

Research on the Move: Exploring WhatsApp as a Tool for Understanding the Intersections between Migration, Mobility, Health and Gender in South Africa

Thea de Gruchy (✉ theadegruchy@gmail.com)

The African Centre for Migration & Society, University of the Witwatersrand <https://orcid.org/0000-0003-2589-5640>

Jo Vearey

The African Centre for Migration & Society, University of the Witwatersrand

Calvin Opiti

University of the Witwatersrand

Langelihle Mlotshwa

The African Centre for Migration & Society, University of the Witwatersrand

Karima Manji

London School of Hygiene and Tropical Medicine

Johanna Hanefeld

London School of Hygiene and Tropical Medicine

Methodology

Keywords: migration, mobility, health, health systems, gender, South Africa, WhatsApp, GIS

Posted Date: August 26th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-60241/v1>

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Version of Record: A version of this preprint was published at Globalization and Health on July 1st, 2021. See the published version at <https://doi.org/10.1186/s12992-021-00727-y>.

Abstract

Background: Reflecting global norms, South Africa is associated with high levels of cross-border and internal population mobility, yet migration-aware health system responses are lacking. Existing literature highlights four methodological challenges limiting the development of evidence-informed responses to migration and health: (1) lack of engagement with the process of migration; (2) exclusion of internal migrants; (3) insufficient attention to the ways in which gender and other identity markers shape health systems access; and, (4) lack of methodologies that are able to capture 'real-time' data about health needs, healthcare seeking experiences, and interactions with healthcare systems over both time and place. In this paper, we reflect on a four-month pilot project which explored the use of WhatsApp Messenger - a popular mobile phone application used widely in sub-Saharan Africa – as a research tool to address these challenges.

Results: A four-month pilot was undertaken with 11 participants between October 2019 and January 2020. Using Survey Node, an online platform that allows for the automatic administration of surveys through WhatsApp, monthly surveys were administered. The GPS coordinates of participants were also obtained. Recruited through civil society partners in Gauteng, participants were over the age of 18, comfortable engaging in English, and owned WhatsApp compatible cell phones. Enrolment involved an administered survey and training participants in the study protocol. Participants received reimbursement for their travel costs and cell phone data monthly. Out of a possible 88 survey and location responses, 61 were received. Findings emphasise the ethical and methodological challenges of using WhatsApp as a tool for data collection with migrant and mobile populations.

Conclusions: The pilot demonstrates the potential of WhatsApp for addressing our concerns with the current state of research exploring migration and health. It suggests, through the ability to focus on the process of migration, including internal migration, and the opportunities it provides to elucidate the ways in which this process intersects with access to healthcare and gender, that WhatsApp has real potential as a research tool. The pilot informed finalisation of the main study, including ensuring that our approach and research met the ethical standards congruent with the method.

1. Background

Recent years have seen increased attention being paid to the global governance of cross-border migration – the movement of people across international borders, including asylum seekers, refugees, migrant workers and undocumented migrants (1,2). Driven in many cases by high-income countries (HICs) who want to restrict the inward movement of people from low- and middle-income countries (LMICs), these discussions tend to focus on concerns around the role of the nation state and sovereignty, and push for the securitisation of cross-border migration through both border management and immigration legislation (3). These ambitions were demonstrated in the adoption of two global compacts in December 2018 – the Global Compact for Safe, Orderly and Regular Migration (GCM) and the Global Compact for Refugees (GCR) - that aim to guide responses to the governance of migration globally (4,5). Whilst a discussion of the content of these Compacts is beyond the scope of this paper, concerns have been raised about the ways in which both the GCM and GCR can be applied to support, or to undermine, the rights of people on the move - including efforts to achieve Universal Health Coverage (UHC) (6–17). Despite attempts by global health actors to push the migration and health agenda for more than a decade, attempts to achieve health for all persist as migrant populations continue to be left-behind (18,19). This is particularly so for marginalised migrant groups, including those who sell sex, undocumented migrants, and people seeking asylum on the basis of their gender identity (18,19). Leaving migrants behind has serious implications for all, negatively affecting progress on the targets set out in the Sustainable Development Goals (SDGs) and other associated global health processes (18–22).

The South African context - associated with high levels of cross-border and internal migration - makes for an ideal case study in which to explore a mobile methodology for understanding the health-related experiences of migrants in 'real-time'. South African health systems are not migration-aware nor mobility-competent, affecting access to healthcare for international and internal migrants (23–26). Key populations, including sex workers and trans persons, who are known to be particularly mobile, face additional barriers to access as a result of their gender and/or sexuality (27). Furthermore, while more women are migrating into South Africa they face particular challenges in the informal economy in which many work (28), accessing healthcare (29) and fulfilling care roles (30).

1.1 Improving responses to migration and health in South Africa

Drawing on existing research literature, we highlight four specific challenges that are limiting the development of improved responses to migration and health globally, although our focus here is on South Africa: (1) the focus on individual migrants rather than on the process of migration; (2) the prioritisation of cross-border migrants and the exclusion of internal migrants; (3) an insufficient understanding of the relationship between gender and migration and health; and, (4) the methodological limitations for obtaining 'real-time' data over time and place.

Firstly, the field of migration and health tends to focus on the movement of individual migrants – including those seeking asylum – rather than on the process of migration itself (18,21). This often results in efforts that, for example, aim to make health systems 'migrant-sensitive' – through cultural competency training for healthcare workers – rather than 'migration-aware', whereby systems would address the movement of people within and between countries (23,26).

Secondly, whilst limited, efforts to address migration and health focus on the movement of cross-border migrants and overlook internal migrants – those who move within their countries of birth – and intra-regional migrants, both of which are prevalent in LMIC contexts. Whilst these movements account for a significant proportion of all global migration, they remain left-behind in global migration and health governance discussions that predominantly focus on the movement of people from LMICs to HICs (21,31,32).

Thirdly, the importance of understanding the gendered nature of migration – including what has been referred to as the feminisation of migration and the importance of moving beyond binary understandings of gender – is increasingly recognised by policy makers and researchers as critical in the development of appropriate approaches to the governance of international migration (7,33–35). Whilst it is well established that gender is a key factor for understanding health seeking behaviours and experiences (36,37), current research on migration and health exploring gender tends to focus exclusively on the experiences of migrant women, and rarely examines how this further interacts with other social identities.

