Journal Pre-proof

How Can Mobile Applications Support Suicide Prevention Gatekeepers in Australian Indigenous Communities?

Kelly A. Brown, Maree Toombs, Bushra Nasir, Steve Kisely, Geetha Ranmuthugala, Sharon L. Brennan-Olsen, Geoffrey C. Nicholson, Neeraj S. Gill, Noel S. Hayman, Srinivas Kondalsamy-Chennakesavan, Leanne Hides

PII: S0277-9536(20)30234-3

DOI: https://doi.org/10.1016/j.socscimed.2020.113015

Reference: SSM 113015

To appear in: *Social Science & Medicine*

Revised Date: 25 March 2020

Accepted Date: 26 April 2020

Please cite this article as: Brown, K.A., Toombs, M., Nasir, B., Kisely, S., Ranmuthugala, G., Brennan-Olsen, S.L, Nicholson, G.C., Gill, N.S., Hayman, N.S., Kondalsamy-Chennakesavan, S., Hides, L., How Can Mobile Applications Support Suicide Prevention Gatekeepers in Australian Indigenous Communities?, *Social Science & Medicine*, https://doi.org/10.1016/j.socscimed.2020.113015.

How Can Mobile Applications Support Suicide Prevention Gatekeepers in Australian Indigenous Communities?

Kelly A. Brown[1], Maree Toombs[2], Bushra Nasir[2], Steve Kisely[3] Geetha Ranmuthugala[2,4], Sharon L Brennan-Olsen[5], Geoffrey C. Nicholson[2], Neeraj S. Gill[2, 6], Noel S. Hayman[2], Srinivas Kondalsamy-Chennakesavan, Leanne Hides[1,7]

[1]School of Psychology and Counselling, Queensland University of Technology, Kelvin Grove, Brisbane, Queensland, Australia

[2]Rural Clinical School, Faculty of Medicine, The University of Queensland, Toowoomba, Queensland, Australia

[3]School of Medicine, The University of Queensland, Woolloongabba, Brisbane, Queensland, Australia

[4]School of Rural Medicine, University of New England, Armidale, New South Wales, Australia

[5]Department of Medicine-Western Health, University of Melbourne, St Albans, Victoria, Australia

[6]School of Medicine, Griffith University, Gold Coast, Queensland Australia

[7]School of Psychology, The University of Queensland, St Lucia, Brisbane, Queensland Australia

Corresponding author: Professor Leanne Hides. Address: School of Psychology, University of Queensland, St Lucia, Brisbane 4072. Phone: +61 7 3365 1111, Email: l.hides@uq.edu.au.

Funding

This research was funded by a National Health and Medical Research Council (NHMRC) Project Grant (APP1076729) and the Australian Government Department of Health Rural Clinical Training and Support scheme. LH's research is funded by an NHMRC Senior Research Fellowship (APP1119098). SLB-O's research is funded by a Career Development Fellowship from the NHMRC (APP1107510) and a Research Fellowship from the Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne.

Declaration of competing interest

No conflicts of interest declared.

Acknowledgements

This project could not have been undertaken without the advice, acceptance, and continued support of the Indigenous communities. Their contribution is acknowledged with gratitude. Acknowledgements are also made to the organisations and community programs that provided us valuable time towards this research.

Introduction

Suicide rates among Indigenous Australians are twice that of the non-Indigenous population, with suicide the leading cause of death among young Indigenous Australians aged 15-34 years (ABS, 2015, HIMH, 2016). There is a critical need for suicide prevention efforts for Indigenous peoples, particularly those in regional, remote, and very remote communities (DOH, 2013). Indigenous people at risk of suicide are less likely to seek help due to limited access to services in rural and remote regions, in addition to stigma, historical mistrust, and dissatisfaction with Western approaches (Isaacs et al., 2010, Sveticic et al., 2012). To address this gap in national health provision, the Australian Government created the National Aboriginal and Torres Strait Islander Suicide Prevention Strategy (DOH, 2013). One recommendation of this strategy was to build the capacity of communities by training *gatekeepers* (i.e., well positioned community members in a position to assist suicidal others) using culturally appropriate suicide prevention training programs.

Suicide intervention training for gatekeepers typically develops the knowledge, attitudes, and skills of specific groups within the community to identify, assess and manage suicidal risk, including referral to support services when necessary (Gould et al., 2005, Isaacs et al., 2010, Isaac et al., 2009). Gatekeepers can be *designated* professionals (e.g., medical/health professionals, social workers, psychologists), and/or *emergent* groups including community members without prior formal suicide intervention training who are well positioned to assist suicidal others (e.g., teachers, community service providers, family, friends, peers; (Isaac et al., 2009). The gatekeeper plays a complex role in navigating their own relationships with suicidal persons and health services, as well as bridging the gaps and building relationships between them. Gatekeepers within Indigenious communities face additional challenges due to the unique barriers to help-seeking including mistrust and power differentials (Emmel et al., 2007, Capp et al., 2001, Kowal, 2015). A recent content analysis

of 16 suicide prevention gatekeeper training models found common components were suicide prevalence statistics, risk factors, warning signs, risk recognition or assessment, referral and consultation, relationship building, postvention, and gatekeeper self-care (Mayer, 2014). Interestingly, none of the programs used technology and only a quarter included social media.

A range of suicide prevention gatekeeper training programs exist internationally, with three systematic reviews on gatekeeper programs including 13 (Isaac et al., 2009), 16 (Yonemoto et al., 2018) and 53 (Burnette et al., 2015) related empirical studies. However, only five published studies evaluating Indigenous gatekeeper programs are available, including two from Australia (Clifford et al., 2013, Nasir et al., 2016).

While there are preliminary data that gatekeeper training improves participants' suicide prevention knowledge, skills, attitudes, self-efficacy, and intention to help, there is less evidence for the impact on behavioural outcomes (Burnette et al., 2015, Holmes et al., 2019, Isaac et al., 2009, Nasir et al., 2016, Yonemoto et al., 2018). Limitations of published studies include the use of dissimilar programs, uncontrolled designs, pre- and post-training evaluations with no long-term follow up, and the use of non-validated measures to assess effectiveness. Few programs considered community member suitability for gatekeeper training, provided gatekeepers with sufficient supervision and support, or booster sessions to maintain training gains. None used mobile technology.

The Indigenous Network Suicide Intervention Skills Training (INSIST) program is a new multifaceted gatekeeper suicide intervention training program, targeting at-risk Indigenous youth (Nasir et al., 2017). INSIST involved Indigenous community in the design, implementation and empirical evaluation of the program, to overcome the limitations of previous programs. The program had three distinct phases: (i) community consultation through participatory action research with communities across regional, remote, and very remote South West Queensland, Australia (2015-16; (Nasir et al., 2017), (ii) the design and

development of the intervention training program, including an app (2016-17), and (iii) the delivery and evaluation of the training program (2017-2019). Consistent with recent calls for technology (e.g., online e-learning and mobile applications) to support gatekeepers with implementing suicide prevention (Ghoncheh et al., 2014, Nasir et al., 2016), a key component of INSIST was the creation of a mobile phone application (mobile app).

Mobile apps may provide innovative, efficient, and cost-effective means for delivering suicide intervention strategies. Systematic reviews have identified between 14 and 49 suicide prevention apps available on Australian and American app markets that vary in terms of target users (mostly for at-risk user, some third party, and combined), or populations (broad community or specific groups, e.g., military or youth), as well as content, features and functions (Aguirre et al., 2013, Castillo-Sánchez et al., 2019, de la Torre et al., 2017, Larsen et al., 2016, Luxton et al., 2015, Martinengo et al., 2019). The following five principal features and functions were identified in Luxton and colleagues (2015) review of 14 apps: information about suicide prevention; connection to services and emergency crisis lines; safety planning and coping strategies; clinical assessment; and patient contact. While a growing number of apps for suicide prevention have been developed, systematic reviews have reported high app turnover rates, few are consistent with evidence-based suicide prevention guidelines, and limited evaluative research on app efficacy in reducing suicide-specific outcomes (Martinengo et al., 2019, Melia et al., 2020, Witt. K. et al., 2017). Further, a systematic review of mobile health interventions for First Nations populations from Canada, Australia, New Zealand, and the United States found only two mobile app interventions for mental health and suicide prevention (Hobson et al., 2019). Only one of these, iBobbly, specifically targeted suicide prevention in at-risk Indigenous youth, rather than gatekeepers, by providing culturally relevant therapy (Shand et al., 2013, 2019, Tighe et al., 2017). Qualitative research on iBobbly and the other therapist assisted app Australian

Integrated Mental Health Initiative (AIMhi) 'Stay Strong' (designed for Indigenous wellbeing concerns), indicated users considered the apps to be culturally fair and sensitive, acceptable, effective tools for use by Indigenous communities (Dingwall et al., 2015, Tighe et al., 2017). There were no apps to specifically support gatekeepers in providing intervention support.

