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Opinions and perceptions of Indigenous mental health applications from service providers and youth samples: a pilot study

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Introduction

Australian Aboriginal and Torres Strait Islander people have reported that since European settlement, they have experienced significantly higher levels of stress than the non-Indigenous community (Purdie, Dudgeon and Walker, 2014). Evidence highlights that historic dislocation of Indigenous people from their land and traditional country coupled with ongoing instances of interpersonal and systemic racism, have significant causal and maintaining effects on conditions such as anxiety, depression, physical ill-health, emotional and behavioural difficulties, childhood illness, alcohol and other substance use, and risk of suicide (Bailie and Wayte, 2006; Ferdinand, Paradies and Kelaher, 2012; Paradies, Harris and Anderson, 2008; Paradies and Cunningham, 2012; Priest et al., 2011; Zubrick et al., 2005). Suicide rates are significantly higher for Indigenous populations compared to non-Indigenous populations (Australian Institute of Health and Welfare, 2009; Australian Bureau of Statistics, 2012). The prevalence of these issues in Indigenous populations is significant as between 27% and 52% of Indigenous respondents in the 2004–05 National Aboriginal and Torres Strait Islander Health Survey (De Maio et al., 2005) reported multiple life stressors exacerbating mental health issues. This was particularly the case with members of the Stolen Generations, the Indigenous children of whom were removed from their families by the Australian government, and their families, who are more likely to have even higher rates of emotional/behavioural difficulties and high rates of harmful substance use (Australian Institute of Health and Welfare, 2009) than other Indigenous populations (De Maio et al., 2005).

Thus far, efforts to improve the mental health of Indigenous youth have often been restricted due to issues of accessibility, and the relevance of materials used (Purdie, Dudgeon and Walker, 2014). With the advent of new technology such as mobile phone applications, there are new possibilities for mental health education for Indigenous youth.

Internet based applications for Indigenous mental health

Aboriginal and Torres Strait Islanders who live in remote and rural areas are at even higher risk of the detrimental effects and access to mental health services is imperative, but lacking, and often not culturally appropriate (Purdie, Dudgeon and Walker, 2014). Internet-based mobile technology, such as mobile phones, has been seen to aid people to make connections over geographical divides (Brusse et al., 2014). It has been observed that Aboriginal values of community and kinship, are related to increased numbers of mobile phone usage due to the technology opening options of readily available communication (Brusse et al.,

2014), especially in Indigenous people who live in rural and remote communities (Brusse et al., 2014) who can then communicate with each other on their own terms. Although mental health information and intervention strategies have been advantageous to youth in rural and remote Australia (Dingwall et al., 2015), there are significant differences in how Aboriginal Australians' perceive and deal with mental health compared to non-Indigenous Australians (Purdie, Dudgeon and Walker, 2014). In the digital space, there appears to be a dearth of culturally sensitive applications (apps) that inform and connect Indigenous youth to mental health services. Only four mental health digital apps developed in Australia have been specially designed to promote mental health of Aboriginal and Torres Strait Islanders, as shown in Table 1.

Table 1. Names and descriptions of existing Indigenous mental health applications

Name	Description
The Australian Integrated Mental Health Initiative (AIMhi) 'Stay Strong' app.	Funded by the National Health and Medical Research Council and developed with Aboriginal Mental Health Workers (AMHWs). This application highlights the themes of strength, and community; and includes Indigenous artwork, language, and imagery related to nature (Dingwall et al., 2015).
The National Aboriginal Community Controlled Health Organisation (NACCHO) app.	Developed in partnership with the Australian Football League and Indigenous All Stars. While it covers similar themes as other applications, it uses sport as a point of interest for youth (Deadly Vibe, 2013).
Kurdiji	Developed by Warlpiri elders native to the Northern Territory in collaboration with the Black Dog Institute, a not-for-profit organisation founded in Sydney, with the aim to prevent mood disorders such as depression and bipolar disorder. The name means 'shield' in the native Warlpiri language, and the application focuses on themes of strength, and connection to community and culture via images of ceremony and the use of native languages (Little, 2005).
iBobbly	The name, derived from a Kimberley greeting in Western Australia, is the name given to reportedly the world's first suicide prevention application developed by multiple Indigenous and non-Indigenous organisations in Western Australia and New South Wales. While no specific themes were explicitly mentioned, it was stated that the application follows the main principles of Acceptance and Commitment Therapy (ACT) (Tighe et al., 2017).

