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A mixed-methods evaluation of college student and provider perspectives on a smartphone application for help seeking after violence

Jocelyn C. Anderson, PhD, RN[1,2,3], **Erin Pollitt, MHA, BSN, RN**[2,4], **Joseph Crowley, MSN, RN**[5], **Debra Holbrook, MSN, RN**[2], **Jessica E. Draughon Moret, PhD, RN**[2,6]

[1]Pennsylvania State University, State College, PA

[2]Mercy Medical Center, Baltimore, MD

[3]Johns Hopkins University School of Nursing

[4]District of Columbia Forensic Nurse Examiners, Washington, DC

[5]Johns Hopkins Hospital, Baltimore, MD

[6]The Betty Irene Moore School of Nursing at the University of California Davis, Sacramento, CA

Abstract

Objective: To elicit feedback on the acceptability, usability, and dissemination options for the bMOREsafe smartphone application (app).

Participants: Forty-nine students and six service-providers provided feedback on the bMOREsafe app between April 2015 and March 2016.

Methods: Students responded to an anonymous online survey and providers participated in semi-structured interviews. Descriptive and thematic analyses were completed.

Results: Students rated the app as useful, however less applicable to themselves and their peers. Students stated they would be most receptive to recommendations about the app from peers and social media. Qualitative data from service providers fell into three main categories: *trauma-informed aspects*; *inclusivity vs. specificity*; and within an app, *language matters*.

Conclusions: Smartphone technology can provide confidential information and resources to help students make decisions related to sexual assault or intimate partner violence care. While students and providers identified apps as a useful strategy for sharing this information, dissemination challenges remain.

Keywords

sexual violence; help seeking; smartphone applications; mixed-methods

Corresponding Author: Jocelyn C. Anderson, jua711@psu.edu.

Introduction

Sexual violence is pervasive on college campuses, with one in five women and one in fourteen men reporting an experience of sexual violence during their academic career.[1–4] These rates have been largely unchanged over the past decade.[3,5] Sexual violence among college students is especially concerning as research also indicates that a minority of affected students engage in formal help seeking. Less than half tell any adult or authority (e.g. parent, teacher, etc.), and less than 10% report through official school procedures or to external police authorities.[1,2,6] Rates of reporting among college students are far lower than the national average of reporting to the criminal justice system (35%),[7] and indicate a barrier to accessing needed healthcare following an assault.

Technology has emerged as a way to communicate important health information and promote healthier behaviors.[8–10] An influx of technology-delivered interventions has resulted in numerous computer, text message, and smartphone-based tools aimed at meeting safety needs of people who have experienced intimate partner or sexual violence. One recent tool, a mobile application (app), designed to assist in safety planning and decision making among college-aged women experiencing dating violence is being evaluated in a randomized controlled trial.[11–13] Additional tools such as the *Circle of 6* app and the *DCUASK* app are freely available in both the Apple and Google app stores, and promote themselves as providing a safety net for sexual assault prevention (*Circle of 6)*, and easy, no-hassle access to resources for people who have experienced sexual violence (*DCUASK)* respectively.

In 2012, the bMORESafe smartphone app was developed by Mercy Medical Center's Forensic Nurse Examiner Program to assist students and other community members in the help seeking process following an incident of sexual assault or intimate partner violence in Baltimore, MD.[14] Mercy Medical Center's Forensic Nurse Examiner Program, located in downtown Baltimore, has been providing medical and forensic nursing care to patients who report sexual assault for over 25 years and more recently expanded its services to include patients who have experienced intimate partner violence. The idea for a mobile app originated from watching students at health fairs who visited the Forensic Nurse Examiner booth but did not take brochures. Discussions with these students revealed that they wanted materials that could be "pulled up" on cell phones and computers. Additionally, as healthcare providers working with patients in violent and dangerous home situations the team understood that sending printed materials home with patients who were experiencing dating violence could put them at additional risk of harm if the abuser should find the materials.[15] Following the development and launch of the app, this study sought to evaluate the content, appropriateness, understandability and usability of the bMORESafe smartphone app for college students and to develop a targeted plan for disseminating the bMORESafe app among college students in the Baltimore area.