Finally, within the field of migration and health research, we have not found examples of methodologies that are able to capture 'real-time' data about health needs, healthcare seeking experiences, and interactions with healthcare systems over both time and place. Longitudinal research on migration and health tends to make use of repeated quantitative measures collated in a single geographic location that rely on participant recall of experiences, time, and place, such as through Demographic Health Surveillance Surveys (DHSS) (38). While qualitative approaches for exploring migration and health over time largely rely on repeated face-to-face interactions between the researcher(s) and participants at different moments, or make use of mobile technology to remain in contact, conduct interviews or, increasingly, explore the potential of mobile technology for participatory research (39). However, these approaches are rarely designed to capture experiences over time and place as they are happening – something particularly important when working with migrant groups. Nor do they tend to explore the capabilities of technology as a data collection tool itself.

1.2 Exploring WhatsApp as a research tool for exploring migration, mobility, health and gender in South Africa

In order to explore intersections between migration, mobility, gender and the South African health system – and taking into consideration the four concerns raised above - the Migration, Gender and Health Systems (MiGHS) project aims to explore the use of a mobile technology as a tool for researching the health-related experiences of international and internal migrants in 'real-time'. MiGHS is a collaboration between the Universities of the Witwatersrand (Wits) and Cape Town (UCT), the London School of Hygiene and Tropical Medicine (LSHTM) and the South African National Department of Health (NDoH). Funded by the UK MRC Wellcome Trust Health Systems Research Initiative, the project draws on previous research in the field of migration and health undertaken by the collaborators (25,40,41).

Following a review of the literature, we chose to explore the use of WhatsApp Messenger - a social media platform operated on smart phones – in our research. Four key reasons explain our decision to use WhatsApp: its prevalence as a means of communication in Southern Africa (42,43); the application's affordability; its ease of use, including allowing the participant to respond to survey questions and share their location within WhatsApp; and – perhaps most importantly – the ability to retain contact with participants should they cross international borders (44–49).

To date, the use of WhatsApp as a tool for data collection in health research has been limited (50). Our scoping review indicates that WhatsApp has either been used to disseminate survey tools, usually through sharing a link to an online SurveyMonkey or Google Form, or, through the creation of a WhatsApp Group as an intervention to facilitate communication between healthcare workers. We found

that there is little published that assesses the use of WhatsApp as a data collection tool in health research and communication interventions. Importantly, even within the literature that does exist, limited attention has been paid to the ethical implications of using WhatsApp or the ways in which existing social and economic inequities may affect its use.

1.3 A pilot study

In this paper we reflect on the results of a pilot study that sought to investigate the potential use of mobile technology to retain contact with 400 mobile study participants to be recruited in four areas of South Africa for a 12-month period to document their experiences of health systems usage in real-time. To explore the feasibility of this study, a four-month pilot project was undertaken between October 2019 and January 2020 to explore the opportunities and challenges associated with the use of WhatsApp as a research tool. This paper reflects on the successes and challenges of the pilot and how it has informed the main study. Through documenting our use of the application in this research and the ways the pilot has shaped our thinking as we move into the main project, we hope to contribute insights to existing gaps in the literature on migration and health and to the development of an emerging best practice around the use of WhatsApp in health research.

2. Methods

In developing the pilot and thinking through the logistics of using WhatsApp, four key questions animated our discussions. The first was how to administer a survey through WhatsApp. Automated questions and responses; being able to send the survey out en masse; and ensuring that anonymity could be assured were all pivotal. The second question pertained to how we could and should ask participants to share their locations with us. The third question was how to ensure, through the recruitment process, that participants felt sufficiently comfortable with and invested in the project that they would respond to survey and location prompts across a four-month period. The final question was how to ensure that at each step of the process the privacy of participants and their information was protected.

2.1 Data collection and management

Data was collected in three ways in the pilot:

1. A survey to ascertain the socio-demographic profile, health seeking behaviour history and migratory history of the participant was administered at the point of recruitment;
2. A monthly survey administered through WhatsApp to explore its potential for collecting and tracking health seeking behaviour across the four months; and
3. A monthly prompt for the participant to share their location with us using the WhatsApp location pin sharing function to generate data that would indicate if and how mobility intersects with healthcare access.

A search of available software through which monthly surveys could be administered indicated that there are very few options. The platform chosen for this project was Survey Node¹. Although Survey Node appears to have been primarily used in customer service evaluations, the software's ability to interface with WhatsApp and the dearth of alternatives were key factors in our choice. As such, after the successful enrolment of the participants, the WhatsApp monthly survey was sent out to each participant four times between October 2019 and January 2020. Table 1 outlines the schedule for the pilot – this was developed so that survey and location prompts were sent in a systematic manner that was clear to the whole research team. Given time constraints, surveys were administered slightly more frequently than once a month. However, they were spaced out as much as possible and to make allowances for Christmas and New Year. In addition, participants were asked to share their location once a month using WhatsApp's 'send location' function. Group 1 were asked to share their location at the same time that they were asked to respond to the monthly survey, while Group 2 were asked to share theirs 10 – 14 days after they had been asked to respond to the survey. This was done to get a sense of whether one worked better than the other, but the pilot data has not suggested any tangible difference.

Data collected through the surveys was exported from Survey Node (by a .csv file) into Excel, cleaned, and then imported into SPSS.

2.2 The enrolment process

Our sampling was respondent driven to ensure the adequate inclusion of migrant and mobile populations (52,53). In the main study, we plan to enrol participants across four provinces and at healthcare facilities as well through organisations that work with migrant and mobile populations. For the pilot, given that we only intended to recruit ten participants, we recruited exclusively in Gauteng – Johannesburg and Tshwane – through non-governmental organisations (NGOs).

Recruitment took place at three NGOs. 16 participants were recruited into two groups – Group 1 included those recruited at the first two organisations, while Group 2 included those recruited at the third as this happened two weeks after Group 1 was recruited. Surveys were sent to each group according to a different schedule due to the time difference between recruitment (Table 1). The organisations approached potential participants, made them aware of the project, and invited them to meet with the researchers. Organisations were asked to ensure that potential participants were over the age of 18, could communicate in English, and owned a cell phone that was WhatsApp compatible.

In addition to administering the enrolment survey, at the point of enrolment much time was spent familiarising participants with the particularities of responding to the survey and location prompts on WhatsApp, for which we developed several practice tools (see Table 2).

