guidance to manage patients</b>	89%	1.69	0.17 – 16.1	0.32
<b>Referred to old chat cases</b>	90%	2.64	0.46 – 14.95	0.16
<b>New clinical insights</b>	93%	17.33	3.13 – 96.01	< 0.05

---

<b>Practical application of pre-existing knowledge</b>	93%	12.83	2.55 – 64.56	< 0.05
<b>Guidance according to national/international guidelines</b>	91%	20	1.63 – 245.63	< 0.05

**\* Mid-P Exact**

*Table 4.6 Clinician recommendation of the WhatsApp group based on their level of engagement in the group*

<b>Variable</b>	<b>Recommend group (%)</b>	<b>OR</b>	<b>95 % Confidence interval</b>	<b>P value</b>
<b>Posted responses</b>	88%	0.83	0.19 – 3.28	0.4
<b>Posted questions</b>	88%	0.97	0.24 – 3.89	0.46
<b>Followed group</b>	93%	4.79	1.19 – 21.10	0.01

**\* Mid-P Exact**

Lastly, I looked at whether internet access impacted clinicians' reported ability to follow the group, but there was no clinically significant association found (Table 4.8).

*Table 4.7 Clinician access to internet and their following the group*

<b>Variable</b>	<b>Followed group (%)</b>	<b>OR</b>	<b>95 % Confidence interval</b>	<b>P value</b>
<b>Internet access</b>	73%	Undef	Undef	0.27

**\* Mid-P Exact**

#### **4.8 Summary**

The preceding analysis found the majority of participants had access to the internet, but there was no association with their following of the group more regularly. There was generally good reported engagement in the group, with the majority of participants following the group regularly. The majority of participants had posted responses at some stage (56%), and those that posted cases were satisfied with the content and the timing of the responses given.

As a learning tool, the majority of participants used the group as guidance to manage other patients, and referred back to old chat discussions (96% and 92% respectively). The participants also reported that the group gave them new clinical insights, helped them to practically apply pre-existing knowledge and that they felt that the guidance was according to international/national guidelines.

From the survey, 86% of the responders agreed that they had gained new clinical confidence in managing their patients by participating in the group. Although a majority of 89% reported that they knew local professional governing body rules about obtaining patient consent when posting on social media, one third did so when posting laboratory results and only half those that posted medical images.

Bivariate analysis found that there was a statistically significant association in participants who engaged in the group, by following it and posting questions, to their improved clinical confidence in managing complicated cases. There was also an improvement of clinical confidence in those who perceived the group as a useful learning tool, namely in those that felt they had gained new clinical insights, had used group guidance to manage patients and referred to old chat cases.

Lastly participants were more likely to recommend the group to other colleagues if they had followed the group, and again reported it as a useful learning tool (specifically if they had reported gain in clinical insights, practical application and felt the guidance was according to international guidelines).

## CHAPTER 5: DISCUSSION

### 5.1 Introduction

WhatsApp is a widely used social media platform and MIM (Mobile Instant Media) technology (Statistica, 2016). Its use in clinical practice has only recently been the subject of clinical review, with available literature showing that it is an efficient and portable mode of communication for medical staff (Nikolic *et al.*, 2018). In countries that have resource constraints, it is also an attractive option for telemedicine support (Mars and Escott, 2016). Added to that, Continuing Medical Education (CME), plays an important role in the retention of medical staff in developing countries (Chen, 2010). WhatsApp is a mobile modality that can be used to provide easily accessible and good quality CME to health professionals in these resource-limited settings (Lygidakis, McLoughlin and Patel, 2016). This study looked at a group of Eastern Cape (EC) doctors that used WhatsApp as part of CME, and assessed its use as an example of an alternative learning tool in the field of HIV/TB medicine, one of the first studies to do so in South Africa.

### 5.2 Group engagement and its usefulness as a learning tool

The responses from participants in this study were favourable in the reported use of the WhatsApp group and its application as a learning tool.

The majority of the study participants had regular internet connectivity. This is important in facilitating the uninterrupted use of the application and communication in real-time (Rambe and Bere, 2013). WhatsApp has many added conveniences because of this internet accessibility. A participant could post a case at any time, not being limited by connectivity or hardware (a mobile phone also being more portable than a computer). With WhatsApp, a user can also download images and easily access saved case records. The convenience in the application's use and its connectivity to the internet, enabled the clinicians to more actively participate in the group.