We therefore designed a mobile app to support INSIST trained gatekeepers, given there has been, to date, no evaluation of apps targeted at gatekeepers who work in Indigenous communities. To achieve this, we conducted participatory design workshops with Indigenous community members to explore how technology, specifically mobile apps, could be used to best support gatekeepers in their roles. Consistent with the NATSISPS recommendations (DOH, 2013), a qualitative design, aligned with the INSIST participatory action research approach (Cox et al., 2014), was used to explore the range of skills and support resources that are required by suicide prevention gatekeeper representatives in Indigenous communities.

Method

Recruitment and Participants

Researchers working on the INSIST project recruited Indigenous adult health workers and Indigenous community members interested in becoming suicide prevention gatekeepers in Toowoomba, a regional city in South West Queensland, Australia. Potential participants were invited to attend an INSIST information session to find out more about the program. Following the information session, volunteers for the participatory design workshop were requested. This convenience sampling strategy was necessary to ensure the INSIST mobile app was developed prior to the delivery of INSIST suicide prevention gatekeeper training program. Twelve people (mean age 40 years, range 22 to 61 years) provided verbal informed consent to participate. Participants came from mixed occupational backgrounds (four community members, eight adult health workers from four non-government organisations,

one government organisation) and all spoke English. The majority were male (n = 10) and identified as Indigenous Australians (n = 7). Two were non-Indigenous, and three of undisclosed background.

Data Collection

Two concurrent, two-hour participatory design workshops were conducted on the same day in July, 2016 at an Indigenous Health Centre. Participants self-allocated into two groups and were seated around a large table to facilitate group discussion. The lead author facilitated one group of seven participants with the assistance of a female, non-Indigenous researcher and Indigenous male member of the INSIST research team. The other group of five participants was facilitated by a male non-Indigenous researcher with experience in running mobile app design workshops, with the support of a female INSIST Indigenous researcher. None of the INSIST team members who supported the workshops had prior knowledge of the workshop content.

A semi-structured interview schedule was developed through informal community consultation with Indigenous health workers in the region as part of the INSIST project (see electronic Supplementary Material A). The schedule incorporated the concept of '*yarning'* (a traditional Indigenous conversational process involving the informal, relaxed sharing of stories and development of knowledge) to enhance the cultural appropriateness of the research, and allow for collaborative and organic discussion with facilitators positioned more as 'listeners' than experts (Leeson et al., 2016, Walker et al., 2014). Workshops began with an acknowledgment of suicide experiences in the community and the INSIST program aims. To strengthen generalisability of outcomes, participants were reminded to also consider the perspectives of other prospective gatekeepers in the community. The schedule then focused on understanding participant experiences and needs as prospective gatekeepers using a number of questions to trigger discussion (*what does being a 'gatekeeper' mean?; what do*

you believe the experiences of being a gatekeeper involves?; what do you feel are the key skills and experiences essential for gatekeepers?; which skills need to be developed/supported to become a gatekeeper?; where do you feel more/less supported?; what are gatekeepers key support needs?), and design preferences for technology to support gatekeepers (*how do you use technology in your personal and professional life?; preferences for key features in a technology resource?*). It was necessary to discuss the definition of a gatekeeper and their roles in the community before discussing how gatekeepers can best be supported with technology such as mobile apps, so that workshop participants understood the purpose of the INSIST app. At the end of the workshop, participants were offered the opportunity to ask questions, thanked for their time, and given the contact details of the INSIST team for further debrief or questions as required.

The workshops were audio-recorded and back-up field notes taken, including participant reflection notes and researcher observations and reflections. The audio-recordings were then professionally transcribed. Due to the group-based nature of the workshops, individual quotes could not be linked to specific participants and only the sex (male or female) of the respondent was provided, based on their voice. The University of Queensland Human Research Ethics Committee (Clearance# 2015000662) and the Queensland University of Technology (Clearance #: 1500000984) approved the study. No reimbursement for participation was provided.

Analysis

Qualitative data analysis following an iterative coding approach (involving open, axial and selective coding processes) was conducted using professionally transcribed audio recordings from the workshops (Corbin and Strauss, 2008, Strauss and Corbin, 1998). The lead author (KAB) considered reflexivity prior to conducting the analysis. Although not Indigenous, the lead author has clinical training in Indigenous cultural competence and

suicide prevention strategies, with previous experience as an Applied Suicide Intervention Skills Training (ASIST) gatekeeper which allowed for greater understanding of group discussion. To address cultural sensitivity of the research, care was taken to make culturally informed decisions and involve Indigenous perspectives at every stage, including design, recruitment, data collection, group facilitation and member-checking outcomes. The lead author was not aware of any biases that may affect analysis.

The lead author initially reviewed field notes, listened to the audio recordings and read the transcripts to confirm accuracy of transcription, gain familiarity with the data, and assess facilitator differences and influences on results before importing all data sources into NVivo qualitative data analysis software version 11.4.0 for Mac (QSR International Pty Ltd). NVivo was then used for inductive open coding of all data sources, using constant comparison and memo writing to document coding definitions and process throughout. Initial screening of the open code data revealed some variation across the groups in phrasing and flow of discussion consistent with the yarning approach (e.g., one group used more humour throughout). However, comparison diagrams of the groups found consistent open coding and as such data from both groups were reviewed together. Axial and selective coding was conducted to create a thematic map until saturation of the dataset was achieved, defined as the point at which no new themes emerged (Corbin and Strauss, 2008, Strauss and Corbin, 1998). The thematic map was subsequently shared with the second facilitator (MT) and INSIST researcher participants for review with feedback incorporated. A third workshop was held in July, 2017 with two previous participants, and four new Indigenous community members to discuss and confirm the outcomes and present how the results informed the initial design of the INSIST mobile app prototype. Consideration of author reflexivity, the triangulation of data sources and member checking strategies ensured an Indigenous perspective throughout analysis and strengthened the validity of the outcomes.

Results

Group members emphasised the critical need for improved, culturally appropriate suicide prevention efforts in the community with concern for young people in particular. The yarning format of this research allowed participants the freedom to share beyond the semi-structured schedule, finding discussion of personal experiences and perceptions as suicide prevention gatekeepers and broader community concerns.

Four key themes emerged related to perceptions of (1) who are gatekeepers, (2) role requirements, (3) technology and supporting resources, and (4) broader community issues (see Figure 1 for thematic map).

[Insert Figure 1 here]

Who Are Gatekeepers

Gatekeepers should be key, accessible and respected people in the community who can support suicide prevention in at-risk people. They should have the skills and responsibility to intervene and act in suicide prevention. Gatekeepers already exist throughout the community and come from diverse ages, backgrounds, cultures, and occupations. They may be individuals with knowledge or life experience in the area, as distinct from gatekeepers who do, or do not, work professionally in suicide prevention (i.e., designated and emergent gatekeepers). By having a range of gatekeepers, people at risk of suicide can access the person they feel most comfortable with (e.g., regarding age, gender, culture, relationship, or qualification) allowing gatekeepers to bridge the gap between at-risk youth and community and professional services.

> *A gatekeeper has to be somebody that's also respected by everyone, you know. Not just within the Indigenous community, but both, everyone, you know.* *Female*

So, for me, like my gatekeepers in the community are like (name), (name) from (Local Service) – those sort of people that are, um, my sort of stepping stone between me and community. *Female*

The term *gatekeeper* was positively received by some group members, but the majority considered it culturally inappropriate. Negative perceptions related to associations with restriction, institutionalisation, and *"the gate to hell"*. Participants emphasised the need for an alternative term, with several alternative, simpler terms suggested (e.g., responder, go-to person, tracker, or an Indigenous language word).