During enrolment, the participant was allocated a unique identifier and their cell phone number and service provider was recorded. All efforts were made to ensure that the participant's contact information was correctly and anonymously recorded so that they would receive the monthly surveys and data. The participant's number was added to one of the four cell phones being used at recruitment, which, through a Google account, were consequently saved in a central contact database. The participant was asked to save the project cell phone in question's number, as well as the number of the phone from which the WhatsApp survey would be sent. Participants were then sent the link to the WhatsApp practice survey(s). Following initial recruitments, researchers decided to develop a second WhatsApp practice survey as the researchers felt that the first was done under heavy supervision by the researcher, and would thus not necessarily indicate comfort or ability to respond to the survey.

Participants were also asked to practice sending their pin locations during enrolment. After the first round of recruitment, it became clear that researchers would need to practice this with participants at the point of recruitment and ensure, for example, that location settings were turned on in WhatsApp.

Three participants were not carrying their WhatsApp compatible phones with them at the time that they were recruited due to security concerns. Although steps were taken by researchers to ensure that these participants could complete their enrolment once they got home, the enrolment of these participants was not successful.

The final part of the enrolment process involved giving the participants approximately 50 ZAR² worth of data to reimburse them for the use of their phones during recruitment. In addition to reimbursing them for any travel expenses incurred as a result of their participation in the project. A week after their recruitment, a WhatsApp initiation survey was sent to each participant. Their completion of this survey marked their successful enrolment in the pilot.

Figure 1 outlines this process and the number of participants who successfully completed each step. Although ten participants completed the initiation survey, upon following up with the six participants who did not, an eleventh participant was found to be willing and able to be included in the groups receiving the monthly surveys moving forward.

2.3 Ethical clearance

Research ethics clearance was obtained from Wits Research Ethics Committee (REC) (non-medical) (certificate H19/09/51) and the LSHTM REC (reference 17889-1) for this study. At the point of enrolment, the project was explained to the group of potential participants as a whole. Individual participants were then approached by a single researcher and asked if they were willing to continue with the recruitment process. The details of the project – as contained in the information sheet – were then discussed, as was the informed consent form. If verbal informed consent was given this was recorded by the researcher and the recruitment process began.

¹Survey Node is a trading name of ESJ Software Ltd, a UK software development company that specialises in developing and supporting innovative cloud and enterprise solutions for telecom networks, value added service providers and customer service focused organisations (51).

²2,8 USD at the time of writing (August 2020). We say approximately as some networks do not have a data or airtime voucher that is worth exactly 50 ZAR.

3. Results

As the focus of this pilot project was on the logistics and methods, and only 11 participants participated across the four-month period, this section exclusively discusses the findings with regard to the feasibility of using WhatsApp as a tool for data collection moving forward. Four key findings emerged from this project which have led us to (a) feel cautiously optimistic about the feasibility of the main study and WhatsApp as a tool for data collection, and (b) implement appropriate changes for the main study.

3.1 Overview of participation

Of great importance to this study was establishing whether participants would continue to respond to surveys administered through WhatsApp over a period of several months. What the pilot was able to establish was that although not all 16 recruited participants responded to the survey and location tracking prompts, if participants responded to the WhatsApp initiation survey, there was a high chance that they would continue to engage with the project over the coming months. While they may not have responded to each prompt, the ten participants who responded to the WhatsApp initiation survey remained engaged over the full period of the pilot.

Figure 1 indicates the number of responses to each survey and location prompt. The low number of responses (3 out of a possible 11) to the prompt for location 3 are something of an anomaly, which we believe is a result of the timing of the prompt. Group 1 was asked to share their third location pin on the 16 December, a public holiday shortly before Christmas. The lack of responses from this group to this prompt account for the much smaller number of responses here.

3.2 Participant recruitment

There were three key findings with regards to the recruitment process. The first was that the enrolment interview allowed us to build a socio-demographic profile of the participants. While analysis of this data means very little given the small numbers recruited into the pilot, it bodes well for the main study. Small changes have been made to the protocols for the main study, the rephrasing of questions for example, as informed by the pilot.

The second finding was that the recruitment process as a whole was fairly successful in positioning people to feel comfortable with responding to the survey and location prompts. Although six recruited participants did not complete the enrolment process, this was not surprising given that three of these six participants did not have WhatsApp compatible phones with them at the point of recruitment. Moving into the main study, only participants with their WhatsApp compatible phone on them will be recruited.

The third finding and decision with regards to the recruitment of participants was to move the recruitment process to REDCap³. The use of multiple documents during enrolment proved cumbersome as did the additional step of needing to manually enter the data into an Excel spreadsheet. REDCap is a secure web-based platform used by many in the School of Public Health at Wits (as well as across other institutions) to build, administer, and manage online databases and surveys. REDCap also has a mobile application that can be downloaded onto mobile devices. Mobile devices can then be used during the recruitment process. This will not only make the collection of data easier, but also improve the management of the database that will be created through the enrolment survey. Data collected through REDCap can be downloaded into various file formats, including .csv, which can then be imported into Excel and SPSS.

As such, the information sheet, informed consent form, checklist for practice surveys and location sharing, and enrolment survey will all be administered through REDCap. Hard copies of the information sheet will also be given to participants to ensure compliance with ethical clearance received.

3.3 Monthly surveys

Over the course of the pilot, participants were each asked to respond to the Monthly survey four times. As such, there were 44 possible interactions between healthcare providers and participants that the pilot could have captured. 19 interactions were reported across the

35 responses to the survey that were received, of which eight were associated with some kind of challenge. Again, given the small number of participants in the pilot, this says very little. However, it does speak to the potential data that the main study will be able to collect.

Importantly, all data will be easy to disaggregate and compare across reported gender identities and an effort has been made to include questions that will indicate whether women bear a particular burden in relation to seeking healthcare, for example. This includes asking specifically whether the participant has accompanied another adult or child to seek healthcare.

Some changes to the monthly survey have been made for the main study. Importantly, where possible, questions and response options have been standardised across the enrolment survey and WhatsApp monthly survey.