WhatsApp also facilitates this engagement because of its ease of use. A clinician will likely always have their mobile devices on their person, and because of internet connectivity, can check the application and contribute to group discussions. This also enables them to refer back to old case discussions. In our study, the majority of participants used the group discussions as a guide to further manage other patients, and referred back to old chat discussions often. There was a general satisfaction at the timeous response to cases, and they

were mostly satisfied all the time at the peer responses (in those that posted cases). Having facilitated access that is quite instant in nature, to learning and clinical support, seems to have been greatly appreciated by our study participants. The study results showed that there is a direct correlation between engaging in a learning platform, such as the WhatsApp group, and the clinician's perception that they had improved in clinical confidence. This correlates with findings by Raiman and colleagues (2017), who discussed in their paper that the use of mobile applications has been shown to increase student participation and therefore foster improved learning. Similarly, Rambe *et al.* (2013) also reported that WhatsApp facilitated, in learners, the ability to more confidently engage with peers and educators.

Group engagement, or participation, in the study was assessed by looking at whether participants followed the group regularly and their posting of cases or responses on the group. The majority of group members reported looking at the application every time a case was posted, which shows what appears to be good engagement. Similarly, more than half the participants posted responses to peer cases at some stage while on the group. The results demonstrated that there was a statistically significant association between engagement in the group and increased clinical confidence - those that followed the group regularly were 8.44 times more likely to report an increase in clinical confidence and 3.8 times more confident if they posted a case. This form of engagement and success can be described through the theory of cooperative learning. In cooperative learning, students who maximally engage in a group are able to extend their current knowledge base, as they are in control of the discussion construct (Johnson, Johnson and Smith, 2007). In our study's context, participants post a case they are most interested in or concerned about and there develops a close relationship between theory, research, and a practical working through the case; this underpins long term retention of knowledge and maximises student learning (Johnson, Johnson and Smith, 2007). Furthermore, the participants also reported that the group: gave them new clinical insights; helped them to practically apply pre-existing knowledge; and that they felt that the guidance was aligned with international/national guidelines. There appears to be numerous reported benefits of learning from the use of such a group amongst our study participants. In a systemic review of medical literature, Kamel Boulos *et al.* (2016) found collective evidence that WhatsApp has been successfully used in health and medical education and learning. They also concluded that apps can help to create virtual communities of enquiry and practice, and bridge distances of busy distributed healthcare settings (Kamel Boulos, Giustini and Wheeler, 2016). Our research adds to literature by further clarifying that the knowledge

gained (whether from peers or specialists) in belonging to such a group, aids in the application of new clinical insights and previous medical knowledge, as well as contributing to clinical confidence by facilitating distance learning .

Our group of study clinicians practice in predominantly rural and geographically spread out EC facilities, with access to only four infectious disease specialists and three tertiary institutes in the province (Gray and Vawda, 2017). Although not specifically asked in this study if the participants felt professionally isolated, it stands to reason that based on their geographical location and lack of specialist support, this is to be expected. Mars *et al.* (2016) found that the use of this form of mobile communication provided a wider range of clinical opinions and better supervision for clinicians, by making specialists more readily available to junior doctors. Krynski (2017) discussed how doctors can learn from senior doctors, who they may not have been able to phone directly before. Nikolic *et al.* (2018) also reported that being part of such a group was found to be particularly useful when senior staff are not available, especially in geographically diverse centres or locations. Having a learning tool, such as WhatsApp, therefore improves access to senior medical staff and negates geographical constraints that participants in this study group might have had, and this will have likely also had an influence on the study's favourable outcomes.

Lastly, our study found that participants were more likely to recommend the group to other colleagues if they had followed the group regularly (OR 4.79), and in those that reported the group as a useful learning tool. These findings therefore demonstrate that the WhatsApp group seems to have promoted good group engagement which in turn facilitated learning, decreased professional isolation and produced a recommendation of a similar platform to other colleagues. Such a mobile learning platform is therefore an important adjunct to current CME practices. Frehywot *et al.* (2013) note that E-learning (of which WhatsApp forms part) can result in greater educational opportunities for participants, while at the same time enhancing student effectiveness and efficiency, as is reported the outcome in our study.

### **5.3 Clinical confidence in managing complicated HIV/TB cases**

The findings indicate that the majority of the participants appeared to have gained greater clinical confidence in managing their patients after participating in the group. The findings showed that there was also an improvement in clinical confidence among those participants who perceived the group as a useful learning tool (previously mentioned how engagement in

the group had a similar effect). Participants that used the chat group guidance to manage their patients were 48 times more likely to feel clinically confident. There was an increase in clinical confidence in those that referred to old chat cases (OR 21.42) and those that gained new clinical insights while participating in the group (OR 23.75). Raiman and colleagues (2017) reported similar findings in their study- a WhatsApp group provided a unique environment to be able to quickly access learning resources, while participating in a discussion facilitated learning. Their participants also cited how useful it was to look back at old recorded learning discussions (Raiman, Antbring and Mahmood, 2017).