Methods

Study Design and Sample

Two distinct samples were utilized for this concurrent mixed-methods study. The first sample group was college students, recruited via in-person and online methods.

Informational materials about the study were shared at community outreach events and via social media. Students were eligible to participate if they were at least 18 years old and were currently enrolled in a post-secondary educational institution. The second sample group was made up of service providers (health care, advocacy, teaching staff, etc.) who interact with high school and/or college students who have experienced sexual assault or dating violence. Eligibility criteria for the second sample group included being at least 18 years old and working in a capacity that included interaction with high school and/or college students who had experienced dating violence and/or sexual assault.

Procedures

Data collection was conducted simultaneously for both aims between April 2015 and March 2016. Recruitment materials for the student survey were located on a secure website and contained information regarding study participation as well as informed consent. Students were recruited via social media (Facebook, Twitter) posts with links to the study flyer and survey and through flyers available to students during campus outreach events (e.g. health fairs, in class presentations by forensic nursing staff). Students who completed the electronic consent process were then able to complete the study measures online via the anonymous study website. Study specific survey measures of app usability and acceptability were developed based on the 31 usability items presented by Reynoldson and colleagues.[16] The measures were initially modified by two authors (JCA & EP) and reviewed by an additional researcher to assist in decreasing the length of the questionnaire. The final usability and acceptability measure included 16 items (see Table 2) that participants were asked to respond to on a 5-point Likert scale (Cronbach alpha for this study 0.94). No additional pilot testing of the measure was completed. For their participation, students were entered into a drawing for a $100 Amazon.com gift card; contact information for this drawing was collected in a separate survey that was not linked to study responses.

Interview participants were identified via contacts known to the investigators and forensic nursing program staff. Potential stakeholder interviewees were contacted via email. Individuals who expressed interest were re-contacted and provided an opportunity to review the written consent documents before choosing to participate. After consent was obtained, semi-structured interviews were conducted via phone or in person and were audio-recorded. Recordings were professionally transcribed for analysis. All procedures were approved by the Johns Hopkins Medical Institution and Mercy Medical Center Institutional Review Boards.

Data Analysis

Survey data were analyzed using SPSS Statistical Software Version 24.[17] Descriptive and exploratory statistics were used for survey variables. Qualitative analysis was conducted using the analysis software Dedoose.[18] Qualitative thematic analysis began with three of the authors (JCA, JDM, & EP) reading all transcripts to garner an overarching understanding of the “big picture.”[19–20] The same three authors next individually open coded each interview, and met to determine concordance of open-coding. When there was disagreement, the authors discussed until a consensus could be reached (i.e. all three authors agreed upon final assigned codes). Memos were used to form an audit trail for decisions regarding code

consensus.[21] After all transcripts were coded, two authors (JCA & EP) met to develop the thematic results from the resulting coded data which were then reviewed and agreed upon by a third author (JDM).[22]

Results

Forty-nine student participants completed the survey measures. The majority of student participants were female (*n*=41, 84%), White/Caucasian (*n*=34, 69%) and non-Hispanic (*n*=41, 84%). Six service providers participated in one-on-one interviews; they were all female and primarily white (83%). Additional demographic characteristics of both sample groups can be found in Table 1.

Student Survey Results

Students largely rated the app as useful and applicable (Table 2). Mean scores for all 16 items were greater than 3/5 with 14/16 receiving a mean greater than 4. The two items which students rated the lowest were "I would recommend the bMORESafe app to my family, friends, and/or peers" (mean rating 3.85) and the usefulness of the "What if I Have Been Forced to Have Sex?" section of the app (mean rating 3.98, see Figure 1 for examples of content in this section). Regarding dissemination options, students reported they would be most likely to download the app if they heard about it from peers (*n*=32, 65%) or social media (*n*=19, 39%), and least likely to download the app if they heard about it from traditional marketing sources such as print media (*n*=2, 4%), TV advertising (*n*=3, 6%), or the program website (*n*=3, 6%; see Figure 2). Referrals from trusted adults (e.g. parent/teacher/counselor or bMORESafe staff) fell between peers and traditional marketing.