As noted by Brown et al. (2020), given the pervasive nature of digital technology use in Australian youth, there is enthusiasm to develop mobile apps for Indigenous youth, but there must be considerations such as cost, knowledge, cultural appropriateness, training, uptake and peer reviewed evaluation regarding efficacy. These factors may well have impacted the paucity of digital mobile technology for this target group.

Of the four mobile mental health applications aimed at Aboriginal populations, their efficacy in improving mental health was evaluated in only two, and neither of them included details of comparative results between different Indigenous populations (Dingwall et al., 2015; Tighe et al., 2017). This indicates a gap in the literature regarding the utility of these applications for improving mental health in these populations.

Despite both studies contributing to Indigenous centred mental health apps, significant omissions remain to adequately claim clinical mastery for such a specialist platform. Dingwall et al. (2015) investigated the values of Indigenous service providers regarding components of the AIMhi apps but did not recruit Indigenous consumers. Tighe et al. (2017) included Indigenous participants but did not explore their evaluative opinions regarding the suitability of the content. Indigenous participants and opinions are therefore areas of interest.

In order to evaluate whether mental health apps, specifically designed for Indigenous youth are efficacious, it would be helpful to explore what aspects are appealing and appropriate, in the hope that this would increase uptake and access of this method of delivery to Indigenous youth wherever they are.

Therefore, this research has two aims:

1. To explore what Indigenous youth consider important for improving mental health.
2. To evaluate the relevance of current mental health applications for Indigenous populations. Specifically, the importance of: (1) Content, (2) Themes, (3) Design, (4) Collaborators, and (5) Interface mechanisms (eg, languages available, audio descriptions, user interface, etc), as reported by service providers and youth samples in a regional area will be evaluated.

For aim 2, we further wanted to assess any differences in perceived importance between genders, and between youth and service providers, and overall awareness of Indigenous mental health applications.

Methods

Study design

This pilot study used a mixed methods methodology that investigated the variables with both quantitative and qualitative analyses.

Participants consisted of youth and service providers. For youth, these were a non-clinical convenience sample, of 15 youths (6 males and 9 females) with a mean (SD) age of 16.93 (2.37) years old, who identified as Indigenous Australians (14 Aboriginal and 1 both Aboriginal and Torres Strait Islander). This youth sample was recruited through their participation in existing community-based wellbeing and cultural youth programs at Central Queensland Indigenous Development (CQID), Rockhampton, Queensland for young Indigenous populations. For service providers, 30 individuals employed at CQID and Central Queensland University Indigenous mentoring program (CQU) (6 males and 24 females) with a mean age (SD) of 34.59 (12.26) years old, who also identified as Indigenous Australians (25 Aboriginal and 5 both Aboriginal and Torres Strait Islander) agreed to participate. All rostered staff and service providers approached on the day of data collection agreed to participate in the study.

Participation in this study was voluntary and was approved by Central Queensland University's Human Research Ethics Committee

The exclusion criteria for youth included: (1) Aged below 15 years old, or above 24 years old, (United Nations Educational and Scientific Organisation (UNESCO) guidelines for the youth age group and for giving one's own consent (UNESCO, 2017); (2) Did not identify as Aboriginal or Torres Strait Islander; (3) Did not speak/understand spoken English. Of the 53 initially recruited, eight of the youth were too young, leaving 45 participants subject to analysis. No potential participants refused.

Materials and measures

As this is a pilot study in an area previously un-researched, a survey investigating knowledge and relevance of Indigenous mental health phone applications was developed for this study.

To maintain the appropriateness of the material and respect for the cultural diversity of the language used, the survey was developed based on (1) a review of the literature around current online Indigenous mental health resources and (2) on four rounds of extensive Delphi style consultations with Indigenous psychologists, mental health workers, and other service providers at CQID (3) approval from the local Indigenous elder regarding the cultural appropriateness of the materials and data collection.

The final survey comprised of 26 items, including four demographic, and 22 content related items. Content related items were divided into (1) Four 'yes/no' response questions (e.g. 'Is it important to Indigenous youth if well-being applications can be used without internet access'), (2) Nine questions related to what they expected to be important on a mental health app for Indigenous youth (e.g. 'How important is it that that they use Indigenous art in the design?') answered on a four-point Likert Scale where '1' indicates 'Not Important' and a '4' indicates 'Very Important', and (3) Three open-ended questions (e.g. 'Is there anything else that you would like to see in well-being applications that would make them a better fit for you'). Participants were also asked to detail their typical online activities (e.g. social media, texting).

Procedure

Participants were invited by CQID to a social event in the grounds of their usual community meeting place. Following an introduction of the project and the researchers, surveys were completed face-to-face in interviews with each youth accompanied by affiliated staff. These interviews were conducted in a separate space from the social event and out of earshot from other participants. Responses were recorded immediately into individual surveys.