3.4 Location tracking

Finally, the use of WhatsApp's location sharing function to track the location of participants proved unsustainable. Management of this data involved having to enter a WhatsApp chat, open the shared location pin, copy the data and paste it into an Excel spreadsheet that could then be imported into GIS software. While this was manageable during the pilot study given the small number of participants, a different mechanism for logging locations has been created for the main study. A secure and user-friendly web-based platform has been developed through which participants can log their location. Locations are attached to the participant's cell phone number and automatically added to a database that can then be managed, imported into GIS software and analysed. Importantly, this platform only captures the participant's location at the moment that they enter their cell phone number into the platform. It does not continue to track their location. This platform was tested with Group 2 the fourth and final time that they were asked to log their location, and elicited as many responses as previous prompts to send their location via WhatsApp.

³ 'REDCap is a secure web platform for building and managing online databases and surveys. REDCap's streamlined process for rapidly creating and designing projects offers a vast array of tools that can be tailored to virtually any data collection strategy.' (54,55)

4. Discussion

Due to both the novelty of WhatsApp as a tool for data collection, in addition to the limited literature documenting its use in health research to date, each stage and element of the pilot project was subject to detailed discussion during the project's development, its implementation and following its conclusion. The concerns that dominated our discussions related to whether or not the research was ethical and was being conducted in ways that protected participants, and whether there were additional ways to streamline the mechanisms underpinning the research.

There were three key ethical considerations in this project. The first pertained to its longitudinal nature and ensuring that consent was ongoing. It was felt that through ensuring a rigorous informed consent process at the point of recruitment and the need for participants to physically 'opt in' every month by responding to the survey questions or logging their location, participants were in a position to decline to remain involved in the project. By continuing to opt in through responding to prompts, participants can thus be understood to be giving continued consent. Important in coming to this decision was understanding the WhatsApp – Survey Node interface.

Although the Survey Node website talked about being WhatsApp compatible, it took some time and contact with the platform's customer service in order to ascertain exactly how Survey Node could be used in conjunction with WhatsApp. We had imagined being able to save participants cell phone numbers attached to a unique identifier in Survey Node, and then send participants the survey from Survey Node directly to WhatsApp. However, survey links can only be sent via text message from the platform. Once the participant clicks on the survey link, indicating consent, they are rerouted to a WhatsApp chat with a United Kingdom number associated with Survey Node⁴. This is in order to comply with Facebook's consent policy. As such, the only way to send the survey to WhatsApp directly, given that we would already have informed consent from participants, is to copy and paste the survey link into a WhatsApp message, and broadcast that to participants from a project cell phone. This was the only way to circumvent a text message resembling spam as the starting point for each monthly survey. Additionally, even if numbers are saved to a unique identifier, survey responses are not linked to the unique identifier in the Survey Node database. They are exclusively linked to the number from which the responses originate.

This links to the second ethical concern - the use of mobile phone numbers and anonymity. While participants' names are never recorded, their numbers are vital for the use of Survey Node and WhatsApp. However, within the South African context, cell phone numbers are not key identifiers of individuals. Several individuals may share one cell phone number, numbers may not be registered in the users' name and are easily discarded and replaced, and reports indicate that often individuals have more than one cell phone or cell phone number to take advantage of various offers by network providers (56). While this may have some ramifications for our research, it means that participants are not exposed to any undue risk by sharing their cell phone numbers with us.

The third ethical consideration pertained to the sharing of location data. As was explained to participants prior to recruitment, no real-time monitoring of their location was undertaken. Instead, patterns in mobility over the study period and across the group of participants as a whole are what is of interest to the researchers. In addition, no location data will be shared with any law or immigration enforcement of any kind, and data presented in publications or at conferences will be anonymised. The development and use of our own secure platform for location sharing ensures that we can circumvent concerns with WhatsApp's security and end-to-end encryption, or lack thereof.

Finally, the biggest logistical concern related to reimbursing participants for the use of their own cell phones and mobile data during the research. Initially, we had imagined that at the point of recruitment, data could be transferred from a project phone to the participant. However, data can only be transferred between phones on the same service provider network, as such this was not a practical solution as there are four major networks in South Africa (MTN, Vodacom/fone, Telkom, Cell C) and a researcher only has access to one project phone at the point of recruitment. On the first day of recruitment, participants were given 50 ZAR cash to purchase data for a network of their choice. On the second day, after asking participants which network they were with, one of the researchers went and bought corresponding vouchers. During the second batch of recruitment, one of the researchers transferred data from her personal banking app to the participants.

Although we were able to make do for the pilot, none of these options are realistic when we consider recruiting over 400 participants. Moving forward, it is clear that pre-purchasing a large quantity of vouchers from each of the service providers and equipping each researcher with several vouchers from each network is the best way to proceed.

In addition, every month, prior to sending participants the survey, participants were sent 50 ZAR of data to enable them to respond to the survey. Understanding how we could send participants cell phone data every month has also proven to be a challenge. Initially, the hope had been to send data through Survey Node, but this is not possible. The only real avenue – what was done in the pilot and what we will continue to do in the main study – is the use of a personal bank account by one of the researchers to send data to each participant on the day that they will receive the survey. As such, a participant would receive 50 ZAR worth of data and then, a few minutes later, a broadcast message on WhatsApp with a link to the survey every month. While this remains a frustratingly cumbersome part of the research method, streamlining and automating this part of the process has not been possible given the constraints of university financing systems and banking systems.

4.1 Limitations

While we believe our pilot study to have been sufficiently successful as to warrant optimism about the main study, several limitations with both WhatsApp as a data collection tool and our piloting of it remain.

A central limitation of this pilot is the small number of participants. While engagement by participants was fairly consistent and high, it is difficult to say with any degree of certainty whether a much larger sample will behave in a similar way. Our sample for the pilot were all recruited through NGOs and, as such many have had a higher level of digital literacy and felt more entitled to reflect on and able to articulate their experiences accessing healthcare. In addition, due to the small size of our sample, it's unclear how existing inequities, including the way in which access to mobile devices is gendered, may affect participation in the main study. While WhatsApp is a fairly cheap way to communicate, for many in South Africa, access to a WhatsApp compatible phone remains prohibitively expensive. The implications of inequities in access to WhatsApp will only become apparent in the main study.

Finally, the use of WhatsApp itself is not a quick and easy research fix. More popular modes of using WhatsApp in health research, as a platform to disseminate a link to an online survey or to host a WhatsApp Group may be easier from a logistical perspective (50). However, as this research has shown, to take advantage of the real potential offered by WhatsApp as a tool for data collection, requires a thorough enrolment process; constant time and input from researchers to ensure that participants are receiving prompts and data

and responding; and for researchers to have access to mobile devices and consistent and reliable internet, in addition to the ability to foot research costs upfront. While this is not meant to dissuade anyone from considering the potential of WhatsApp as a research tool, it is important to note that this approach to research is not to be undertaken lightly and without adequate preparation.