Service Provider Interview Findings

Provider interview findings regarding usability fell into three main areas: 1) *trauma-informed aspects* of the app; 2) *inclusivity vs. specificity* of the app; and 3) that within an app, *language matters*.

Trauma-informed aspects—Providers appreciated the straightforward design of the app, that presented users with options in a way that was both manageable and unintimidating. One provider stated

> "I see it as being very user-friendly in terms of being able to ask very clear, straightforward, simple language to guide their pathway towards resources."

While another said,

> "I feel like it's pretty logical and doesn't overwhelm you. It kinda takes you step-by-step in a decision process and gives you just the options you need to think about at each time."

In addition to the straightforward design and process, providers also appreciated that the app provided a level of privacy or confidentiality to students as they sought help. As one provider noted,

> "It's nice for people to be able to get information in a private manner. They can scroll through and read it at their own pace and can go from tab to tab in privacy. I think both before or after violence has occurred would be good."

Despite these accolades, providers still voiced concerns regarding the dual purpose of the app for sexual *and* intimate partner violence. While there was nearly universal support for sharing the app and encouraging students to download it to their phones "just in case" or "too help a friend someday," regarding the sexual assault resources, there was concern for students who may be experiencing dating violence in which a partner may use controlling a phone as a form of abuse. One provider noted:

> "I wouldn't recommend it to anyone who is currently in a dangerous situation that can't get out of it. Where safety planning is your number one biggest concern, while the app may have, has really great resources, I don't know if that's the person I'd recommend it for."

The same provider continued,

> "I think that there would be a huge benefit to this being part of Freshman orientation classes. Even if in two weeks they deleted the app off of their phone. I think even having these questions answered would be fairly interesting."

Inclusivity vs. specificity—The second primary theme from the provider interview data was the challenge between providing an app with context that is general enough to be acceptable to the entire target population and providing information specific to sub-groups of students and their needs. The location specific nature of the app's resources was one area that all providers noted. Some providers offered recommendations for ensuring that students understand that the app is a local resource,

> "If that information somehow could be presented, I don't know emphasized or highlighted, just very clear to link for clinical services because [hospital name] is the only one that does clinical services [in Baltimore],"

while others encouraged the addition of national level resources to broaden the potential usability.

When asked about the appropriateness of the app for the populations they served, providers generally approved of the app's simplicity and directness. However, they also offered opportunities to provide additional information to specific situations or populations. Providers requested tailored information specific to men, LGBTQ, military members, immigrant, and refugee populations. As one provider noted,

> "… I don't know how much information you can include to say, 'This resource is good for this population or what not.' I think that sort of stuff sends a message to people that, 'Oh, they thought about people like me using this service.' I think that could be good if you have the space to include a couple resources that work directly with those populations. There's hotlines that work directly with LGBTQ populations and with men and that sorta thing."

Requests for additional inclusivity features included: adding the definition of sexual assault, options for care seeking outside of the Baltimore area, and more varied resource information (e.g. mental health resources, non-English language support).

Language matters—All service providers discussed the importance of language, a theme that overlaps with the previously mentioned themes of inclusivity and trauma-informed design. Specific recommendations for inclusive and trauma-informed language that were identified as things done well in the bMOREsafe app included: not using male or female specific pronouns, avoiding labels such as victim or survivor that individuals might not identify with, and avoiding using language that places blame or ownership regarding the sexual assault on the patient (e.g. “your assault”). One provider in particular stressed the importance of readability and options for low literacy individuals as an important piece to improve the app’s acceptability and inclusivity.

> “That would just make it more accessible. If you think about the Baltimore City population where a lot of the poorer school communities might have literacy issues. It would make sense for there to be an option to have it text to speech or text to voice translation.”

She continued,

> “Then some of these other words that I’m going to mention are not, they’re not horribly above high school level but… could be simplified in some way. Those words were forensic, advocate, register and preventative medicine. I just feel like some of those words might not make sense to a high schooler using the app. I also work with special needs kids with word processing disorders. That might just be my students. I don’t know, still a consideration.”