Data analysis

For Aim 1, strategies utilised by participants to improve their poor mental health were assessed by the open-ended question. "What do you do to help you feel better?". Open-ended responses on what factors Indigenous people most commonly attribute to improving their mental health were subjected to thematic

analyses (Braun, Clarke and Terry, 2014) with all identified themes subsequently agreed on by both authors.

For Aim 2, the importance of eight content categories presented in existing Indigenous youth mental health applications were summed (Indigenous art, Indigenous language, traditional storytelling, nature in the design, themes of strength/courage, themes of community, involvement of Indigenous people in the design, and reference to Indigenous role models - sports star or elder). Responses were on four-point Likert scales ranging from Not Important, Slightly Important, Important, to Very Important. A further four questions measured agreement with application interface components including the option to: (1) Have the words read aloud, (2) Have password protection, (3) Be accessible without Internet access, and (4) Use videos and music to communicate. These four questions required Yes/No responses. These responses were analysed in ratio perspectives to establish majority/minority opinion.

Differences in perceived importance of content categories between genders and service provider vs youth were examined with between groups analyses, with significance set at 0.05. As the sample sizes were unequal with some cases where homogeneity was violated, the Robust test of equality of means – the Welch test was used (Tomarken and Serlin, 1986). Lastly, data related to awareness of Indigenous mental health applications were also collected and presented in a frequency table.

Results

To address Aim 1, we asked participants the open-ended question “What do you do to help you feel better?” Table 2 shows the list of responses and their frequencies for both service providers and youth participants.

Table 2. Participant responses to how Indigenous service providers and youth help themselves to feel better

Participant status	Response	Percent (Frequency)	Cumulative Percent
Service providers			
	Spend time with family	25 (12)	25
	Exercise	18.75 (9)	43.75
	Eat food	6.25 (3)	50
	Nature	6.25 (3)	56.25
	Spend time with friends	6.25 (3)	62.5
	Talk to someone	4.16 (2)	66.66
	Sleep	4.16 (2)	70.82
	Gardening	4.16 (2)	74.98
	Drive	4.16 (2)	79.14
	Alone time	2.08 (1)	81.22
	Music	2.08 (1)	83.3
	Religion	2.08 (1)	85.38
	Write	2.08 (1)	87.46
	Meditation	2.08 (1)	89.54
	Art	2.08 (1)	91.62
	Read	2.08 (1)	93.7
	Shopping	2.08 (1)	95.78
	Pets	2.08 (1)	97.86
	TV/Movies	2.08 (1)	99.94
	Total (Frequency)	48	
Youth			
	Exercise	22.22 (4)	22.22
	Music	16.66 (3)	38.88

Spend time with family	11.11 (2)	49.99
Alone time	11.11 (2)	61.1
Spend time with friends	11.11 (2)	72.21
Art	11.11 (2)	83.32
Read	5.55 (1)	88.87
Talk to someone	5.55 (1)	94.42
Sleep	5.55 (1)	99.97
Total (Frequency)	18	

Table 2 illustrates that ‘spending time with family’ was the most popular response amongst service providers (25%) followed by ‘exercise’ (18.75%) which together accounted for 43.75% of total responses.

In comparison, youth participants prefer to exercise in order to improve their mental health/well-being (22.22%), followed by ‘Listening to music’ (16.66%) and ‘spending time with family’ (11.11%). These three factors accounted for 49.9% of total responses. By contrast only 5.55% of youth participants cited ‘talking to someone’ as helpful.