⁴ 'To initiate a message to a number via WhatsApp there must be an explicit confirmed opt-in obtained prior to message initiation.' (personal communication with Survey Node, 9 October 2019)

5. Conclusion

The successful completion of this pilot points to the feasibility of and potential for the use of WhatsApp in health research, particularly with migrant and mobile populations. We have shown that WhatsApp can be used as a platform for undertaking repeat surveys over time and place, without needing to redirect the participant to another platform and survey tool that may not be compatible with their device and which may lead to increased costs for the participant. However, the mechanics of research that uses WhatsApp as a research tool need to be carefully thought out. This is particularly true during the enrolment process; this is the only point at which the researcher meets with the participant face-to-face. The use of WhatsApp provides the opportunity to gather real-time data from participants over a period of time. Data that, in this case, will hopefully go some way to improving our understandings of the ways in which migrant and mobile individuals move; their health experiences and interactions with the healthcare system; and, the ways in which their movement and healthcare seeking in South Africa is mitigated or complicated by their gender identity. However, the use of WhatsApp can – if not managed carefully – place participants at increased risk due to both the nature of the data that is collected and the method of capturing data through the application. As with any research approach, due consideration must be given to ensure that the data provided by participants is protected and that they are not exposed to any risk through the research process. The use of mobile technology heightens the importance of the principle of do no harm.

In paying careful consideration to the use of WhatsApp, we have developed mechanisms to rigorously document our experiences of the use of WhatsApp and to detail our approach to addressing the associated ethical challenges – key gaps in the current literature as identified by our scoping review (50). It is difficult to determine if we have adequately understood and taken into account the ways that existing inequities are reflected in the research methodology due to the limited number of participants in the pilot study (56,57). However, the pilot suggests that ownership of WhatsApp-compatible cell phones is sufficiently widespread to allow for this kind of a study. In addition, ensuring that participants are provided with data to enable their participation ensures that participants are not excluded due to the cost of participation.

Finally, the pilot demonstrates that the use of WhatsApp allows for research that addresses the four concerns we raised with the state of research on migration and health. Firstly, through continuous engagement with participants over both time and place a shift in focus from the experiences of individual migrants to a better understanding of how the migration process intersects with access to healthcare is facilitated. Secondly, through respondent driven sampling, internal migrants – and, therefore, internal migration – are not left-behind. Thirdly, continuous engagement with participants in addition to survey design can ensure that gender is explored in relation to migration and health. Finally, the use of WhatsApp allows for the collection of 'real-time' data over time and place. It suggests, through the ability to focus on the process of migration, including internal migration, and opportunities it provides to elucidate the ways in which this process intersects with access to healthcare and gender, that this kind of research method has real potential.

The findings from this pilot study inform the finalisation of the methodology for our main study which, at the time of writing (August 2020), this has been delayed indefinitely due to the Covid19 pandemic.

Abbreviations

ACMS – The African Centre for Migration & Society, University of the Witwatersrand

GCM – Global Compact for Safe, Orderly and Regular Migration

GCR – Global Compact for Refugees

HIC – High-income country

LMIC – Low- and middle-income country

LSHTM – London School of Hygiene and Tropical Medicine

MiGHS – The Migration, Gender and Health Systems project

NDoH – National Department of Health

NGO – Non-governmental organisation

REC – Research Ethics Committee

SDG – Sustainable Development Goals

UCT – University of Cape Town

UHC – Universal Health Coverage

Wits – University of the Witwatersrand

Declarations

Ethics approval and consent to participate

Research ethics clearance was obtained from Wits Research Ethics Committee (REC) (non-medical) (certificate H19/09/51) and the LSHTM REC (reference 17889-1) for this study.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed for this paper are included in this published article [and its supplementary information files].

Competing interests

The authors declare that they have no competing interests.

Funding

This research is funded through the Health Systems Research Initiative (HSRI) in the UK, a collaboration between the UK MRC, ERSC, DFID, and the Wellcome Trust. Grant number: MR/S013601/1.

Authors' contributions

TdG was involved in the development of the pilot project, led the recruitment of participants, and managed the logistics of the pilot, including data collection, management and analysis. TdG wrote the first draft and has been responsible for incorporating the feedback from other authors.

JV was involved in conceptualisation and proposal writing; development of the pilot project; made substantive contributions to the first draft of this paper; and finalised the manuscript with TdG.

CO consulted on the use of WhatsApp for gathering location data, and designed and built the secure web-based platform which will be used by participants in the main study. CO reviewed this paper to ensure that it accurately reflected his work.

LM was involved in the development of the pilot project, the recruitment of and following up with participants. She contributed to discussions about the pilot and the development of this paper.

KM was involved in the development of the pilot project and the recruitment of participants. She contributed to discussions about the pilot and the development of this paper.

JH was involved in conceptualisation and proposal writing, as well as development of the pilot project.

Acknowledgements

We would like to acknowledge and thank the members of the MiGHS project who were not directly involved in the pilot project, but who provided insights and guidance during its conception and the writing of this paper - Lucy Gilson, Moeketsi Modisenyane, Jill Olivier, Shehani Perera and Helen Walls. We would like to thank Lenore Longwe and Kwandakwethu Ndaba of the ACMS for administrative support throughout the project. Thanks to Janine White from the Wits School of Public Health for her assistance with REDCap. Abigail Dawson from the Consortium for Refugees and Migrants in South Africa (CoRMSA), Liesbeth Stockaert and Kate van den Berg from Médecins sans Frontières (MSF) and Ngqabutho Mpofu from the Treatment Action Campaign (TAC) are thanked for their assistance in facilitating our fieldwork for the pilot. Finally, we would like to thank Paul Ajayi for consulting with us on the functionality of the location data shared via WhatsApp.