Improved clinical confidence among our participants could be due to two main aspects, accessibility and case-based learning. Doctors could easily access the application, could easily access old cases in the application, and could easily access new knowledge by asking for guidance on the application. Wani et al. (2013) found that doctors started management in patients quicker after using WhatsApp clinician advice because of faster access to that advice, and that they found that management to be more effective. Kaliyadan (2016) determined in an online survey of dermatology clinicians that WhatsApp was a good platform for case discourse and improvement in patient management. It is often laborious trying to find best evidence based management in medical literature, especially in a time-constrained clinical setting. Also, the application of that knowledge is sometimes broad, with medical theory not always correlating clearly to what is found in clinical practice. By providing input on a specific case (in a specific South African clinical setting) and supporting the clinician in managing the case in real time, a clinician's confidence can be further bolstered. The WhatsApp group provides a form of case based learning, which has been shown to tie theory to practice and promote deeper learning (McLean, 2016). Studies that use interactive techniques for CME, such as case-discussions, produce a favourable change in professional practices and outcomes (Davis *et al.*, 1999). This correlates to a similar reported outcome in our study.

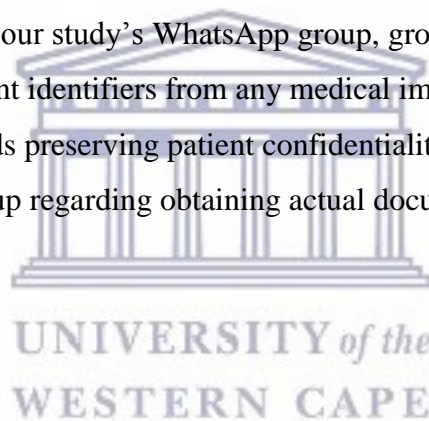
#### **5.4 Clinician's knowledge and use of informed consent**

Although WhatsApp is relatively safe in terms of hacking and leaking of confidential content because of its end-to-end encryption of data, there is still much concern about its use in medical literature and the impact on patient confidentiality (Mars and Escott, 2016). The majority of our study participants (89%) reported being aware that they needed to obtain



documented patient consent when posting a patient-related image (photographs, case report, laboratory report) on social media. However, only half obtained consent when posting patients' photos or other medical images on the group (even if patient identity was not revealed) and around two third of participants had not obtained consent for posting laboratory results. There seems to be a discrepancy in what the clinicians reported to know, and what they did to maintain patient confidentiality in this study.

Several authors share similar concerns that the use of patient data needs to be regulated when using social media, and that there needs to be a review of the roles and responsibilities of medical professionals when using such platforms (Denecke *et al.*, 2015). Kirk *et al.* (2014), states that doctors and nurses require further education on the use and responsibility regarding patient privacy and photography with the use of smartphones. Mars and colleagues (2016), found few reports of patient consent being regularly sought when sending patient information over WhatsApp. They concluded that doctors need to be told what steps to take to maintain confidentiality. In our study's WhatsApp group, group rules were posted advising clinicians to remove any patient identifiers from any medical images when posting. This helped in some regards towards preserving patient confidentiality, but further education needs to be iterated to our study group regarding obtaining actual documented consent from the patients themselves.



## **5.5 Generalisability**

The results of the study show that WhatsApp is perceived as an effective means of learning and clinical support in this study group. This mobile application can then can be applied to other clinical disciplines (not only infectious diseases), from other health settings (private, district, provincial level), as a learning intervention. The target population groups that could potential use this intervention include, for example, doctors in other clinical disciplines that need expert advice/access regarding patient management, allied health professionals (such as nurses, physiotherapists, occupational therapists) that need clinical supervision and advice from senior consultants regarding patients they are managing.

The second outcome of the study was to assess if potential patient confidentiality breaches had occurred with the posting of cases, and if doctors were aware of the legal obligations they are under when posting patient case details on a social media platform. The findings of this study could definitely be generalised to any health profession. It would aid in raising

awareness of the pitfalls of posting cases on social media, and in doing so, protect health professionals from any future litigation as well as protecting their patient's confidentiality.

## **5.6 Limitations**

There are several limitations to this study. Although many attempts were made to get responses from the group, only 55% participants submitted responses. The small sample size would have affected the confidence intervals in the analysis, and some bias could have been introduced by the online format of the questionnaire (with possible technical inability to fill it in correctly). We did not also get any demographic data from the respondents, in order to reduce the length of the questionnaire. The retrospective nature of the study could also affect the participants' responses, as recall of their experiences of the chat group over a period of one year could vary from their original experiences. A more accurate observation of the WhatsApp group would have been obtained through direct analysis of the chat contents, which was the initial intent of the investigator. However this was not approved by HREC (Human Research Ethics Committee) from the University of Witwatersrand (the investigator needed to obtain the written consent from each of the 166 doctors in the group, which was beyond the scope of the study given its retrospective nature). There is also lack of clarity as to whether it was medical specialists or peer input received in response to the cases posted. The questionnaire was sent to the entire group- so could not differentiate between the two, which could impact the outcome of the study aim to "improve clinician access to specialised clinical management of complicated HIV/TB cases".

## CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

### 6.1 Conclusion

A WhatsApp group was initially started by Wits RHI in order to meet a gap in service delivery among clinicians working in the Eastern Cape public health setting in the field of HIV/TB medicine. Support and further training was needed in order for these doctors to meet the demands of ever increasing complex HIV/TB cases presenting at their facilities. With a lack of onsite specialist support and professional isolation, the WhatsApp group was an attempt at a novel approach to long distance learning and support to these clinicians.

This study has shown that these clinicians had regular connectivity and access to this group, with facilitated engagement with peers and specialists working in the HIV/TB fields. The group was perceived as a useful learning tool, with participants being able to use the guidance from cases posted to better manage patients in their own settings. There was general satisfaction at the process involved in case posting and responses obtained and given, with access to responses being timeous. There was also a number of other reported learning benefits by participants: the group gave them new clinical insights, helped them to practically apply pre-existing knowledge and that they felt that the guidance was according to international/national guidelines. With a broad geographical dispersion amongst the participants within the province, a learning platform such as WhatsApp, aided in reducing professional isolation by promoting facilitated, seemingly, instant access to learning and clinical support from peers and specialists. Among the participants who actively engaged, there was a statistically significant increase in clinical confidence, likely mediated by the cooperative learning that existed in the group.

An overall statistically significant increase in clinical confidence in patient management was also reported in those clinicians that perceived the group as a useful learning tool, referred to old case material and used the peer guidance to manage patients further. Study participants who engaged well and saw the group positively as a good learning tool, strongly recommend the WhatsApp group to other colleagues as a learning platform. Many of the studies positive findings are likely underpinned by the easy accessibility and use of the app, as well as by the case-based model used as a learning method.

There appeared to be a discrepancy between the clinicians' self-reported knowledge of informed consent regarding posting patient details on social media, and their application of

those regulations. The majority of clinicians reported to be aware that they needed to obtain written consent from patients when posting their details, and yet less than half did so, which is concerning despite WhatsApp data safety mechanisms.

## 6.2 Recommendations

The recommendations below are based on the setting up and maintenance of similar clinical support groups, using WhatsApp as the learning platform. The evidence from this study, as well as the literature, support its use in the medical setting as an effective means of communication, long distance learning and support between peers and specialists.

- There needs to be a commitment from participants in the group to active participation; those that engage more actively will benefit more from the learning experience.
- A case-based method of discussion is a useful learning method, but other learning modalities can be decided by the group. Cooperative engagement is led by students determining the learning construct of the group that will benefit them the most.
- It is useful to have a range of different levels of clinical expertise in the group. Peer and specialist input in adjunct aid in the supervision and facilitated discussions (as per medical literature).
- There needs to be an increased awareness and education among clinicians on the legal implications of posting patient details in social media (not just WhatsApp) without proper informed consent, in order to protect patient confidentiality. Clinicians need to be educated up-front when participating in these groups.
- My co-investigators and I recommend that further research be done on this topic. This would include auditing clinical advice given on clinician WhatsApp groups, according to best practice principles in medical literature, or directly auditing patient outcomes in those having been managed by doctors that participate in similar mobile learning platforms in South Africa. This would give a more objective analysis as to whether advice given on the group improves clinical management in patients or not. Further discussion or analysis of the study findings could also be discussed with group participants that are clinical experts, in order to differentiate to what extent the clinical input discussed in the group was in fact driven by peers or by the experts.

As there are no official HPCSA guidelines on the use of social media for health professionals for clinical purposes, it is recommended that this governing body consider the implications of

the above social media use, and to develop guidelines. We further recommend that feedback regarding the study findings be shared with the participants and with the EC Department of Health. This can be done once the study findings are published, by putting it on the WhatsApp (which is still ongoing).

### **6.3 Concluding comments**

The initial aim of this study was to show that participating in a WhatsApp group was a useful adjunct learning tool that could also clinically support doctors in geographically widespread facilities without onsite specialist support. Based on the participant responses from this research, this mobile platform does offer an alternative Continuing Medical Education solution that can be easily and successfully implemented in various health fields. By giving health care professional opportunities for career development, CME, motivation and support through this novel learning platform, we can perhaps aid in their retention in the public health sector (WHO, 2013). Caution needs to be taken to maintain patient confidentiality when posting on social media, but does not negate WhatsApp's usefulness in a clinical learning setting.