[perception of the term] Just a gate that opens to give them guidance to who they can talk to or where they can go, who they can speak to in their life and hopefully change their journey. *Male*

[Alternative term] More like a wise one. Someone who's wise. Somebody who's aware as well. *Female*

Gatekeeper Role Requirements

The gatekeeper role is multifaceted and involved in multiple stages of suicide prevention. Training is needed to ensure prospective gatekeepers have the knowledge, skills and confidence to intervene. The role can be challenging and training needs to consider gatekeeper wellbeing support needs. Subthemes related to identifying people at risk of suicide and intervention, contributing to gapless care, cultural awareness, gatekeeper challenges and wellbeing needs, and other training factors.

Identify persons at risk of suicide. Gatekeepers needed the ability to identify persons at risk of suicide (e.g., detect warning signs) and intervene as a preventative measure before and at point of crisis.

Identifying signs that, you know, in your core group, like you had those five blokes or all that pressure on one bloke. He's saying, "Okay, he's my mate.

He's changed." You know. "There's something different about him today. Maybe he needs to go and have a chat with somebody. Hey brother, want to have a yarn? What's going on?" *Male*

Assist with suicide and crisis intervention. Gatekeepers needed to be able to provide a crisis intervention. This involved the ability to actively problem solve, respond immediately, stay with the person until they are safe, work through a range of different suicide presentations (e.g., different levels of emotional arousal), and most importantly, know how to talk to someone who is suicidal. Additionally, gatekeepers should keep in mind that the resolution of a crisis may be temporary and give a false sense of safety, thus they needed to be aware of the need for follow-up and/or referral to professionals if necessary. Training should include basic counselling skills around building rapport, active listening skills, being compassionate, non-judgemental, and patient, with the use of appropriate language and a strengths-based empowering approach to build hope. Gatekeepers should also provide brief psychoeducation to at-risk persons and their support networks on warning signs and support services to contact to prevent future crises.

You know, letting him think he's got a choice rather than bossing them around and railroading them. And taking time. Like not rushing through the process. Like we just had a yarn for half an hour. You know, in the end he was wanting to do what I was wanting him to do anyway. *Female*

Gapless care. Gatekeepers should provide a warm referral, whereby they connect at-risk people with support services, and work collaboratively with services to ensure feedback, follow-up and ongoing support is provided, assisting to bridge the gap between at-risk persons and support services. This required the ability to establish and maintain trusting relationships, a solid knowledge of service provision, including what to expect when

accessing services, and the ability to navigate barriers and advocate for, and support, people's needs.

> *I guess you've got to be careful that the first services you send them to is not one where they're going to get a bit of a block, because that might be the only… Yep, place they contact…It might be the only time they've actually got the courage to walk through a door. So, if they get rejected, that's the end of them.* *Female*

Cultural awareness. It was important to address and increase cultural awareness, including factors of "mob of shame" (*mob* referring to Indigenous social, familial or socio-political group; family and friends, and *shame* referring to stigma and embarrassment associated with attention from behaviour or actions; (Dixon, 2006), historic experiences, and vital need to respect confidentiality, particularly in small communities with close family networks. Cultural awareness related to talking with Indigenous people included the need to respect "men and women's business" (referencing specific customs and practices performed by men and women separately), use of English and Indigenous languages, literacy and health literacy considerations, and awareness of local and cultural terms associated with suicide (e.g., "silly business").

> *That comes back to your cultural appropriateness and safety. You know, mob of shame. So, they don't want their family to know they're thinking about committing suicide, so you've got to be very careful.* *Male*

Challenges of being a gatekeeper. Training needed to address the challenges of being a gatekeeper, including the potential to feel nervous, unprepared, and distressed by suicide prevention work. A need for policies around gatekeeper safety when supporting at-risk people (e.g., notify others when alone) was identified, as well as the importance of referral to ensure the gatekeeper is not the sole support. Gatekeeper tasks could be time-

consuming. Some group members thought gatekeepers should intervene if they were the most appropriate person in closest proximity to the at-risk person. Others disagreed and highlighted the need for clear boundaries, particularly for designated gatekeepers with limited availability after-hours, cautioning against making the role too complex for volunteer emergent gatekeepers.

> *There's going to be a lot of triggers there for the gatekeepers because, like, I just know how many of the kids I've seen that have known three or more people have suicided. Some of them have cut them down, some of them have been there, some of them have found their brothers after they've been hanging for a week. So, yeah, the sort of people who stick their hand up to be gatekeepers are going to be pretty easily triggered that a lot of stuff has happened around them as well.* *Female*

Recommendations to maintain gatekeeper wellbeing. Training needed to address self-care for gatekeeper wellbeing by providing them with strategies. A support system to facilitate debriefing was considered essential (e.g., have a buddy system for gatekeepers who trained together, bi-monthly meetings, and technology resources).

> *So, I reckon there should be some sort of debrief on that situation where they ring up the person and say, "Listen, this is what's just happened" … handled in the proper manner, I suppose, and it's just like the debriefs on, you know, accidents and stuff that police have put forward.* *Male*

Other important training factors. Training methods should include role-plays. There was also debate on whether gatekeepers should be trained in how to write case notes, with the general consensus that emergent gatekeepers should not be required to do this.

> *I reckon role-plays are good because you never know how you will respond until you're put right in that position. You know, observing role-plays can*

be hard, but for everybody having a go at it, because not everybody is going to be flat and withdrawn, don't want to have eye contact with you... But role-plays, at least you get something, and maybe your head might kick into gear. *Female*

Technology and Supporting Resources

Influences on current technology use. Gatekeepers could currently use a variety of forms of technology in their personal and professional lives for communication, research, scheduling, and reporting, including mobile phones, computers, and services (Google, email, Facebook, and online forums). Access to smartphones, internet, and use of Facebook was considered common in the community, particularly among young people. However, barriers to technology use included perceptions that older or less technologically competent gatekeepers would prefer not to use technology, may own non-smartphones, or don't have internet on the phone. Other potential barriers included cost (e.g., not being able to afford a smartphone or phone credit) and work restrictions (e.g., work phone non-app enabled, blocked websites, limited time).

And if they don't get credit, Facebook is the only thing they've got. You can use Messenger when you've got no credit left on your phone to ring people. *Male*

Multipurpose resources needed. Multiple types of technology and physical resources were recommended to support gatekeepers. Potential resources for supporting at-risk people were also identified (e.g., access a Facebook group to find a gatekeeper, self-assessment risk questionnaire on an app). Technology resource recommendations included an application for mobiles and tablets, Facebook group with a messenger feature, online community map/services directory forum, and a telephone helpline. While the mobile app was supported, there were mixed opinions on technology resources. Some group members

were enthusiastic about the use of a private Facebook group to connect the gatekeeper network, share information, and provide free and fast peer support. Others were concerned about privacy, confidentiality, monitoring/moderation and the potential impact of this on volunteer emergent gatekeepers. Some endorsed online forums for information sharing while others disliked them due to the time commitment required to navigate and maintain them. Another concern was the challenge of maintaining and keeping technology up-to-date beyond the INSIST project. While there was enthusiasm to develop a mobile app resource, there was an essential need for gatekeepers to be trained in how to use any technology that was developed.

> *I think that app thing is a really good idea, but I think you need a helpline as well because like definitely people out there who have – I was saying to (name) before – who have little Nokia phones or something like that that can't get apps* *Female*

In addition to technology resources, there was emphasis on the need for physical resources (e.g., identification lanyard information cards, wallet cards, sharable education booklets) and physical meetings (e.g., bimonthly meetings to share experiences and informal network catch-ups).

> *I suppose you put a little booklet out there – names, phone numbers, addresses, you know – people that can't use phones. It doesn't have to be a big book. Just be a book with numbers that can ring and maps or whatever. Just a little map on there as well.* *Male*

How gatekeepers may use resources. Multiple types of resources were needed to accommodate the numerous ways gatekeepers may support at-risk people. Gatekeepers could use resources to assist in suicide intervention (e.g., prompts), refresh training, find

information and service contact details, share information with at-risk people, and accessing gatekeeper peer support and debriefing network.