Choice of words also overlapped with the *Inclusivity vs. specificity* theme where it intersected with choice of what languages the app would be supported or translated into. One participant who worked with Spanish-speaking patients and evaluated the Spanish language version of the app noted:

> “I think this would be really beneficial to that population. Especially from what we’ve seen, from the victims of sexual assault is that—who are Spanish speaking, is that the rates where—in my area, the rate of reporting is almost zero because they don’t—when it comes to domestic violence, it seems that it’s a lot clearer for some reason of oh, okay, my partner hit me. The idea in the Hispanic idea of forced sex is almost non-existent…I think that this portion is so helpful, because one, it kind of validates that forced sex exists, and it’s in a language that you speak. You’re like wow, okay, even if I’m in a relationship with this person and I was forced to have sex, it’s real. Forced sex is a real thing. I can get help. Yeah, I’m really glad that it’s so clear and concise. Especially for Spanish speakers.”

Dissemination—We also inquired directly about opportunities and ideas for app dissemination during interviews with service providers. Responses regarding dissemination of the app varied widely, and included mention of six of the seven categories included in the student survey (see Figure 2). Providers were more likely to recommend dissemination

strategies that relied on or incorporated teachers, counselors, or other adults in the dissemination process. Providers did note the importance of the relationships between those sharing information however, with one provider noting,

> "I would say if you could make one-on-one connections with the students like have a small group of ten girls and talk about issues in small groups. I think that would be super effective"

and another stating,

> "They're more likely to listen to their teacher who's telling them everything important throughout the school year and they trust. Having the information presented by people who are already trusted advisors or mentors to these students"

More universal implementation strategies such as inclusion in freshmen orientation or with annual mandatory Title IX education were also discussed. Here again the desire to make the app more targeted was noted, with some providers stating that universities may be more inclined to promote the app to their students if it included school specific information.

Comparison of Student and Provider Responses

Students and providers generally agreed that the bMORESafe app was useable by students who may be impacted by sexual violence (Table 3). However student and provider response data varied in important ways regarding acceptability and dissemination of the app. Students rated the item "I would recommend the bMORESafe app to my family, friends, and/or peers." lowest of all items in the survey. While providers generally stated a belief that all students should be exposed to the app's content and have access to it unless a direct dating violence concern made having the app on a phone more dangerous than not. Providers and students also differed in their thoughts on dissemination of the app. Students noted that they were most likely to download the app if they heard about it from peers (n=32, 65%) or social media (n=19, 39%), while providers tended to offer options that were adult led (n=10, 38%) or more traditional and passive in nature (posters/handouts, n=5, 19%).

Comment

One key area of concern in the results is the discordance between students' report of what sources would be most likely to influence them to download the app, with peers and social media being the two most highly rated items, and students mean response (3.85/5) to the "I would recommend this app to a my family, friends, and/or peers" being the lowest rated item in the acceptability and usability survey. This discordance demonstrates a challenge noted by others with similar apps. In a 2015 National Public Radio story, one sexual violence survivor says of after being introduced to the UASKDC app and acknowledging that it includes important information about getting medical help, filing a police report, or talking to a university Title IX representative, "I don't know who would download the app. You don't want to think that you're ever going to need it. So why would you put it on your phone?"[23] The difficulty both in raising awareness of sexual violence related services and in encouraging people to identify themselves as potentially at-risk for needing these services in order to take an action such as downloading an app or saving a hotline phone number

into their cell phone is not a new challenge, especially in adolescent and young adult settings such as campus health. Strategies such as promoting an app as a positive bystander intervention, in which the student could be prepared to help a friend who needed it is one strategy that has been used in other sexual and dating violence interventions.[24–26]

Mobile apps related to sexual assault or violence are unlikely to gain popularity organically.[27] Thus, in order to maximize downloads and increase usage, dissemination should be done in a strategic manner. Incorporating the mobile app into school orientation and promotion by resident advisors as well as other school influencers were options for dissemination that were suggested to maximize utilization, as students reported that they were unlikely to download the bMORESafe app unless someone had told them about it or recommended it. Programs with limited funding might consider such a targeted dissemination campaign in order to maximize awareness and utilization of help seeking mobile apps.