## REFERENCES

- Analysys Mason Group (2017) *Connected Consumer Survey 2017: Mobile Services and Devices in Sub-Saharan Africa*.
- Arockia, M. (2017) 'Usage of whatsapp for open distance learners 1', 3(2), pp. 3–5.
- Buchan, J. *et al.* (2013) 'Early implementation of WHO recommendations for the retention of health workers in remote and rural areas.', *Bulletin of the World Health Organization*, 91(11), pp. 834–40.
- Chen, L. (2010) 'Striking the right balance: healthcare workforce retention in remote and rural areas', *Bulletin of the World Health Organization*, 88(5), p. 323.
- Cresswell, J. (2014) *Research design. Qualitative, quantitative and mixed methods*. Los Angeles: SAGE.
- Davis, D. *et al.* (1999) 'Impact of formal continuing medical education: do conferences, workshop, rounds and other traditional continuing medical education activities change physician behavior or health care outcomes?', *Jama*, 282(9), pp. 867–74.
- Denecke, K. *et al.* (2015) 'Ethical Issues of Social Media Usage in Healthcare', *IMIA Yearbook of Medical Informatics*, 10(1), pp. 137–147. doi: 10.15265/IY-2015-001.
- Ganasegeran, K. *et al.* (2017) 'The m-Health revolution: Exploring perceived benefits of WhatsApp use in clinical practice', *International Journal of Medical Informatics*, 97. doi: 10.1016/j.ijmedinf.2016.10.013.
- Geiger, J. (2016) 'Learning about paediatric HIV and TB—exploring participant's experience and perceptions to apply what they learned in a blended learning course', (December). Available at: <http://scholar.sun.ac.za/handle/10019.1/100273>.
- Gray, A. and Vawda, Y. (2017) *South African Health Review 2017, Health Systems Trust*. doi: ISSN 978-1-919839-89-9.
- Hernández, B. and Velasco-Mondragón, H. E. (1987) 'Cross-sectional surveys', *Salud publica de Mexico*, 42(5), pp. 447–455.
- HPCSA (2008) *General Ethical Guidelines for the Health Care Professions, Booklet 14*. HPCSA. Available at: [www.hpcsa.co.za/Uploads/editor/UserFiles/downloads/conduct\\_ethics/rules/generic\\_ethical\\_](http://www.hpcsa.co.za/Uploads/editor/UserFiles/downloads/conduct_ethics/rules/generic_ethical_)

rules/booklet\_10\_confidentiality\_protecting\_and\_providing\_information.pdf.

HSRC (2012) *SAFE HYGIENE PRACTICES IN EASTERN CAPE RURAL COMMUNITIES*.

Jobson, M. (2015) 'Structure of the health system in South Africa Structure of the health system in South Africa', *Khulumani Support Group*, 1(1), pp. 1–14.

Johnson, D. W., Johnson, R. T. and Smith, K. (2007) 'The state of cooperative learning in postsecondary and professional settings', *Educational Psychology Review*, 19(1), pp. 15–29. doi: 10.1007/s10648-006-9038-8.

K. Klauman (2016) 'The dangers of digital communication', *MPS Junior Doctor*, 6(2), p. 8.

Kaliyadan F (2016) 'What's up dermatology? A pilot survey of the use of WhatsApp in dermatology practice and case discussion among members of WhatsApp dermatology groups', *Indian J Dermatol Venereol Lepro*, 82, pp. 67–69.

Kamel Boulos, M. N., Giustini, D. M. and Wheeler, S. (2016) 'Instagram and WhatsApp in health and healthcare: An overview', *Future Internet*, 8(3), pp. 1–14. doi: 10.3390/fi8030037.

Kankane VK, Jaiswal G, G. T. (2016) 'Application of WhatsApp: A quick, simple, smart and cost competent method of communication in neurosurgery.', *Romanian Neurosurg*, 30(12).

Kinfu, Y. *et al.* (2009) 'The health worker shortage in Africa: are enough physicians and nurses being trained?', *Bulletin of the World Health Organization*, 87(3), pp. 225–230. doi: 10.2471/BLT.08.051599.

Kirk, M. *et al.* (2014) "'The role of smartphones in the recording and dissemination of medical images'", *Journal of Mobile Technology in Medicine*, 3(2), pp. 40–45. doi: 10.7309/jmtm.3.2.7.

Levin, K. A. (2006) 'Study design III: Cross-sectional studies', *Evidence-Based Dentistry*, 7(1), pp. 24–25. doi: 10.1038/sj.ebd.6400375.