> *You'd have to have the training on the app because [if] you don't actually do or handle a suicide, you're going to forget it because we all get busy.*
>
> *Male*

How gatekeepers use resources may be influenced by individual differences and preferences. Gatekeepers who are older or less comfortable with technology may prefer physical resources such as leaflets or wallet cards, while younger, more technologically competent users may tend to prefer technology resources. Some individuals may prefer to meet face-to-face to debrief with peers, others may prefer text or phone for social comfort or accessibility. Gatekeepers less experienced in suicide prevention may find a resource more useful than more experienced or confident gatekeepers. Some gatekeepers discussed intention to use resources like a mobile app interactively with at-risk persons during intervention. Others saw it as a training refresher and information source with concerns it would distract from managing a crisis.

> *In my experience, I haven't been in that situation as yet, but if I was, then I'd go, "Hang on, what was that question again?" I'd press on it, and then it's like, "Oh, okay". Have you thought about this before? And then just run through those. So, if I don't have that on me, I would have it on my phone. Something like that for when you're at that immediate – when there's that crisis happening there.* *Female*

Recommended technology features. Recommended features of a technology resource included a look and feel that was user-friendly, aesthetically pleasing (e.g., more visuals, Indigenous artwork and potentially Indigenous language for more remote communities), easy to read, quick to navigate, and interactive (e.g., notifications, touch

screen, user online status shown). Content features included prompts to complete an intervention (e.g., what to ask), role-play videos, direct access to an emergency help-line, local geographical map, group messaging format to contact other gatekeepers, brief intervention outcome survey, ability to alert your gatekeeper buddy for peer support, service feedback about at-risk persons, reminders to refresh training, directory of contact numbers including the gatekeeper network, and possible functionality for case notes.

> *Yeah, you don't have to keep searching through the app. Like in my head I just see little squares or something that you press, click on something, and then information comes up. So, it's not like "Oh" and then you're trying to search in the search tool what you're looking for. You click on it.* *Female*

Broader Community Issues and Support Needs

Personal experiences with, and negative perceptions of, the health system influenced gatekeeper attitudes and actions in suicide prevention. Negative perceptions included cultural factors such as 'shame', historical mistrust of welfare institutions like hospital, police and emergency response teams, and a lack of cultural sensitivity by services.

> *I've only ever called the ambulance once, and I'll never do it again, because five minutes later five armed police came marching through my office. Because as soon as you mention suicide, the ambulance call the police, and that frightened the hell out of me because I didn't expect that to happen.* *Female*

Participants were also concerned these services may be dismissive and disrespectful towards emergent gatekeepers and at-risk people. Further concerns included the poor communication systems, under-resourced nature, poor response times (most services open 0900-1700 with hospital only option after-hours) and lack of after-crisis-care/recovery

services for suicide prevention of hospital and community health services. A need for better reporting on suicide for government funding was also raised.

> *We will follow them through as far as we can possibly go to the hospital. There's no feedback to us, ah, and a lot of the cases, ah, they're just dismissed, they're discharged without a thing. Yeah, so there's got to be a bit of tracking here, like you said. Tracker.* *Male*

Finally, participants identified a need for further suicide prevention efforts targeting schools, particularly around earlier mental health education, peer role models, and family education. Another target population was jail programs.

> *Early education around it, though, because kids seven or eight wouldn't probably know about services like this. I know that when I was at school I didn't learn about Beyond Blue, all that sort of stuff, till Grade 11. And a lot of this stuff is happening way before that.* *Female*

Discussion

This study conducted two participatory design workshops in a convenience sample of 12 Indigenous health workers or community members to design a mobile app to support suicide prevention gatekeepers in Indigenous communities. To achieve this aim, the workshops first explored what knowledge, skills and support suicide prevention gatekeepers may require to identify the critical components of the app.

Principal Findings

Gatekeeper knowledge, skills, and support needs. Results were generally consistent with the literature on Indigenous gatekeeper programs in general, and the NATSISPS recommendations for this type of suicide prevention program in Indigenous communities (DOH, 2013, Capp et al., 2001, Westerman, 2007). The need for a community-wide gatekeeper program targeting a diverse range of Indigenous and non-Indigenous

community members as designated and emergent gatekeepers was highlighted (Nasir et al., 2016). Participants were optimistic about the role of the INSIST gatekeeper program in this, and hoped it would increase access to help for at-risk community members, in particular Indigenous youth, and help bridge the gap between community and services.

The findings highlighted the need for gatekeeper programs to address broader community concerns about suicide prevention. Consistent with research on unique Indigenous suicidology, these factors included mistrust of welfare services, shame and stigma, negative personal experiences and perception of culturally inappropriate and under-resourced services (Capp et al., 2001, Elliott-Farrelly, 2004). However, while gatekeepers could make meaningful positive impacts, it should be noted that gatekeeper programs alone cannot be expected to would not overcome these entrenched inequalities. Broad recommendations for the development of culturally appropriate suicide prevention programs to target primary and tertiary schools, jail rehabilitation programs, and social welfare services were also made, in order to improve suicide awareness, cultural sensitivity, and collaboration of suicide prevention responses within and between these key services/programs and the wider community (DOH, 2013, Kuipers et al., 2016).

The suicide prevention gatekeeper role in Indigenous communities was perceived to be multifaceted. Training was recommended to address key knowledge, skills and support needs: a finding consistent with the common components encompassed within gatekeeper training models (Mayer, 2014) and within existing Australian Indigenous gatekeeper programs (Capp et al., 2001, Westerman, 2007, Nasir et al., 2017). This included the need for culturally appropriate training for working with Indigenous people and relevant Indigenous suicidology factors (e.g., risk factors, stressors, barriers, enablers). Consistent with the importance of using relevant language in developing culturally appropriate suicide prevention training (Armstrong et al., 2018), participants recommended using a more appropriate term

for *gatekeepers* (Povey et al., 2016). However, unlike existing research, our participants did not discuss the need for training in Indigenous suicide statistics, cultural myths around suicide, or extensive discussion of unique risk factors and warning signs (e.g., suicide clusters; (Capp et al., 2001, Dingwall et al., 2015, Povey et al., 2016); still, no discussions does not mean that those issues are not important.

Our findings suggested several specific training requirements and adaptations for the Indigenous community context. Participants highlighted the less common gatekeeper role of providing brief psychoeducation to at-risk people and their support networks, potentially similar to the use of "helping hand cards" employed elsewhere in Australia (Capp et al., 2001). The concept of gapless care recommended by group members was consistent with the common gatekeeper-training components of referral, consultation, postvention and follow-up in other populations, although it was important to contextualise this for the Indigenous community (Mayer, 2014). It was also consistent with the need for better collaboration and information sharing between agencies, local Indigenous families and representative workers to ensure continuity of care and follow up (Kuipers et al., 2016). Our findings suggested the potential for gatekeepers to contribute to suicide prevention care in a more integrated and collaborative way, with formal and informal service pathways. This acknowledges the liminal and complex role gatekeepers play in building and maintaining relationships of empathy and mutual trust with marginalised or difficult to access community members and health services (Emmel, Hughes, Greenhalgh and Sale, 2007). This focus may be similar to the new unevaluated Jekkora Group Indigenous model that positions gatekeepers as key volunteer members of an interdisciplinary suicide prevention team (Hearn et al., 2016). The role of gatekeeper as advocate (a common function), navigating within and between the worlds of Indigenous community and health services, would also be particularly important in this context due to the influence of unique Indigenous community barriers to help-seeking that

could reduce gatekeeper and community member intentions to refer to welfare services (Capp et al., 2001).