Reference List

1. Guild E, Grant S. Migration governance in the UN: What is the Global Compact and what does it mean? [Internet]. London: Queen Mary University of London; 2017 [cited 2019 Jul 2]. Report No.: 252/2017. Available from: <https://repository.ubn.ru.nl/bitstream/handle/2066/182071/182071.pdf?sequence=1>
2. Newland K. The Global Compact for Safe, Orderly and Regular Migration: An Unlikely Achievement. *Int J Refug Law*. 2019 May 18;30(4):657–60.
3. Nanopoulos E, Guild E, Weatherhead K. Securitisation of Borders and the UN's Global Compact on Safe, Orderly and Regular Migration. *Queen Mary Univ Lond Sch Law Leg Stud Res Pap No 2702018 Secur*. 2018;
4. United Nations. Global Compact for Safe, Orderly and Regular Migration - A/RES/73/195. United Nations; 2018.
5. United Nations. Global Compact on Refugees - A/73/12 [Internet]. United Nations; 2018 [cited 2020 Jul 20]. Available from: https://www.unhcr.org/gcr/GCR_English.pdf
6. Devakumar D, Russell N, Murphy L, Wickramage K, Sawyer SM, Abubakar I. Children and adolescents on the move: what does the Global Compact for Migration mean for their health? *Lancet Child Adolesc Health*. 2018 Dec 5;
7. Wickramage K, Annunziata G. Advancing health in migration governance, and migration in health governance. *The Lancet*. 2018 Dec;392(10164):2528–30.
8. Guinto RLLR, Curran UZ, Suphanchaimat R, Pocock NS. Universal health coverage in 'One ASEAN': are migrants included? *Glob Health Action*. 2015 Dec 1;8(1):25749.
9. Mosca DT, Vearey J, Orcutt M, Zwi AB. Universal Health Coverage: ensuring migrants and migration are included. *Glob Soc Policy*. 2020 Jun 24;146801812092222.
10. Onarheim KH, Melberg A, Meier BM, Miljeteig I. Towards universal health coverage: including undocumented migrants. *BMJ Glob Health*. 2018 Oct;3(5):e001031.
11. Legido-Quigley H, Pocock N, Tan ST, Pajin L, Suphanchaimat R, Wickramage K, et al. Healthcare is not universal if undocumented migrants are excluded. *BMJ*. 2019 Sep 16;366:i4160.
12. Bozorgmehr K, Jahn R. Adverse health effects of restrictive migration policies: building the evidence base to change practice. *Lancet Glob Health*. 2019 Apr 1;7(4):e386–7.
13. Zenner D, Wickramage K, Trummer U, Pottie K, Hui C. Assessing the Health of Persons Experiencing Forced Migration: Current Practices for Health Service Organisations. In: Bozorgmehr K, Roberts B, Razum O, Biddle L, editors. *Health Policy and Systems Responses to Forced Migration* [Internet]. Cham: Springer International Publishing; 2020 [cited 2020 Mar 16]. p. 175–94. Available from: https://doi.org/10.1007/978-3-030-33812-1_10

14. Douglas P, Paxton G, Wickramage K, Ahmed I, Jan A, Perera S, et al. Migrant health assessments: from exclusion towards an instrument of public health good and improving outcomes for migrants? *BMJ*. 2019 forthcoming;
15. Gammeltoft-Hansen T, Guild E, Moreno-Lax V, Panizzon M, Roele I. What is a compact? Migrants' rights and state responsibilities regarding the design of the UN global compact for safe, orderly and regular migration. 2017 Oct.
16. Guild E. The UN Global Compact for Safe, Orderly and Regular Migration: What Place for Human Rights? *Int J Refug Law*. 2019 May 18;30(4):661–3.
17. Pugh S. A moving target. Gender, health and the securitisation of migration. In: O'Manique C, Fourie P, editors. *Global Health and Security Critical Feminist Perspectives* [Internet]. Routledge; 2018 [cited 2018 Jun 23]. Available from: <https://www.taylorfrancis.com/books/e/9781317195580/chapters/10.4324%2F9781315559568-5>
18. Vearey J, Hui C, Wickramage K. Migration and Health. In: *World Migration Report 2020*. Geneva: IOM; Forthcoming.
19. Mosca DT, Vearey J, Orcutt M, Zwi AB. Universal Health Coverage: ensuring migrants and migration are included: *Glob Soc Policy* [Internet]. 2020 Jun 24 [cited 2020 Jun 25]; Available from: <https://0-journals-sagepub-com.innopac.wits.ac.za/doi/full/10.1177/1468018120922228>
20. Abubakar I, Aldridge RW, Devakumar D, Orcutt M, Burns R, Barreto ML, et al. The UCL–Lancet Commission on Migration and Health: the health of a world on the move. *The Lancet*. 2018 Dec;392(10164):2606–54.
21. Wickramage K, Vearey J, Zwi AB, Robinson C, Knipper M. Migration and health: a global public health research priority. *BMC Public Health*. 2018 forthcoming;
22. IOM. *Health of Migrants: Resetting the Agenda*. Report of the 2nd Global Consultation. Colombo, Sri Lanka, 21-23 February 2017 [Internet]. Geneva, Switzerland: IOM; 2017. Available from: https://www.iom.int/sites/default/files/our_work/DMM/Migration-Health/GC2_SriLanka_Report_2017_22.09.2017_Internet.pdf
23. de Gruchy T, Vearey J. "Left behind": why implementing migration-aware responses to HIV for migrant farm workers is a priority for South Africa. *Afr J AIDS Res*. 2020 Mar 10;1–12.
24. Vearey J. Moving forward: why responding to migration, mobility and HIV in South(ern) Africa is a public health priority. *J Int AIDS Soc*. 2018 Jul;21:e25137.
25. Vearey J, de Gruchy T, Kamndaya M, Walls HL, Chetty-Makkan CM, Hanefeld J. Exploring The Migration Profiles of Primary Healthcare Users in South Africa. *J Immigr Minor Health* [Internet]. 2016 [cited 2016 Dec 2]; Available from: <http://www.readcube.com/articles/10.1007/s10903-016-0535-7>
26. Vearey J, Modisenyane M, Hunter-Adams J. Towards a migration-aware health system in South Africa: A strategic opportunity to address health inequity. In: Padarath A, Barron P, editors. *South African Health Review 2017* [Internet]. Durban: Health Systems Trust; 2017. p. 89–98. Available from: <http://www.hst.org.za/publications/south-african-health-review-2017>
27. Walker R, Vearey J. Gender, migration, & health in SADC: A focus on women and girls. The African Centre for Migration and Society; Sonke Gender Justice; UKAID; 2019 Jul.
28. Statistics South Africa. *Migration dynamics of women, children and the elderly in South Africa* [Internet]. Pretoria: Statistics South Africa; 2020 [cited 2020 Mar 5]. Report No.: 03-51–04. Available from: <http://www.statssa.gov.za/publications/Report-03-51-04/Report-03-51-042020.pdf>
29. Makandwa T, Vearey J. Giving Birth in a Foreign Land: Exploring the Maternal Healthcare Experiences of Zimbabwean Migrant Women Living in Johannesburg, South Africa. *Urban Forum*. 2017 Mar;28(1):75–90.
30. Walker R. Selling Sex, Mothering and 'Keeping Well' in the City: Reflecting on the Everyday Experiences of Cross-Border Migrant Women Who Sell Sex in Johannesburg. *Urban Forum*. 2017 Mar 1;28(1):59–73.
31. UNDESA. *International Migration 2019* [Internet]. New York: United Nations Department of Economic and Social Affairs; 2019 [cited 2020 Jul 20]. Available from: https://www.un.org/en/development/desa/population/migration/publications/wallchart/docs/MigrationStock2019_Wallchart.pdf
32. Vidal EM, Tjaden JD, Global Migration Data Analysis Centre. *Global migration indicators 2018: insights from the Global Migration Data Portal*: www.migrationdataportal.org [Internet]. 2018 [cited 2020 Jul 20]. Available from: https://publications.iom.int/system/files/pdf/global_migration_indicators_2018.pdf
33. Abubakar I, Aldridge RW, Devakumar D, Orcutt M, Burns R, Barreto ML, et al. The UCL–Lancet Commission on Migration and Health: the health of a world on the move. *The Lancet* [Internet]. 2018 Dec [cited 2018 Dec 7]; Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0140673618321147>