Lygidakis, H., McLoughlin, C. and Patel, K. (2016) 'Achieving Universal Health Coverage: Technology for innovative primary health care education'. doi: 10.13140/RG.2.2.35291.57121.

Mars, M. and Escott, R. (2016) 'WhatsApp in clinical practice: A literature review', *Studies in Health Technology and Informatics*, 231(March), pp. 82–90. doi: 10.3233/978-1-61499-712-2-82.

- McLean (2016) 'Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature', *Journal of Medical Education and Curricular Development*, p. 39. doi: 10.4137/JMECD.S20377.
- Nawaila, M. B. and Bicen, H. (2018) 'WhatsApp as a tool for distance learning', *PONTE International Scientific Researchs Journal*, 74(1). doi: 10.21506/j.ponte.2018.1.36.
- Nikolic, A. *et al.* (2018) 'The Use of Communication Apps by Medical Staff in the Australian Health Care System : Survey Study on Prevalence and Use', 6, pp. 1–7. doi: 10.2196/medinform.9526.
- Raiman, L., Antbring, R. and Mahmood, A. (2017) 'WhatsApp messenger as a tool to supplement medical education for medical students on clinical attachment', *BMC Medical Education*. BMC Medical Education, 17(1), pp. 1–9. doi: 10.1186/s12909-017-0855-x.
- Rambe, P. and Bere, A. (2013) 'Using mobile instant messaging to leverage learner participation and transform pedagogy at a South African University of Technology', *British Journal of Educational Technology*, 44(4), pp. 544–561. doi: 10.1111/bjet.12057.
- SANAC (2017) 'Let our actions count: South Africa's national strategic plan for HIV, TB and STIs 2017-2022', *The South African National AIDS Council*, 1(March), pp. 1–132. Available at: [http://sanac.org.za/wp-content/uploads/2017/05/NSP\\_FullDocument\\_FINAL.pdf](http://sanac.org.za/wp-content/uploads/2017/05/NSP_FullDocument_FINAL.pdf).
- Sedgwick, P. (2014) 'Cross sectional studies: Advantages and disadvantages', *BMJ (Online)*, 348(March), pp. 1–2. doi: 10.1136/bmj.g2276.
- Setia (2016) 'Methodology Series Module 3: Cross-sectional Studies', *Indian Journal of Dermatology*, 61(3), pp. 261–264.
- Statistica (2016) *Number of monthly active WhatsApp users worldwide from April 2013 to January 2017 (in millions).*, Statistica. Available at: <https://www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/>.
- Stats SA (2017) *Mid-Year Population Estimates 2017*. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesanalysisistool>.
- Umut Gulacti, Ugur Lok, Sinan Hatipoglu, H. P. (2016) 'An Analysis of WhatsApp Usage for Communication Between Consulting and Emergency Physicians Authors Authors and affiliations', *Journal of Medical Systems*, 40(130).



UNAIDS (2017) 'Ending Aids Progress Towards the 90-90-90 Targets', *Global Aids Update*, p. 198. doi: UNAIDS/JC2900E.

Veroni, L., Ferrari, A. and Acerra, A. (2015) 'Consideration on the use of WhatsApp in physician-patient communication and relationship', *Recenti Prog Med*, 106(7), pp. 331-6.

Wani, S. *et al.* (2013) 'Efficacy of communication amongst staff members at plastic and reconstructive surgery section using smartphone and mobile WhatsApp', *Indian Journal of Plastic Surgery*, 46(3), p. 502. doi: 10.4103/0970-0358.121990.

WHO (2013) 'Transforming and scaling up health professionals' education and training: World Health Organization guidelines 2013', *Guidelines*, p. 124. doi: 10.1613/jair.301.

Willemse, J. (2015) 'Undergraduate nurses reflections on WhatsApp use in improving Primary Health care education', *Curationis*, 38(2), p. 1512.

Winters, N. (2016) 'Impact of a mCHW, a mobile learning intervention for the training and supervision of CHWs in Kenya', in *Presentation at the ESCR-DFID workshop in Pretoria, South Africa*.

World Health Organization and Global Health Workforce Alliance (2014) 'A universal truth: No health without a workforce', pp. 1-104. doi: ISBN 978 92 4 150676 2.