Our results also highlight the challenges of meeting a community's needs with a technological solution. Just as with any other solution, one-size-fits-all is unlikely to work in a diverse population. Students and providers offered insights into areas of the app where they would like additional features and information. Providers who worked with victims of sexual violence looked particularly favorably on the straightforward and uncluttered nature of the app. Given the bMORESafe app was designed and disseminated by a hospital-based forensic nursing program, a primary goal was to ensure that the app provide accurate help-seeking information to a broad target audience (e.g. the entire Baltimore population who may utilize services).[14] Individuals, clinics, or universities contemplating app development will want to ensure they weigh the costs of development against the benefit of having a specifically targeted product. Working with multiple agencies to coordinate an app may be more cost effective, but balancing the requests and preferences of each adds an element of complexity to development and maintaining fidelity to the app's purpose.

Limitations

The convenience sample was a limitation in this study, as minorities were under-represented; the students and service providers surveyed were predominantly White non-Hispanic females. The responses in the study do not necessarily reflect the mindset of someone who has experienced sexual assault or domestic violence, as study participants were not asked about previous history of trauma or violence. The sample had several additional notable limitations. As obtaining and verify parental consent to participate in research was not feasible for the online survey, we were unable to include high school students in our sample. While tracking a response rates was not feasible given recruitment was conducted using unpaid online postings, flyers, and word of mouth – given the number of college students in the Baltimore metro area, the number of participants is not ideal in order to obtain a representative sample. It is likely that our sample is over representative of individuals who have a strong interest in the topic of sexual violence on campuses and were willing to respond to this type of advertising.

Data for this study was also collected more than three years ago, which is several generations in smartphone technology. As such, the app has gone through multiple

technologic infrastructure updates in addition to content updates as a result of both the data collected and presented here and continued feedback from stakeholders. The current app is still freely available for download on Apple and Android platforms. Despite these limitations, this study is one of few studies to seek direct feedback from college students on a smartphone app designed to share violence-related content, and can provide insight into developing future iterations of the bMORESafe app as well as other mobile apps for sexual and dating violence.

Implications for College Health Providers

Clinicians must be cognizant of the target audience when promoting a mobile app to ensure that the app aligns with the population being served. Potential users may be deterred if they are unable to identify with an app. For example, one study participant noted that the male and female gender symbols could alienate potential users who do not identify as cisgender or who were not in heterosexual relationships. Target audiences are unlikely to download or use an app they do not identify with. Likewise, providers requested information tailored to the specific populations they served, including men, members of the LGBTQ community, military members, and non-English speaking persons. Mobile apps can be designed to relate specifically to the populations a provider or organization serves in order to promote inclusivity. Reviewing any resource for applicability to the target patient population is one key to successful implementation.

When designing interventions aimed towards students, attention to the students' developmental stage must be considered. The importance of friends in the college student's decision-making process has been emphasized by students when describing their help seeking process. The "it won't happen to me" mentality also appears to be coming through in our data based on students' reporting the app contains useful information, but not keeping it on their phones, or wanting to recommend it to peers.[28–30] Strategies such as those used in bystander intervention programs and other violence harm reduction interventions to encourage students to keep the resource on hand in the event that they, *or a friend,* ever needs it, may be useful in encouraging dissemination. One aspect of the bMORESafe app that was appealing to students and service providers alike was that it could be downloaded, forgotten about, and accessed again when needed.

Conclusion

Smartphones play a large role in the lives of many patient populations, especially college students. Likewise, smartphone apps have become increasingly popular as a means of sharing educational and health related information. Recent events have shifted attention to help-seeking in the event of sexual assault or domestic violence on campus. Smartphone technology is one way to provide confidential information and resources that may help a student to make decisions related to their care or seek help in the event of such an emergency. While students and providers identified apps as a useful strategy for sharing this information, limited app uptake remains an important barrier to dissemination.