34. Kofman E. Gender and the feminisation of migration. In: Inglis C, Li W, Khadria B, editors. *The SAGE Handbook of International Migration*. SAGE; 2019. p. 216–31.
35. Vearey J, Orcutt M, Gostin L, Braham CA, Duigan P. Building alliances for the global governance of migration and health. *BMJ*. 2019 Sep 16;4143.
36. Gideon, J., editor. *Handbook on Gender and Health* [Internet]. Cheltenham: Edward Elgar Publishing; 2016 [cited 2016 Jul 20]. Available from: <http://www.e-elgar.com/shop/handbook-on-gender-and-health>
37. Morgan R, George A, Ssali S, Hawkins K, Molyneux S, Theobald S. How to do (or not to do)... gender analysis in health systems research. *Health Policy Plan*. 2016 Oct 1;31(8):1069–78.
38. Gerritsen A, Bocquier P, White M, Mbacké C, Alam N, Beguy D, et al. Health and demographic surveillance systems: contributing to an understanding of the dynamics in migration and health. *Glob Health Action* [Internet]. 2013 Jul 11 [cited 2015 Jul 16];6(0). Available from: <http://www.globalhealthaction.net/index.php/gha/article/view/21496>
39. Migration and Health: A Research Methods Handbook [Internet]. 1st ed. University of California Press; 2014 [cited 2020 Jul 20]. Available from: <https://www.jstor.org/stable/10.1525/j.ctt7zw2z4>
40. Walls HL, Vearey J, Modisenyane M, Chetty-Makkan CM, Charalambous S, Smith RD, et al. Understanding healthcare and population mobility in southern Africa: The case of South Africa. *S Afr Med J*. 2015 Nov 24;106(1):14.
41. Hanefeld J, Vearey J, Lunt N, Bell S, Blanchet K, Duclos D, et al. A global research agenda on migration, mobility, and health. *The Lancet*. 2017 Jun 17;389(10087):2358–9.
42. Dahir AL. WhatsApp is the most popular messaging app in Africa [Internet]. Quartz Africa. [cited 2020 Jul 22]. Available from: <https://qz.com/africa/1206935/whatsapp-is-the-most-popular-messaging-app-in-africa/>
43. Most popular messaging apps [Internet]. Statista. [cited 2020 Jul 22]. Available from: <https://www.statista.com/statistics/258749/most-popular-global-mobile-messenger-apps/>
44. WhatsApp [Internet]. WhatsApp.com. [cited 2020 Jul 22]. Available from: <https://www.whatsapp.com/>
45. Lambton-Howard D, Anderson R, Montague K, Garbett A, Hazeldine S, Alvarez C, et al. WhatFutures: Designing Large-Scale Engagements on WhatsApp. In: Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems - CHI '19 [Internet]. Glasgow, Scotland Uk: ACM Press; 2019 [cited 2020 Jul 22]. p. 1–14. Available from: <http://dl.acm.org/citation.cfm?doid=3290605.3300389>
46. Lima ICV de, Galvão MTG, Pedrosa SC, Cunha GH da, Costa AKB, Lima ICV de, et al. Use of the Whatsapp application in health follow-up of people with HIV: a thematic analysis. *Esc Anna Nery* [Internet]. 2018 [cited 2018 May 8];22(3). Available from: http://www.scielo.br/scielo.php?script=sci_abstract&pid=S1414-81452018000300202&lng=en&nrm=iso&tlang=en
47. Sylverken AA, Owusu-Dabo E, Kwarteng A, Twumasi-Ankrah S, Owusu M, Adu-Amoah L, et al. Use of social media in a national Tuberculosis Drug Resistance Survey: lessons from the first anti-tuberculosis drug resistance survey in Ghana. *AAS Open Res*. 2019 Jan 17;2:4.
48. Kamel Boulos MN, Giustini DM, Wheeler S. Instagram and WhatsApp in Health and Healthcare: An Overview. *Future Internet*. 2016 Sep;8(3):37.
49. Montag C, Błaszkiewicz K, Sariyska R, Lachmann B, Andone I, Trendafilov B, et al. Smartphone usage in the 21st century: who is active on WhatsApp? *BMC Res Notes* [Internet]. 2015 Aug 4 [cited 2020 Jul 22];8. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4522968/>
50. Manji K, Hanefeld J, Vearey J, Walls H, de Gruchy T. Using WhatsApp for Health Research – A scoping review of available literature. Forthcoming;
51. Survey Node. Survey Node | Conduct WhatsApp, SMS & IVR Surveys – Global Platform For WhatsApp, SMS & IVR Surveys [Internet]. 2019 [cited 2020 Mar 18]. Available from: <https://www.surveynode.com/>
52. Coetzee J, Gray GE, Jewkes R. Prevalence and patterns of victimization and polyvictimization among female sex workers in Soweto, a South African township: a cross-sectional, respondent-driven sampling study. *Glob Health Action*. 2017 Jan;10(1):1403815.
53. Johnston LG, Sabin K. Sampling Hard-to-Reach Populations with Respondent Driven Sampling. *Methodol Innov Online*. 2010 Aug;5(2):38.1-48.
54. Patridge EF, Bardyn TP. Research Electronic Data Capture (REDCap). *J Med Libr Assoc JMLA*. 2018 Jan;106(1):142–4.
55. REDCap. REDCap [Internet]. [cited 2020 Mar 18]. Available from: <https://redcap.core.wits.ac.za/redcap/>