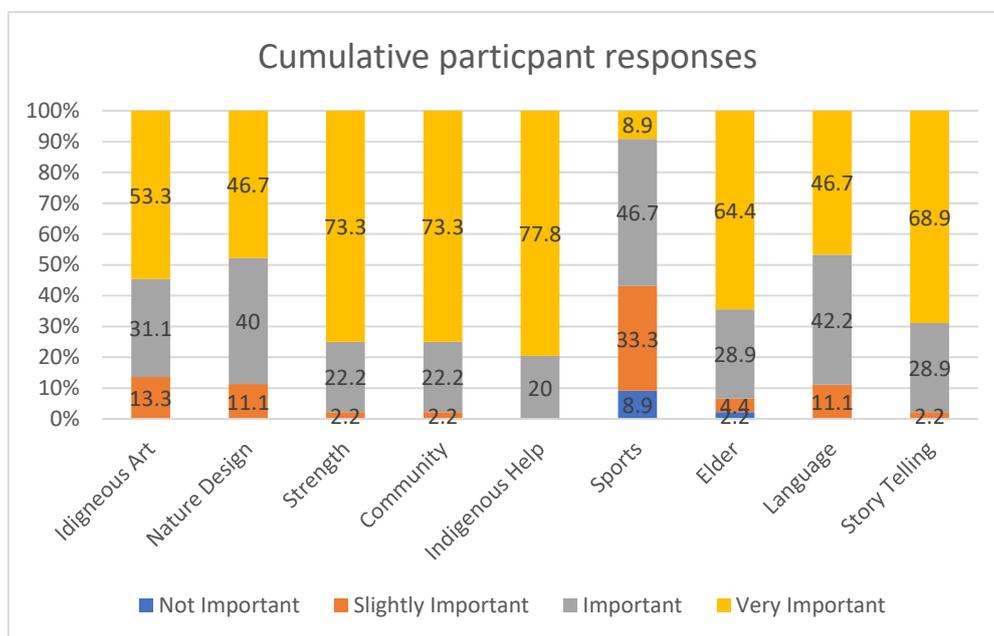
To address Aim 2, in order to evaluate the level of importance attributed to certain components presented in available Indigenous mental health applications, participants responded on a 4-point Likert scale where 1 = ‘Not Important’, to 4 = ‘Very Important’. Scores were summed and Table 3 presents the means and standard deviations for participant responses. The higher the mean score, the greater the importance attributed to that component.

Table 3. Participant mean response scores for perceived importance of application content/ components

	Indigenous Art	Nature Design	Strength	Community	Indigenous help	Sports	Elder	Language	Story telling
n	44	44	44	44	44	44	45	45	45
Mean	3.41	3.36	3.48	3.73	3.80	2.57	3.56	3.36	3.67
sd	.726	.685	.590	.499	.408	.789	.693	.679	.522

Table 3 indicates that, on average, all presented Indigenous mental health application components were rated between ‘Important’ and ‘Very Important’. One exception was having an Indigenous sports star involved, which received the lowest average response (between ‘Slightly Important’ and ‘Important’). This value also had the highest standard deviation, indicating the greatest variance of responses regarding its importance. These percentages are detailed below in Figure 1 which presents the response and cumulative percentages frequencies for each item.

Figure 1. Breakdown of the frequencies of participant responses for perceived importance of application values reported in Table 3.



Information was also collected regarding whether Indigenous people found particular interface components important to increase engagement with phone applications. (For example, the option for words to be read aloud to assist those with literacy deficits). Below are the percentages and frequencies of ‘yes/no’ responses for these items.

Table 4. Frequencies of participant responses for perceived importance of application interface components

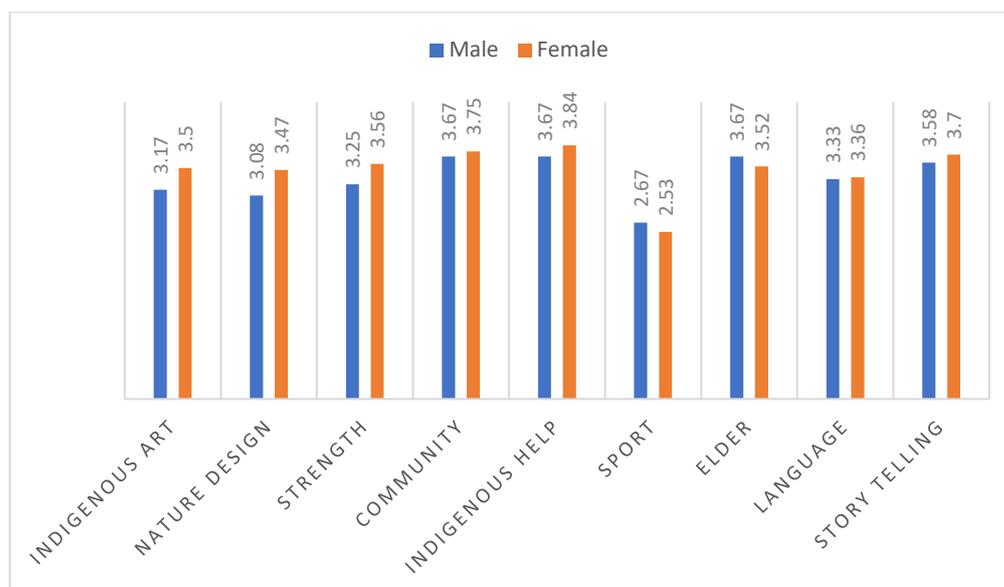
Item	Response	Frequency	Percent
Option for Reading Words aloud	Yes	39	86.7
	No	6	13.3
	Total	45	100.0
Being password protected	Yes	39	86.7
	No	5	11.1
	Response Total	44	97.8
	Missing	1	2.2
	Total	45	100.0
No Internet	Yes	44	97.8
	No	1	2.2
	Total	45	100.0
Including Video /Music	Yes	45	100.0

Table 4 illustrates a unanimous overall agreement to the importance of these interface factors, ranging from 86.7% agreement for having the option for ‘words read aloud to you’ and ‘having password protection’ to 100% for the use of videos and music to facilitate different ways of communication.