However, participants also cautioned against over-complicating the gatekeeper role. Programs in other populations have addressed this by using flexible training delivery according to participants prior knowledge and position in service provision (e.g., only designated gatekeeper required training in recording case notes; (Capp et al., 2001, Condron et al., 2019, Westerman, 2007). It has been well established that suicide prevention work is challenging and may negatively influence those supporting at-risk persons such as mental health workers (Hawgood and de Leo, 2015). However, there is limited research on the negative impact of suicide prevention work on trained emergent gatekeepers, particularly those at-risk of suicide personally (Holmes et al., 2019, Sareen et al., 2013). Recommendations for gatekeeper training to address challenges and wellbeing needs were consistent with programs in other populations commonly using clear role boundaries, risk minimisation policies, ongoing training, and self-care strategies, including informal peer and social support (Mayer, 2014, Holmes et al., 2019). While rare for gatekeeper programs, the Jekkora Group program includes a regular peer and professional debrief component, which our group members indicated as essential for support (Hearn et al., 2016). This is consistent with clinical training literature that suggested the provision of adequate follow-up support (e.g., supervision, consultation, or reflection) is essential for trainees to get maximum benefit from, and effectively implement, training programs (Bennett-Levy et al., 2017, Bennett-Levy and Padesky, 2017, Lyon et al., 2011, Nadeem et al., 2013).

Technology and support resources. This research is the first to explore how a mobile app could support gatekeepers in suicide prevention. While there was support for an app to provide gatekeepers with a practical resource to aid in addressing indigenous suicide, it is important to acknowledge that neither gatekeepers nor technology/apps were seen as

panaceas for addressing suicide risk in these vulnerable communities. Rather, they were seen as a potential part of a comprehensive suicide prevention program. Consistent with the NATSISPS recommendation to produce materials in diverse formats, participants recommended integration of multiple types of gatekeeper resources. These included an app for mobile phones and tablets, physical tools, and a telephone hotline. Offering a combination of multipurpose resources may reduce potential barriers to use and accommodate the numerous and individual ways gatekeepers may support at-risk people. Key recommended functions of an app were to support gatekeepers with suicide intervention (e.g., prompts), training recall, finding information and service contact details, sharing information with at-risk people, and access to gatekeeper peer support and debriefing networks. Consistent with Holmes and colleagues' (2019) recommendations, these findings suggested that a mobile app could function as a training booster tool to provide interactive practice opportunities, as well as access to up to date information and referral pathways to address concerns with training maintenance in the literature (Isaac et al., 2009, Nasir et al., 2016). The app could also function similarly to other online communities developed to reduce rural and remote mental health workers' barriers to supervision and support (Penn et al., 2016).

Although there was support for a mobile app for gatekeeper use, the suitability of social media and online community forums was debated. Participants suggested a digital tool for facilitating help-seeking would be useful for both gatekeepers and at-risk Indigenous youth. Although this research was focused on gatekeepers, a companion tool for at-risk youth could be particularly valuable in this context. Further, while previous research has reported e-learning modules for gatekeeper training are an accessible and effective delivery method (Lancaster et al., 2014), our participants did not discuss this option. Nevertheless, the need for further research exploring how other technologies could be used to support gatekeepers was highlighted.

Findings recommended physical support resources, considered rare in gatekeeper programs, including sharable booklets, wallet cards (e.g., as used in ASIST), and regular networking meetings (Mayer, 2014). These resources would support gatekeepers in providing brief psychoeducation to at-risk persons and facilitate sustainable ongoing gapless care, peer support and supervision, which some gatekeepers would prefer to do face-to-face.

Consistent with the literature, participants reported access to smartphones, internet, and use of Facebook was common in the community, particularly among young people (Tighe et al., 2017). As for Indigenous mobile apps (iBobbly and AIMhi Stay Strong), potential constraints to use were issues with phone and internet access, technology competence, individual preferences, privacy and confidentiality, sustainability, and the need for training in how to use the app. Some participants were concerned that the app could detract from engagement and crisis management, which was also raised by some users of AIMhi Stay Strong (Povey et al., 2016). However, most AIMhi Stay Strong users reported the app facilitated engagement and rapport, and suggested the interactive use of a mobile app could facilitate the discussion of sensitive topics to help empower at-risk people in their recovery. Caution would be necessary to manage crises on an individual basis, with further research needed to evaluate the appropriateness and effectiveness when used this way. Participants also reported unique constraints for the gatekeeper context, including work restrictions for designated gatekeepers and the level of experience in suicide prevention, with less experienced gatekeepers finding a resource more helpful than those more experienced or confident. The findings are consistent with recent research into the eMental health training needs and resource preferences of Indigenous health professionals (i.e., designated gatekeepers), which indicated that to be of value, training programs and resources should account for differences in individual needs (e.g., according to factors of their technology

competence, their role and scope of practice, and level of training; (Bennett-Levy and Padesky, 2017, Bird et al., 2017).

The recommendations for mobile app features were largely consistent with the literature on available international suicide prevention mobile apps (Larsen et al., 2016, Luxton et al., 2015) including iBobbly and AIMhi Stay Strong (Dingwall et al., 2015, Povey et al., 2016). However, several unique recommendations specific to the gatekeeper user in this Indigenous community context were found. These related to aids for suicide intervention (e.g., prompts, brief outcomes survey, case notes), training maintenance (e.g., role-play videos, reminders to refresh training) and networking (e.g., service feedback notifications, gatekeeper network communication tools, "buddy system" alerts). The use of online role-play simulations with emotionally responsive avatars has be investigated as a feasible and promising training tool for suicide prevention in Indigenous communities, which warrants further exploration of its use as a training maintenance tool (Bartgis and Albright, 2016, O'Brien et al., 2019). Interestingly, our participants did not discuss other common features such as safety planning and coping strategies, standardised assessment measures, password protection, sharing data with health providers, and patient contact specifically (Luxton et al., 2015). This finding could suggest that these common features of apps for at-risk users may not be as relevant for gatekeeper users, but more likely reflects the small sample size. The findings offered important recommendations for the design and development of the INSIST mobile app to support suicide prevention gatekeepers in Indigenous communities.

Prototype development of INSIST mobile app

The INSIST mobile app prototype is presented in Figure 2. An iterative design and development process with ongoing community consultation with Indigenous and non-indigenous INSIST researchers was used to develop the app. The initial design of the INSIST mobile app prototype was also reviewed by Indigenous community members in a third

participatory design workshop. The seven key functions of the initial prototype included: (1) to support interventions with people at-risk of suicide and share outcomes (including direct access to emergency/crisis helplines); (2) to search a directory of support services and assist with referral; (3) to connect a network of INSIST gatekeepers; (4) to revise training over time; (5) to link with helpful psychoeducation and online resources; (6) support gatekeeper self-care; and (7) to record notes and reminders. The INSIST app is currently available to INSIST trained gatekeepers through the Australian Apple iTunes app and Google Play stores (released July 2018). The acceptability, utility and quality of the app are being evaluated as part of the INSIST project. This information will be used to refine and develop future iterations of the app, to be evaluated in larger samples of trained gatekeepers.

[Insert Figure 2 Here]

Limitations

A small convenience sample of 12 participants were recruited to attend participatory app-design workshops immediately after attending an information session on the INSIST project. While all participants had expressed interest in attending future suicide prevention gatekeeper training, none had received training in INSIST or any other type of suicide prevention gatekeeper program prior to the workshop, limiting their ability to speak about the gatekeeper experience. However, all participants were Indigenous health workers or Indigenous community members, and were primed to the nature and purpose of the gatekeeper role in the INSIST program information session. A shared understanding of the gatekeeper role was also developed at the beginning of the workshop. Regardless, the convenience sampling strategy and small sample size limits the representativeness of the sample and generalisability of results. As does the recruitment of individuals from only one small regional city, given the significant diversity of urban, rural and remote Indigenous communities. All participants spoke English and future research is required to determine the

applicability of current results to communities where traditional Indigenous languages are still spoken. It also needs to be acknowledged that INSIST information session attendance prior to the workshop may have also introduced positive bias towards the INSIST program. Some participants self-reported low technological competency, which may have also influenced perceptions of technology.

Future Research Implications

Further research is needed to confirm the validity and generalisability of the results of this research with larger samples of gatekeeper representatives (designated, emergent, and youth), from multiple rural, remote, and very remote Indigenous communities. This should consider the potential influence of participant characteristics (i.e., age, gender, technological competence, gatekeeper experience, INSIST training). Consideration of at-risk Indigenous community members' perceptions of the INSIST gatekeeper program and resources is also needed. While this research focused on mobile apps, the findings suggest value in further exploration of the role of social media, online community forums, telephone hotlines, and companion resources to support gatekeepers. The process we used to inform the development of the app may have implications for the involvement of other Indigenous communities in the design of culturally-appropriate applications to meet their needs.