## APPENDIX

### Appendix 1: Participant Online Questionnaire

Please answer each question/statement below:

1. I always had access to Wi-Fi or other Internet that allowed me to use the Whatsapp doctors group.
  - 1- Yes, all the time
  - 2- Yes, occasionally
  - 3- No
  
2. I followed the WhatsApp doctors group on the below basis:
  - 1- I looked every time a case was posted
  - 2- I checked the group infrequently
  - 3- I ignored the group completely
  
3. How many times did you post a case seeking assistance on the WhatsApp doctors group?
  - 1- 0
  - 2- 1-5 times
  - 3- 6-10 times
  - 4- >10 times
  
4. What types of cases did you present?
  - 1- Paediatric case
  - 2- Adult OI
  - 3- Unsuppressed VL
  - 4- Dermatology
  - 5- ARV adverse event
  - 6- Maternity/PMCT
  - 7- Other
  
5. Did you feel that the peer responses led to a satisfactory resolution of your case?
  - 1- Yes, all the time
  - 2- Yes, occasionally



**3- No**

**4- I did not post any cases**

6. The responses received to the question, came timeously- while I still had the patient in the facility.

**1- Yes, all the time**

**2- Yes, occasionally**

**3- No**

**4- I did not post any cases**

7. I posted a response to a case on the Whatsapp doctors group:

**1- Yes, all the time**

**2- Yes, occasionally**

**4- I did not post any responses**

8. I used the clinical guidance posted on the WhatsApp doctors group to manage my patients care:

**1- Yes, all the time**

**2- Yes, occasionally**

**3- The guidance was not relevant to my case management**

9. I referred back to chats on the WhatsApp doctors group when complicated clinical cases presented at my clinic:

**1- Yes, all the time**

**2- Yes, occasionally**

**3- The guidance was not relevant to my case management**

10. The Whatsapp doctors group gave me greater clinical confidence in managing complicated HIV/TB cases.

**1- Strongly disagree**

**2- Disagree**

**3- Neutral**

**4- Agree**

**5- Strongly agree**

11. I found the WhatsApp group useful in helping me gain new clinical insights on HIV/TB.

**1- Strongly disagree**



- 2- Disagree**
- 3- Neutral**
- 4- Agree**
- 5- Strongly agree**

12. I found the WhatsApp group useful in helping me to practically apply any pre-existing knowledge I had learnt about HIV/TB.

- 1- Strongly disagree**
- 2- Disagree**
- 3- Neutral**
- 4- Agree**
- 5- Strongly agree**

13. I feel the information discussed in the group chat is according to national guidelines and international best practice principles of HIV care.

- 1- Strongly disagree**
- 2- Disagree**
- 3- Neutral**
- 4- Agree**
- 5- Strongly agree**



14. I am aware that according to HPCSA regulations I need to obtain documented patient consent when posting a patient related image (photo, case report, lab result) that the public can access.

- 1- Yes**
- 2- No**

15. I obtained documented patient consent when I posted patients' photos or other medical images on the group (even if patient identity was not revealed).

- 1- Yes**
- 2- No**
- 3- I did not post any cases**

16. I always obtain documented patient consent when I have posted patients' laboratory results on the group (even if patient identity not revealed).

- 1- Yes**
- 2- No**
- 3- I did not post any cases**

17. I would recommend a similar case discussion platform to other colleagues.

**1- Strongly disagree**

**2- Disagree**

**3- Neutral**

**4- Agree**

**5- Strongly agree**



UNIVERSITY *of the*  
WESTERN CAPE

## **Appendix 2: Participant Information Document for use of anonymous internet questionnaire**

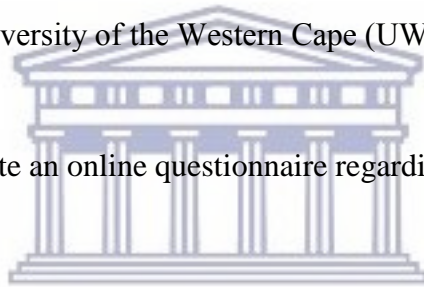
### **PARTICIPANT INFORMATION DOCUMENT**

**Study title:** A descriptive analysis of the role of a WhatsApp clinical discussion group as a forum for Continuous Medical Education in the management of complicated HIV/TB clinical cases in a group of doctors in the Eastern Cape.

Hello doctors

We, Wits RHI in collaboration with Beyond Zero, are doing research on the usefulness of using a WhatsApp chat group to improve knowledge and clinical acumen around managing complicated HIV/TB patients. This study will also form part of research undertaken for a Master's in Public Health, University of the Western Cape (UWC) for Dr Joana Woods.

We are inviting you to complete an online questionnaire regarding your participation in this group.



**What is involved in the study:** The online questionnaire contains 17 questions and will take approximately 15 minutes to complete. The questions in the questionnaire aim to gauge your perceived usefulness of the group as a learning platform, and your participation in the group. We estimate that around 166 doctors from the Eastern Cape will take part in this research. Your requested involvement in this research will entail completing the online questionnaire.