Despite similar mean values and mostly non-violated homogeneity of variance (all Levene statistics all $p > 0.05$ except Indigenous help $p = 0.02$), to explore whether gender dictates differences in values presented in Indigenous mental health applications, we utilised a Welch test due to the unequal sample

size (Braun, Clarke and Terry, 2014). According to this test, there were no significant differences between genders for any (See Figure 2).

Figure 2. Mean gender differences in responses for perceived importance of application components



Results showed similar responses for both genders with no significant differences (all $<p = 0.05$) between genders in preferences for certain components. However, a trend emerged for the question about the use nature or country in the design $F(1, 42) = 2.883, p = 0.097$, with the female group showing slightly more interest in this variable. The most common answer across genders was in response to the item ‘That it incorporates some Indigenous language’ $F(1,43) = 0.17, p = 0.897$, with the highest average response (between ‘Important’ and ‘Very Important’). The total value difference was not statistically significant $F(1,43) = 1.245, p = 0.271$ indicating that both genders found this equally as important. Overall, females scored most components higher than males, but these did not reach significance.

To explore differences between Indigenous service providers and Indigenous youth in values presented in Indigenous mental health applications a Robust Test of Equality of Means Welch test was undertaken given the difference in sample sizes and some violations of homogeneity (See Table 5).

Table 5. Results of Welch Tests for differences in responses between service providers and youth for perceived importance of application values

Application Value	Service provider (N=30): Mean (SD) Range	Youth (N=15): Mean (SD) Range	Significance
Indigenous Art	3.5 (.731) 2-4	3.21 (.699) 2-4	0.224
Nature Design	3.575 (.626) 2-4	2.93 (.616) 2-4	0.004*
Strength	3.63 (.490) 3-4	3.14 (.663) 2-4	0.023*
Community	3.87 (.346) 3-4	3.43 (.646) 2-4	0.029*
Indigenous Help	3.87 (.346) 3-4	3.64 (.497) 3-4	0.145
Sports	2.55 (.736) 1-4	2.60 (.910) 1-4	0.861
Elder	3.67 (.758) 1-4	3.33 (.488) 3-4	0.083
Language	3.4 (.724) 2-4	3.27 (.594) 2-4	0.515
Story Telling	3.73 (.521) 2-4	3.53 (.516) 3-4	0.232
Total	31.93 (3.17) 23-36	29 (2.6) 25-32	0.005*

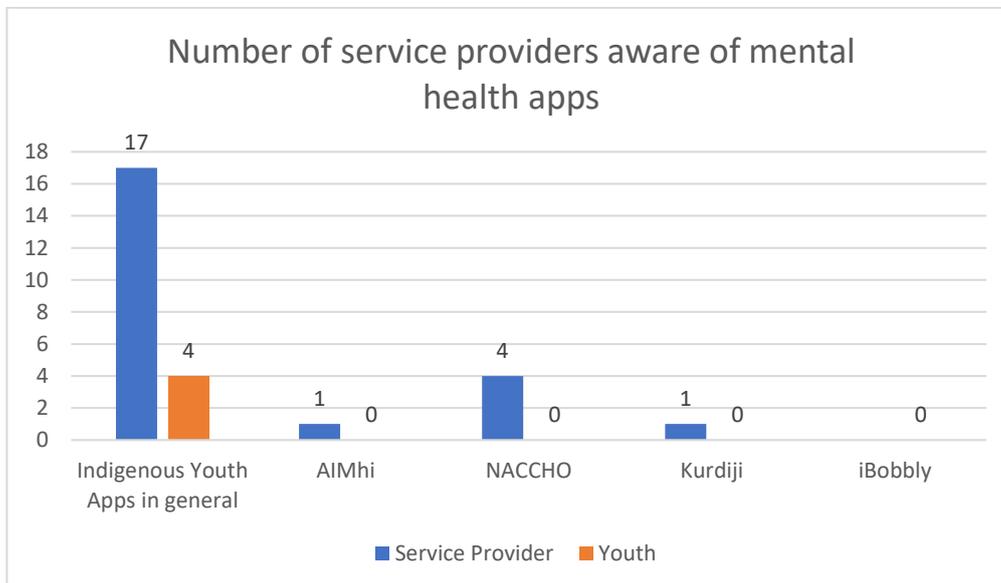
Note. SD = Standard Deviation * = statistical significance at $p < 0.05$