Conclusions

This research was the first to report on perceptions of how technology, specifically mobile apps, can support suicide prevention gatekeepers in Indigenous communities. Implications of this research for the INSIST program include specification that training should target community wide designated and emergent gatekeepers, address multifaceted gatekeeper role requirements, and use a more culturally appropriate 'gatekeeper' term. Participant recommendations for how a mobile app could support gatekeepers in suicide intervention, training maintenance, referral, brief psychoeducation, and networking were

incorporated into the INSIST mobile app prototype. The app is currently available to gatekeepers trained in the multifaceted, community developed and culturally appropriate INSIST program targeting at-risk Indigenous youth and is currently being evaluated. Further research is required to assess the effectiveness of the app in supporting gatekeepers help at-risk youth in Indigenous communities.

References

ABS 2015. 3303.0 Causes of death, Australia 2015 Belconnen, ACT: Australian Bureau of Statistics.

AGUIRRE, R. T. P., MCCOY, M. K. & ROAN, M. 2013. Development guidelines from a study of suicide prevention mobile applications (apps). . *Journal of Technology in Human Services,* 31**,** 296-293.

ARMSTRONG, G., IRONFIELD, N., KELLY, C. M., DART, K., ARABENA, K., BOND, K., REAVLEY, N. & JORM, A. F. 2018. Re-development of mental health first aid guidelines for supporting Aboriginal and Torres Strait islanders who are experiencing suicidal thoughts and behaviour. *BMC Psychiatry,* 18**,** 228.

BARTGIS, J. & ALBRIGHT, G. 2016. Online role-play simulations with emotionally responsive avatars for the early detection of native youth psychological distress, Including depression and suicidal ideation. *American Indian and Alaska Native Mental Health Research,* 23**,** 1-27.

BENNETT-LEVY, J. & PADESKY, C. A. 2017. Use It or Lose It: Post-workshop Reflection Enhances Learning and Utilization of CBT Skills. *Cognitive and Behavioral Practice,* 21**,** 12-19.

BENNETT-LEVY, J., SINGER, J., DUBOIS, S. & HYDE, K. 2017. Translating E-Mental Health Into Practice: What Are the Barriers and Enablers to E-Mental Health Implementation by Aboriginal and Torres Strait Islander Health Professionals? . *Journal of Medical Internet Research,* 19.

BIRD, J., ROTUMAH, D., BENNETT-LEVY, J. & SINGER, J. 2017. Diversity in eMental Health Practice: An Exploratory Qualitative Study of Aboriginal and Torres Strait Islander Service Providers. *JMIR Mental Health,* 4**,** e17.

BURNETTE, C., RAMCHAND, R. & AYER, L. 2015. *Gatekeeper training for suicide prevention: A theoretical model and review of the empirical literature* [Online]. Retrieved from RAND Corporation; Santa Monica, CA, Web-only: https://www.rand.org/pubs/research_reports/RR1002.html. [Accessed].

CAPP, K., DEANE, F. P. & LAMBERT, G. 2001. Suicide prevention in Aboriginal communities: Application of community gatekeeper training. *Australian and New Zealand Journal of Public Health,* 25**,** 315-321.

CASTILLO-SÁNCHEZ, G., CAMARGO-HENRÍQUEZ, I., MUÑOZ-SÁNCHEZ, J. L., FRANCO-MARTÍN, M. & DE LA TORRE-DÍEZ, I. 2019. Suicide prevention mobile apps: Descriptive analysis of apps from the most popular virtual stores. *JMIR mHealth and uHealth,* 7**,** e13885.

CLIFFORD, A. C., DORAN, C. M. & TSEY, K. 2013. A systematic review of suicide prevention interventions targeting indigenous peoples in Australia, United States, Canada and New Zealand. . *BMC Public Health,* 13**,** 463.

CONDRON, S., GODOY GARRAZA, L., KUIPER, N., SUKUMAR, B., WALRATH, C. & MCKEON, R. 2019. Comparing the effectiveness of brief versus in-depth gatekeeper training on behavioral outcomes for trainees. *Crisis: The Journal of Crisis Intervention and Suicide Prevention,* 40**,** 115-124.

CORBIN, J. & STRAUSS, A. 2008. *Basics of qualitative research (3rd ed.): Techniques and procedures for developing grounded theory,* Thousand Oaks: United States, California, Thousand Oaks: SAGE Publications, Inc.

COX, A., DUDGEON, P., HOLLAND, C., KELLY, K., SCRINE, C. & WALKER, R. 2014. Using participatory action research to prevent suicide in Aboriginal and Torres Strait Islander communities. *Australian Journal of Primary Health,* 20**,** 315-349.

DE LA TORRE, I., CASTILLO, G., ARAMBARRI, J., LÓPEZ-CORONADO, M. & FRANCO, M. A. 2017. Mobile apps for suicide prevention: Review of virtual stores and literature. *JMIR mHealth and uHealth,* 5**,** e130.

DINGWALL, K. M., PUSZKA, S., SWEET, M. & NAGEL, T. 2015. "Like drawing into sand": Acceptability, feasibility, and appropriateness of a new e-mental health resource for service providers working with Aboriginal and Torres Strait Islander people. . *Australian Psychologist,* 50**,** 60-69.

DIXON, R. M. W. 2006. *Australian Aboriginal words in English: Their origin and meaning (2nd ed.),* South Melbourne, Oxford University Press.

DOH 2013. National Aboriginal and Torres Strait Islaner Suicide Prevention Strategy. Canberra: Department of Health and Ageing.

ELLIOTT-FARRELLY, T. 2004. Australian Aboriginal suicide: The need for an Aboriginal suicidology? *Australian e-Journal for the Advancement of Mental Health,* 3**,** 138-145.

EMMEL, N., HUGHES, K., GREENHALGH, J. & SALES, A. J. S. R. O. 2007. Accessing socially excluded people—Trust and the gatekeeper in the researcher-participant relationship. 12**,** 1-13.

GHONCHEH, R., KOOT, H. M. & KERKHOF, A. J. 2014. Suicide prevention e-learning modules designed for gatekeepers: A descriptive review. *Crisis,* 35**,** 176-185.

GOULD, M. S., MARROCCO, F. A., KLEINMAN, M., THOMAS, J. G., MOSTKOFF, K., COTE, J. & DAVIES, M. 2005. Evaluating iatrogenic risk of youth suicide screening programs: A randomized controlled trial. . *Journal of the American Medical Association,* 293**,** 1653-1643.

HAWGOOD, J. & DE LEO, D. 2015. Working with suicidal clients: Impacts on psychologists and the need for self-care. *InPsych: The Bulletin of the Australian Psychological Society Ltd,* 37**,** 9-11.

HEARN, S., WANGANEEN, G., SUTTON, K. & ISAACS, A. 2016. The Jekkora group: An Aboriginal model of early identification, and support of persons with psychological distress and suicidal ideation in rural communities. *Advances in Mental Health,* 14**,** 96-105.

HIMH 2016. Facts and stats about suicide in Australia

HOBSON, G. R., CAFFERY, L. J., NEUHAUS, M. & LANGBECKER, D. H. 2019. Mobile health for First Nations populations: Systematic review. *JMIR Mhealth Uhealth,* 7**,** e14877.

HOLMES, G., CLACY, A., HERMENS, D. F. & LAGOPOULOS, J. 2019. The long-term efficacy of suicide prevention gatekeeper training: A systematic review. *Archives of Suicidal Research,* December.

ISAAC, M., ELIAS, B., KATZ, L. Y., BELIK, S.-L., DEANE, F. P., ENNS, M. W. & SAREEN, J. 2009. Gatekeeper training as a preventative intervention for suicide: A systematic review. *Canadian Journal of Psychiatry,* 54**,** 260-268.

ISAACS, A. N., PYETT, P., OAKLEY-BROWNE, M. A., GRUIS, H. & WAPLES-CROWE, P. 2010. Barriers and facilitators to the utilization of adult mental health services by Australia's Indigenous people: Seeking a way forward. *International Journal Mental Health Nursing,* 19**,** 75-82.