**Risks and Benefits:** There is no foreseeable risk to you in taking part in this study, besides any discomfort of your time taken in filling it in. The study findings will hopefully benefit future patients, as it could provide an alternative learning platform for doctors in clinical practice, increasing their access to specialist and peer knowledge. The questionnaire is anonymous, no one will be able to identify you.

**Participation is voluntary:** You have the right to refuse to take part in this study and withdraw your consent at any time (without fear of negative consequences and loss of benefits).

**Reimbursement:** There is no reimbursement for this study

**Confidentiality:** Efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed, however the online questionnaire is anonymous.

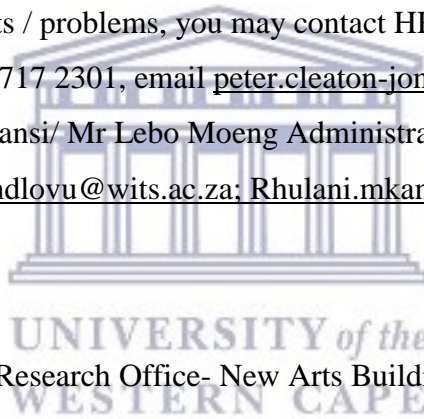
Organisations that may inspect our research records for quality assurance and data analysis include Wits Human Research Ethics Committee (HREC) and BMREC (Biomedical Research Ethics Committee) from the University of the Western Cape

If results are published, it may lead to the identification of only the province you work in (not your identity or that of your facility).

**Contact details of researcher:** For further information, contact Dr Joana Woods:  
0613142962.

**Contact details of HREC chairperson:**

For reporting of any complaints / problems, you may contact HREC (Medical) contact Prof P Cleaton Jones, Tel 011 717 2301, email [peter.cleaton-jones1@wits.ac.za](mailto:peter.cleaton-jones1@wits.ac.za)  
Ms Z Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng Administrative Officers 011 717 2700/2656/1234/1252 [zanele.ndlovu@wits.ac.za](mailto:zanele.ndlovu@wits.ac.za); [Rhulani.mkansi@wits.ac.za](mailto:Rhulani.mkansi@wits.ac.za); and [Lebo.moeng@wits.ac.za](mailto:Lebo.moeng@wits.ac.za)



**Contact details of BMREC:** Research Office- New Arts Building,  
C-Block, Top Floor, Room 28  
University of the Western Cape  
Private Bag X17  
Bellville 7535

I have read this information sheet, understand its contents and agree to allow the researcher to use the data obtained in the online questionnaire.

Click on box

**Appendix 3: Ethics approval from Human Research Ethics Committee (HREC) from the University of Witwatersrand**



R14/49 Dr Joana Woods and Dr Madeleine Muller

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**  
**CLEARANCE CERTIFICATE NO. M170559**

**NAME:** Dr Joana Woods and Dr Madeleine Muller  
**(Principal Investigator)**  
**DEPARTMENT:** Wits Reproductive Health Institute  
**PROJECT TITLE:** A Descriptive Analysis of the Role of WhatsApp Clinical Discussion Group as a Forum for Continuous Medical Education in the Management of Complicated HIV/TB Cases in a Group of Doctor in the Eastern Cape  
**DATE CONSIDERED:** 26/05/2017  
**DECISION:** Approved unconditionally  
**CONDITIONS:**  
**SUPERVISOR:** Dr Michelle Moorhouse  
**APPROVED BY:**   
Professor P. Cleaton-Jones, Chairperson, HREC (Medical)  
**DATE OF APPROVAL:** 09/11/2017

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd floor, Philip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. I agree to submit a yearly progress report. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially review May and will therefore be due in the month of May each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

\_\_\_\_\_  
Principal Investigator Signature

\_\_\_\_\_  
Date

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**



**Appendix 4: Ethics approval from Biomedical Research Ethics Committee (BMREC) from University of Western Cape**



**OFFICE OF THE DIRECTOR: RESEARCH  
RESEARCH AND INNOVATION DIVISION**

Private Bag X17, Bellville 7535  
South Africa  
T: +27 21 959 2988/2948  
F: +27 21 959 3170  
E: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)  
[www.uwc.ac.za](http://www.uwc.ac.za)

18 October 2017

Dr J Woods  
School of Public Health  
Faculty of Community and Health Sciences

**Ethics Reference Number:** BMI 7/8/15

**Project Title:** A descriptive analysis of the role of a WhatsApp clinical discussion group as a forum for continuous medical education in the management of complicated HIV/TC clinical cases in a group of doctors in the Eastern Cape.

**Approval Period:** 29 September 2017 to 29 September 2018

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

*Please remember to submit a progress report in good time for annual renewal.*

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read 'Josias'.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

**PROVISIONAL REC NUMBER -130416-050**