There was a significant difference shown in the perceived importance of the components with youth reporting, on average, lower scores compared to service

providers except in relation to inclusion of sports stars. Specifically, youth reported less importance for ‘nature design’ $F(1,25.87) = 10.14, p = 0.004$. ‘strength and courage’ $F(1,19.89) = 6.10, p = 0.02$; ‘community, and a sense of belonging’ $F(1,16.57) = 5.67, p = 0.02$; with a trend emerging for ‘Elder’ $F(1,40.03) = 3.17, p = 0.08$ compared to service providers.

Lastly, information was collected to evaluate how aware service providers and youth were of current Indigenous mental health applications. Figure 3 below presents those participants who answered yes.

Figure 3. Differences in responses between service providers and youth for awareness of existing Indigenous mental health applications



Overall, the data show a higher awareness of Indigenous mental health applications in service providers, both for each app (see Figure 3) with 76% ($n=23$) of service providers reporting knowledge of mental health apps compared to 27% ($n=4$). Importantly, no youth reported that they had any specific knowledge of any current application.

Discussion

This was the first paper to evaluate opinions of mobile applications targeted at Indigenous youth and assess the relevance of their strategies for improving mental health amongst the target population. Pilot data presented here provide information in better understanding Indigenous youth engagement in digital

mental health information and may be particularly helpful in developing future apps for use in Indigenous populations.

Indigenous views on improving their mental health

The first question investigated what factors Indigenous people most commonly improve their mental health. ‘Spend[ing] time with family’ was seen to be the most common response overall. This finding is consistent with Ypinazar et al. (2007) who also reported similar considerations when they performed a meta-analysis on Indigenous understandings of mental health and found that ‘family and community kinships’ was a reoccurring theme. Similarly, in a recent review, Rice et al. (2016) also comment that strong cultural identity, community, and family connections, were linked to improved wellbeing outcomes. Further these authors, suggested digital technologies can have a powerful role in promoting Indigenous wellbeing by inclusion of these components. However, in the current study, when the data are split between Indigenous youth and service providers, differences emerged. Service providers ranked ‘Spend time with family’ first with 25% of the responses, while youth only gave that response just over 11% of the time; which they also did with ‘Alone time’, ‘Spend time with friends’, and ‘Art’. Youth samples also reported ‘Exercise’ and ‘Music’ as more important than ‘Spend time with family’ with just over 22% and almost 17% of responses, respectively. Youth participants also reported less desire to engage in activities involving others (27%) compared to service providers (35%). The results also show that Indigenous youth are just as likely to turn to their friends in order to ‘feel better’ as they would turn to their family, whereas service providers are four times more likely to go to their family over their friends, indicating a possible generational shift in Indigenous perspectives of a collectivist ‘community’.

Both groups, however, responded that ‘talk[ing] to someone’ was a low priority (approximately 5%) which may indicate that resources to improve mental health that do not require verbal interaction may be welcome and beneficial. This concurs with Burns et al.’s (2010) study on young non-Indigenous Australians use of the internet, that found 38.8% of their sample used the internet to seek information about a mental health problem outside of their friendship group. Whilst reasons for this may include acceptance, connectivity and awareness of mental health treatments, two studies have suggested this may be potentially related to a cultural concern of “shame” in Indigenous communities. Stronach et al. (2019) link “shame” to focussing negative attention on oneself. This concept may prevent youth from talking

directly about their concerns thus bringing attention to themselves (Stronach, Maxwell and Pearce, 2019). A study exploring this further would be of great value.

Perceived importance of presented application values

Moving from their own mental health, the next section of the survey was asking Indigenous people whether they agree with the importance of components presented in available Indigenous mental health applications for youth. For this section of the survey, this meant that while youth participants were answering for themselves, service providers were answering based on what they thought was important for youth. So, while previous studies have explored the values of service providers in relation to Indigenous mental health applications (Dingwall et al., 2015), this study aimed to also include the values of Indigenous youth and compare them. The results showed that participants overall responded that all values were either 'Important' or 'Very Important'. Most commonly reported across both service providers and youth was the importance of cultural awareness and sensitivity contained in the app. This study showed that components specific to Indigenous culture (Purdie, Dudgeon and Walker, 2014) such as nature, storytelling, indigenous art, kinships and community were important. Brown et al. (2020) similarly reported that Indigenous youth like to use social media to enhance aspects of cultural compatibility, community and family connections but also found identity, power and control, and to connect with whom they choose on their own terms to be important.