KOWAL, E. 2015. *Trapped in the gap: Doing good in Indigenous Australia,* Berghahn Books.

KUIPERS, P., LINDEMAN, M. A., GRANT, L. & DINGWALL, K. 2016. Front-line worker perspectives on Indigenous youth suicide in Central Australia: Initial treatment and response. *Advances in Mental Health,* 14**,** 106-117.

LANCASTER, P. G., MOORE, J. T., PUTTER, S. E., CHEN, P. Y., CIGULAROV, K. P., BAKER, A. & QUINNETT, P. 2014. Feasibility of a web-based gatekeeper training:

implications for suicide prevention. *Suicide and Life-Threatening Behavior,* 44**,** 510-523.

LARSEN, M. E., NICHOLAS, J. & CHRISTENSEN, H. 2016. A systematic assessment of smartphone tools for suicide prevention. *Public Library of Science One,* 11**,** e0152285.

LEESON, S., SMITH, C. & RYNNE, J. 2016. Yarning and appreciative inquiry: The use of culturally appropriate and respectful research methods when working with Aboriginal and Torres Strait Islander women in Australian prisons. *Methodological Innovations,* 9.

LUXTON, D. D., JUNE, J. D. & CHALKER, S. A. 2015. Mobile health technologies for suicide prevention: Feature review and recommendations for use in clinical care. *Current Treatment Options in Psychiatry,* 2**,** 349-362.

LYON, A., STIRMAN, S., KERNS, S. & BRUNS, E. 2011. Developing the Mental Health Workforce: Review and Application of Training Approaches from Multiple Disciplines. *Administration and Policy in Mental Health and Mental Health Services Research,* 38**,** 238-253.

MARTINENGO, L., VAN GALEN, L., LUM, E., KOWALSKI, M., SUBRAMANIAM, M. & CAR, J. 2019. Suicide prevention and depression apps' suicide risk assessment and management: a systematic assessment of adherence to clinical guidelines. *BMC Medicine,* 17**,** 231.

MAYER, G. 2014. *Content analysis of gatekeeper training models.* University of Cincinnati.

MELIA, R., FRANCIS, K., HICKEY, E., BOGUE, J., DUGGAN, J.,, O'SULLIVAN, M. & YOUNG, K. 2020. Mobile Health Technology Interventions for Suicide Prevention: Systematic Review. *JMIR Mhealth Uhealth,* 8**,** e12516.

NADEEM, E., GLEACHER, A. & BEIDAS, R. 2013. Consultation as an Implementation Strategy for Evidence- Based Practices Across Multiple Contexts: Unpacking the Black Box. *Administration and Policy in Mental Health and Mental Health Services Research,* 40**,** 439-450.

NASIR, B., KISELY, S., HIDES, L., RANMUTHUGALA, G., BRENNAN-OLSEN, S., NICHOLSON, G., GILL, N. S., HAYMAN, N., KONDALSAMY-CHENNAKESAVAN, S. & TOOMBS, M. 2017. An Australian Indigenous community-led suicide intervention skills training program: community consultation findings. *BMC Psychiatry,* 17.

NASIR, B. F., HIDES, L., KISELY, S., RANMUTHUGALA, G., NICHOLSON, G. C., BLACK, E., TOOMBS, M. & AL, E. 2016. The need for a culturally-tailored gatekeeper training intervention program in preventing suicide among Indigenous peoples: A systematic review. *BMC Psychiatry,* 16.

O'BRIEN, K., FUXMAN, S., HUMM, L., NICOLE, T., PIRES, W., COLE, A. & GOLDSTEIN GRUMET, J. 2019. Suicide risk assessment training using an online virtual patient simulation. . *mHealth,* 5.

PENN, D. L., SIMPSON, L., EDIE, G., LEGGETT, S., WOOD, L., HAWGOOD, J., DE LEO, D. & AL, E. 2016. Acceptability of mental health apps for Aboriginal and Torres Strait Islander Australians: A qualitative study. . *Journal of Medical Internet Research,* 18**,** e65.

POVEY, J., MILLS, P. P., DINGWALL, K. M., LOWELL, A., SINGER, J., ROTUMAH, D., NAGEL, T. & AL, E. 2016. Acceptability of mental health apps for Aboriginal and Torres Strait Islander Australians: A qualitative study. *Journal of Medical Internet Research,* 18**,** e65.

SAREEN, J., ISAAK, C., BOLTON, S. L., ENNS, M. W., ELIAS, B., DEANE, F., KATZ, L. Y. & AL., E. 2013. Gatekeeper training for suicide prevention in First Nations community members: A randomized controlled trial. . *Depression and Anxiety,* 30**,** 1021-1029.

SHAND, F., MACKINNON, A., O'MOORE, K., RIDANI, R., REDA, B., HOY, M., HEARD, T., DUFFY, L., SHANAHAN, M., JACKSON PULVER, L. & CHRISTENSEN, H. 2019. The iBobbly Aboriginal and Torres Strait Islander app project: Study protocol for a randomised controlled trial. *Trials,* 20.

SHAND, F. L., RIDANI, R., TIGHE, J. & CHRISTENSEN, H. 2013. The effectiveness of a suicide prevention app for indigenous Australian youths: Study protocol for a randomized controlled trial. . *TRIALS,* 14**,** 396.

STRAUSS, A. L. & CORBIN, J. M. 1998. *Basics of qualitative research: Techniques and procedures for developing grounded theory (2 ed.).* , Thousand Oaks, Sage Publications.

SVETICIC, J., MILNER, A. & DE LEO, D. 2012. Contacts with mental health services before suicide: A comparison of Indigenous with non-Indigenous Australians. . *General Hospital Psychiatry,* 34**,** 185-191.

TIGHE, J., SHAND, F., RIDANI, R., MACKINNON, A., DE LA MATA, N. & CHRISTENSEN, H. 2017. Ibobbly mobile health intervention for suicide prevention in Australian Indigenous youth: A pilot randomised controlled trial. *BMJ Open,* 7**,** e013518.

WALKER, M., FREDERICKS, B., MILLS, K. & ANDERSON, D. 2014. "Yarning" as a method for community-based health research with Indigenous women: The Indigenous women's wellness research program. . *Health Care for Women International,* 35**,** 1216-1226.

WESTERMAN, T. 2007. Summary of results from indigenous suicide prevention programs delivered by Indigenous psychological services

WITT. K., SPITTAL, M. J., CARTER, G., PIRKIS, J., HETRICK, S., CURRIER D., ROBINSON, J. & MILNER, A. 2017. Effectiveness of online and mobile telephone applications ('apps') for the self-management of suicidal ideation and self-harm: a systematic review and meta-analysis. *BMC Psychiatry,* 17**,** 297.

YONEMOTO, N., KAWASHIMA, Y., ENDO, K. & YAMADA, M. 2018. Gatekeeper training for suicidal behaviors: A systematic review. *Journal of Affective Disorders,* 246**,** 506-514.