56. Silver L, Johnson C. Internet connectivity seen as having positive impact on life in Sub-Saharan Africa [Internet]. Pew Research Center; 2018 Oct. Available from: file:///Users/theadegruchy/Downloads/Pew-Research-Center_Technology-use-in-Sub-Saharan-Africa_2018-10-09.pdf
57. Gillwald A, Mothobi O, Rademan B. The state of ICT in South Africa. Cape Town: Research ICT Africa; 2018 Jul p. 123. Report No.: 5.

Tables

Table 1:
Pilot schedule

Group 1			Group 2		
Day from enrolment	Date	To do	Day from enrolment	Date	To do
1	15-Oct	Recruit, enroll, administer enrolment survey	1	31-Oct	Recruit, enroll, administer enrolment survey
	16-Oct				
6	21-Oct	Sent out WhatsApp initiation survey via a WhatsApp broadcast	5	04-Nov	Sent out WhatsApp initiation survey via a WhatsApp broadcast
7	22-Oct	Followed up via broadcast	7	06-Nov	Followed up via broadcast
8	23-Oct	Followed up via broadcast	9	08-Nov	Followed up individually
10	25-Oct	Followed up individually	12	11-Nov	Sent data/airtime to participants who had responded to the WhatsApp initiation survey Sent out WhatsApp monthly survey 1/4
13	28-Oct	Sent data/airtime to participants who had responded to the WhatsApp initiation survey Sent out WhatsApp monthly survey 1/4 & asked for pin	14	13-Nov	Followed up individually with those who did not respond the survey Followed up with those who did not respond to C
15	30-Oct	Followed up individually with those who did not respond to the survey or send their pin Followed up with those who did not respond to the WhatsApp initiation survey	26	25-Nov	Asked for pin
39	22-Nov	Sent data/airtime to those who responded to WhatsApp monthly survey 1/4 Sent out WhatsApp monthly survey 2/4 & asked for pin	37	06-Dec	Sent data/airtime to those who responded to WhatsApp monthly survey 1/4 Sent out WhatsApp monthly survey 2/4
42	25-Nov	Followed up individually with those who did not respond to the survey or send their pin	40	09-Dec	Followed up individually with those who did not respond the survey
63	16-Dec	Sent data/airtime to those who responded to WhatsApp monthly survey 2/4 Sent out WhatsApp monthly survey 3/4 & asked for pin	49	18-Dec	Asked for pin
65	18-Dec	Followed up individually with those who did not respond to the survey or send their pin	68	06-Jan	Sent data/airtime to those who responded to WhatsApp monthly survey 2/4 Sent out WhatsApp monthly survey 3/4
91	13-Jan	Sent data/airtime to those who responded to WhatsApp monthly survey 3/4 Sent out WhatsApp monthly survey 4/4 & asked for pin	70	08-Jan	Followed up individually with those who did not respond the survey
93	15-Jan	Followed up individually with those who did not respond to the survey or send their	79	17-Jan	Asked for pin

pin					
94	16-Jan	Thank you message to all participants	89	27-Jan	Sent data/airtime to those who responded to WhatsApp monthly survey 3/4 Sent out WhatsApp monthly survey 4/4
			91	29-Jan	Followed up individually with those who did not respond the survey Asked for pin to be shared via new location sharing platform
			92	30-Jan	Thank you message to all participants

Table 2:
Research instruments

Name	Aim	When is it administered	What does it comprise of	Technological component
WhatsApp practice surveys 1 & 2	To get the participant comfortable with the WhatsApp/Survey Node interface	At the point of recruitment	3 questions	In person Survey Node - WhatsApp
Enrolment survey	To ascertain socio-demographic profile; health seeking behaviour history; and migratory history of the participant	At the point of recruitment	66 questions - some closed, others open ended	In person Voice recorded Paper survey
WhatsApp initiation survey	To ascertain whether the participant is comfortable to respond without assistance to the survey and confirm enrolment	1 – 2 weeks after recruitment	5 questions	Survey Node - WhatsApp
WhatsApp monthly survey	To collect and track health seeking behaviour and mobility	Once a month for 4 months	17 questions Open and closed	Survey Node - WhatsApp

Figures

16 participants recruited

- 13 /16 completed WhatsApp practice survey 1
- 3 /3 completed WhatsApp practice survey 2
- 16 /16 completed the Enrolment interview

10 /16 completed the WhatsApp initiation survey

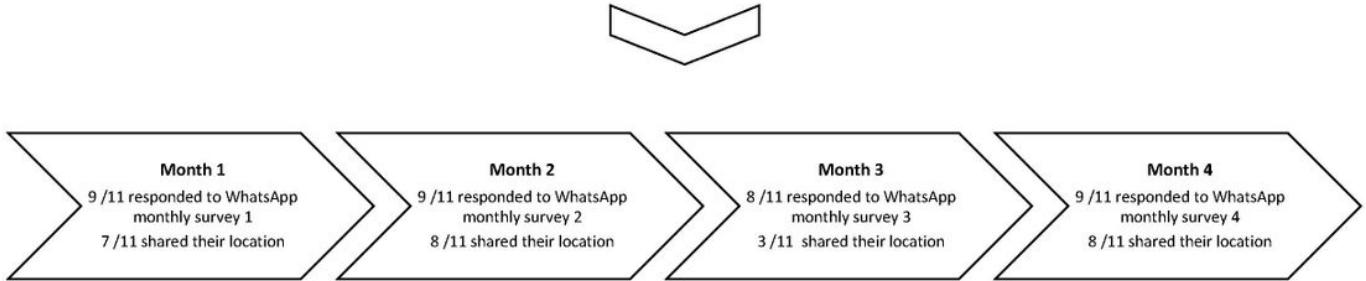


Figure 1

Overview of participation