However, despite overall similarity between service providers and youth in this study there were some significant differences in their preferences. Specifically, service providers perceived themes of strength and community, and using nature in the design, as more important than Indigenous youth.

There may be several reasons for this. Firstly, service providers were older and perhaps more connected to traditional culture than youth (Purdie, Dudgeon and Walker, 2014). Secondly, service providers are working in a role that is focused on Indigenous youth mental health and therefore are more sensitive to the values that they expect to improve their wellbeing. While this may not illustrate that they are more aware of what specific values are important for Indigenous youth mental health, it would explain their higher perceived importance of items in general. As seen in Dingwall et al.'s study (2015), service providers were recruited as reliable assessors of the AIMhi application and whether it was appropriate for its target consumers. However, while service providers in Indigenous organisations have been used in the past, and are

important facilitators, it is necessary to ask the youth themselves as identified in this study.

Another potential reason may be different trends in phone usage between service providers and youth. Most notable are the differences in usage of social media and forms of direct communication (texting, phone calls, and emails). While 37% of service providers reported mostly using their phones for social media, and 43% for direct communication, Indigenous youth reported the opposite, with 23% mostly using their phones for direct communication, and 50% mostly using them for social media. That is, Indigenous youth seemingly preferred a more indirect manner of communication in social media where communication is to a wider audience, as opposed to service providers directly contacting individual others through texting and phone calls. This appears to relate to our previously discussed findings where this cohort of Indigenous youth prefer online solo activities compared to those involving others (Brusse et al., 2014). This may highlight significant and inherent differences in how the two samples interact with their phones, and therefore how they would relate to mental health applications.

The least important component of health apps, appeared to be the utilisation of an Indigenous sports star (as seen in the NACCHO application (Deadly Vibe, 2013)), which was rated least important by both groups and also had the highest standard deviation, suggesting a broader range of opinion. Even though participants rated 'Exercise' as the second most common factor for improving their mental health in the first question, indicating perhaps that sports and physical activity may be an important aspect to improving mental health, results for the second question suggest role models do not necessarily need to be sports stars. This concurs with reports (Dockery and Gorman, 2017) as seen in the Kurdiji where there was a user preference for role models from more traditional sources, such as Indigenous elders. In the current study, 64% rated 'Indigenous elders' as 'Very Important', compared to just under nine percent who rated Indigenous Sports stars as 'Very Important'. This may be due the distinction of a role model seen as relevant for a particular avenue of life (such as sports), or a person, such as an elder, who is seen as a more general guiding influence for a person's holistic wellness and perhaps a cultural role model (Purdie, Dudgeon and Walker, 2014). Stronach et al. (2019) suggest that sports role models can positively empower Indigenous youth, but also caution that the concept of shame may hinder participation. These authors reported conversations with young Indigenous women athletes who reported the shame associated with poor performance during sports. Whether this may be a view held by the

overrepresented female participants in this study is unclear. Nonetheless, while there are increasing reports of Australian footballers discussing their mental illnesses (Dockery and Gorman, 2017), further investigation could assist in understanding whether sport or sports stars in general, are seen as potentially important representatives of e-mental health campaigns.

Aside from the values discussed above, the survey also assessed the perceived importance of particular interface components of current Indigenous mental health applications, such as having the option for the application to read text aloud to help with possible literacy issues in its users for ease of usage. Participants stated that every interface component in the survey was important including security and alternative methods of delivery (eg, music, videos and reading words aloud). These findings are similar to those reported by Brown et al. (2020) whose participants suggested that apps should be easy to read and navigate, and interactive with notifications and potentially a touch screen. Together our data suggest that the interface mechanisms used in currently available Indigenous mental health applications are generally acceptable and appropriate for use by Indigenous youth and should be considered in future applications.

Gender differences in participants

This study showed no statistically significant differences between genders across all items and values reported, despite a trend towards females indicating greater perceived importance of presented components overall, aside from sports star role models and Indigenous elder role models. While the current study sample has a higher ratio of females to males (33 to 12 respectively), which could have skewed these results, there could be another possible and important reason for this trend. Males have more externalised and rebellious behaviour as responses to issues with mental health (Purdie, Dudgeon and Walker, 2014), which has led to the existence of foundations with aims of reintegrating Indigenous males with their schools (Clontarf Foundation, 2012). Males in general do not engage in mental health interventions as well as females (Haavik et al., 2017). Perhaps Indigenous males are less likely to perceive importance in existing mental health applications in general due to a reticence to focus on internal mental health states encompassed in mental health applications. Certainly, this has been the case in previous work (Haavik et al., 2017). In that study by Haavik et al., compared to males, females were better informed and aware of problems such as anxiety and trauma, knew more about mental health services and were more optimistic about barriers to service provisions such as cost.