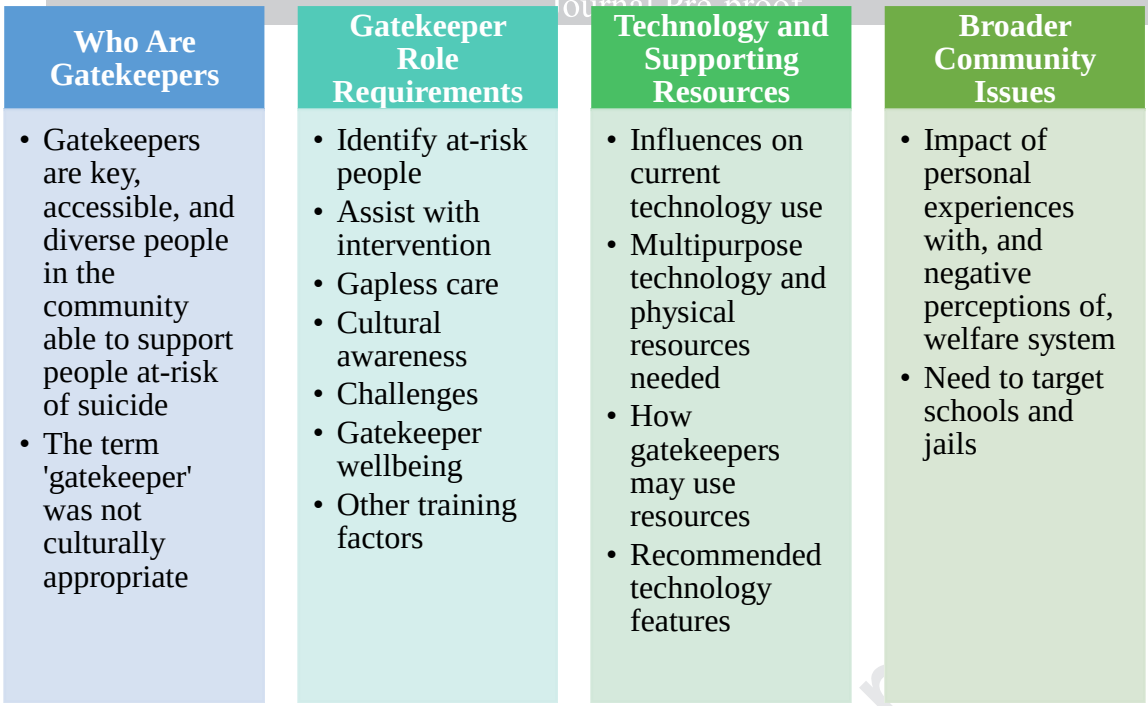

Fig. 1. Thematic map showing key themes and subthemes.

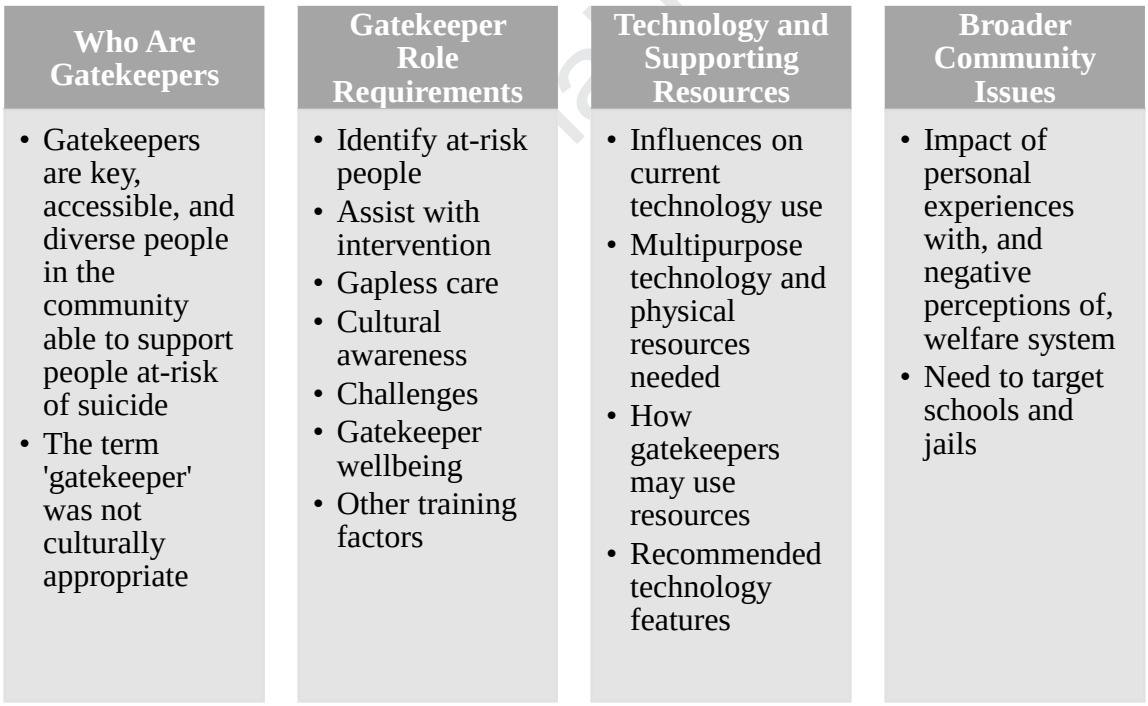

Fig. 2. Thematic map showing key themes and subthemes.

Fig. 3. Screenshots of key sections of the INSIST mobile app.

Fig. 4. *Screenshots of key sections of the INSIST mobile app.*

Research Highlights

- Qualitative study explores new suicide prevention tools for Indigenous Australians.
- Multi-platform technology and physical gatekeeper support resources recommended.
- Key app functions include suicide intervention, refresher training, and referral.
- Gatekeeper/responder selection criteria and training recommendations are provided.

Supplementary Material A

Semi-Structured Interview Schedule

Indigenous Network Suicide Skills Training Program (INSIST)

eTool Development Workshops

Objectives:

The purpose of this workshop is to determine how technology can best be used to support gatekeepers in the delivery of the INSIST program and to design and develop eTools to achieve this. It is hoped the eTools will increase trained gatekeeper knowledge, skills and confidence to complete a suicide risk assessment and access the right help to support young people in their community who are at risk of suicide.

Materials Required

- Audio recorder
- Laptop with cords to connect to a projector for INSIST PowerPoint
- iPhone and Android
- A3 paper and printed app design templates
- Coloured markers
- Material to mind-map.

Day One Workshop

Time: 1400, duration two hours

Location: Toowoomba, South East Queensland, Australia

Facilitators: KB, SS

INSIST Attendees: AW, BN, MT

Rooms: Set seating in circle with resources in the middle.

Brief INSIST information session presentation (allow 15mins)

Introduction to Mobile App's for Suicide Prevention (allow 5mins)

Focus: have a yarn about how you use technology in your communities and as a gatekeeper, how might technology help you feel assisted, supported and connected.

Obtain informed consent and start recording (5-10mins)

Welcome to country and acknowledgement of suicide in the community by Indigenous INSIST researcher. *Allow brief time for informal introductions/icebreaker*.

Explore perceptions about gatekeeper needs for support (allow minimum 20mins)

Intro: The gatekeeper role can be challenging. It is important they receive the support they need to feel best able to use their skills and look after themselves in the process. Keeping in mind that INSIST gatekeepers will receive training, including dedicated time to discuss their personal lived experiences with suicide in a safe and supportive environment. Gatekeepers will be varied people in the community, some health workers who may already have experience working in this area and others, who may not, such as youth and elders, so please keep them in mind when responding as well.

**Write down list of responses for mind-map.*

- What does 'gatekeeper' mean? (term)
- What do you believe the experience of being a gatekeeper involves?
- What do you feel are the key skills and experiences essential for gatekeepers?
- Which skills need to be developed / supported to become a gatekeeper?
- Thinking of these key areas, where do you feel more supported and where do you feel you need more support?
- What are gatekeepers key needs for support?

Explore perceptions of how technology can meet identified needs (allow minimum 20mins):

- How do you use technology to support you in your personal life and professional role?

- Preferences for key features in a technology resource?

Opportunity to ask questions.

Thank for time and encourage to contact INSIST team for further debrief if needed.

Kelly A. Brown: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data Curation, Writing – Original Draft, Writing – Review and editing, Project administration. **Maree Toombs:** Conceptualisation, Methodology, Validation, Investigation, Resources, Writing – Review and editing, Project administration, Funding acquisition. **Bushra Nasir:** Validation, Investigation, Resources, Writing – Review and editing, Funding acquisition. **Steve Kisely:** Conceptualization, Writing – Review and editing, Project administration. **Geetha Ranmuthugala:** Conceptualization, Writing – Review and editing, Project administration, Funding acquisition. **Sharon L Brennan-Olsen:** Conceptualization, Project administration, Funding acquisition. **Geoffrey C. Nicholson:** Conceptualization, Writing – Review and editing, Project administration, Funding acquisition. **Neeraj S. Gill:** Conceptualization, Methodology, Writing – Review and editing, Project administration, Funding acquisition. **Noel S. Hayman:** Conceptualization, Project administration. **Srinivas Kondalsamy-Chennakesavan:** Conceptualization, Project administration, Funding acquisition. **Leanne Hides:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – Original Draft, Writing – Review and editing, Supervision, Project administration, Funding acquisition.