However, despite a lack of statistical significance it is worth considering studies with equal male and female representation in future as there is value in considering possible gender differences in values, Indigenous cultural considerations and gender within Indigenous cultural practices, (often identified as ‘Men’s business’ and ‘Women’s business’) (Purdie, Dudgeon and Walker, 2014), which indicates that there may be an embedded differences of opinion in regard to mental health in Indigenous populations.

Awareness of Indigenous mental health applications and relevance for clinical management of mental health

An important finding of this study was how little service providers and indigenous youth knew about Indigenous mental health applications, with only 57% of service providers and 27% of Indigenous youth had heard of applications for Indigenous mental health. Only three percent of service providers were specifically aware of Kurdiji or AIMhi and no participants were aware of iBobbly. Importantly this cohort of Indigenous youth were unaware of any application available to them.

So while available Indigenous mental health applications may have been constructed with values in line with the target population, there is more that can be done regarding promotion of awareness of the products. Further collaboration between the developers of mental health applications and other Indigenous organisations, and/or addressing potential issues of disengagement from these services, such as remaining stigma towards ‘mental health’ (Purdie, Dudgeon and Walker, 2014), may increase uptake of mental health applications.

One question that has arisen from this study is whether or not mobile and digital technology is helpful for improving mental health for Indigenous youth. It is difficult to answer this question given that in this sample of Indigenous youth knew little about available mental health apps. Is this a lack of interest in digital apps or mental health treatment (or both), poor engagement of the mental health establishment with digital technology to promote mental health awareness or insufficient marketing and evaluation of these apps?

Statistics regarding mobile phone usage by Indigenous youth would suggest that a lack of interest in digital technology may not be the cause. Orłowski et al. (2016) have reported the reticence of mental health clinicians to fully embrace digital technology citing that apps could detract from engagement and crisis management, despite enhanced capacity to more closely track users’ progress and level of risk. Finally, there is a paucity of peer-reviewed publications in this

area, particularly regarding evaluation, with little publicly available information of any of these apps which would potentially inhibit marketing (Rice et al., 2016).

It is important however not to disregard the potential for mobile technology for promoting health issues in Indigenous youth. Mobile phones in both Indigenous and non-Indigenous youth, have exploded in the last 10 years and are by far the most used technology among all adolescents (Rice et al., 2016), greater than other forms of Internet access or entertainment technology. Rice et al. suggest that mobile devices can reduce logistical barriers and bring connectivity to individuals in remote or underserved communities. In addition, the Indigenous population distribution is much younger than the general Australian population generally, (median age of 20 years vs with 35 years) (Brusse et al., 2014) and it is probable, like their non-Indigenous peers, that they embrace digital technology. Furthermore, Indigenous Australians are more likely than other Australians to live in small, remote communities, with relatively few services, facilities, and opportunities (Australian Institute of Health and Welfare, 2009). Use of digital technology offers potential opportunities for them to connect with those they wish to on their own terms.

Potential limitations of the research are related to the selective study sample and the uneven size of the groups which reflect the pilot nature of the project. Lastly, the sample did not represent individuals with significant mental health issues. Unlike Tighe et al. (2017), who recruited their sample according to a cut-off level of psychological distress screened by questionnaires, this study recruited healthy individuals who had engaged with community-based programs but who were not actively seeking mental health intervention. While there is value in the opinion of non-clinical samples regarding mental health assistance and products, this presents a gap in the literature. The values of target consumers with mental health issues could also provide important information when evaluating these products. Future studies should include larger more gender diverse cohorts, both evaluating and using mental health applications to assessed appropriateness and efficacy.

Despite these limitations, this study provides novel information that can assist in the further development of Indigenous mental health applications for youth. Mental health applications represent both an opportunity and increasingly a requirement for mental health treatment for Youth in Australia and it only Indigenous youth. The study was also developed in conjunction with frontline staff, including Indigenous psychologists and other mental health

professionals, with Indigenous collaborative input ensuring cultural appropriateness. Importantly, the study provides data from both service providers and Indigenous youth and shows significant gaps between the values of the direct consumer target and those who may be their first point of contact for issues to do with their mental health.

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