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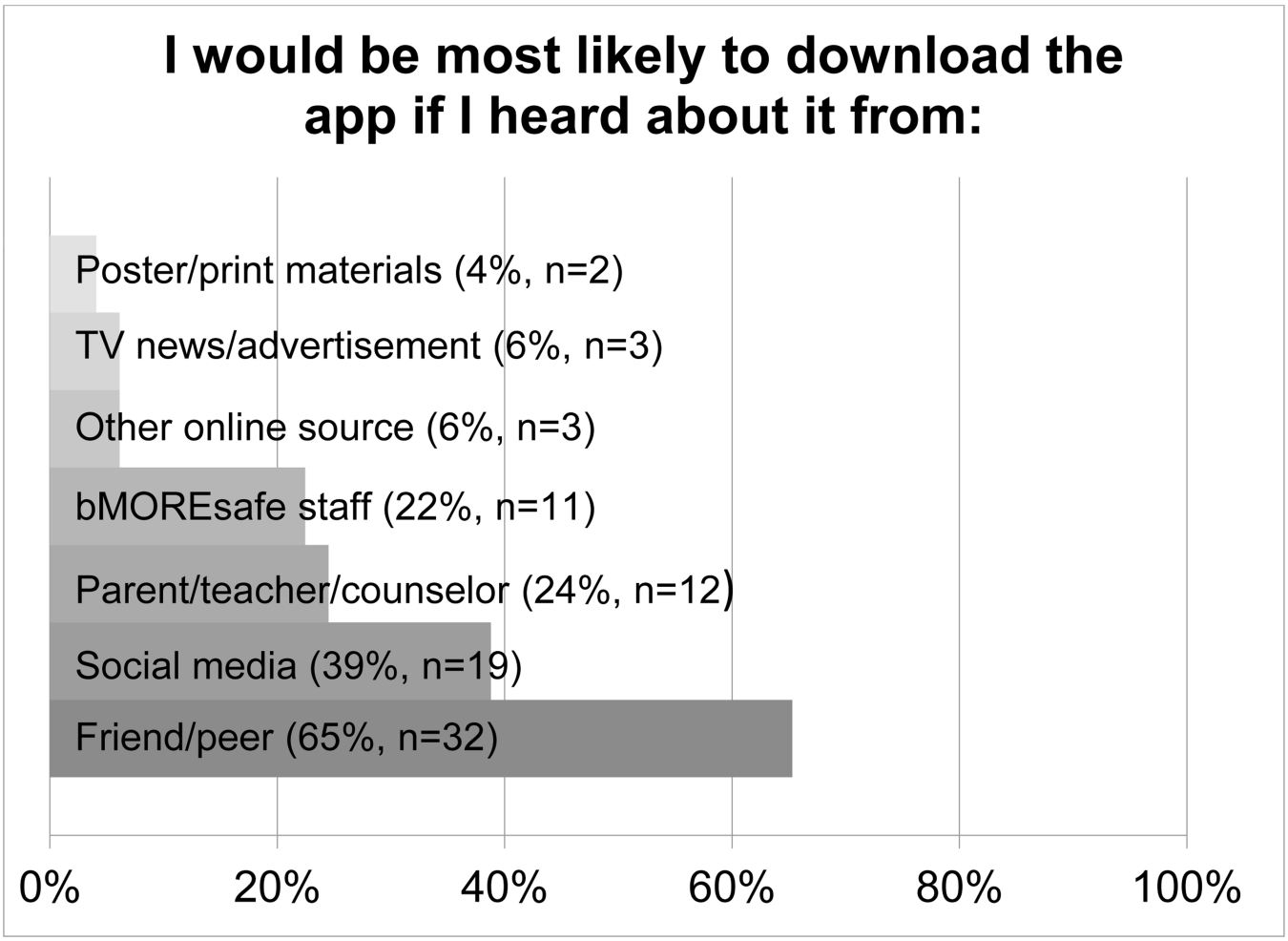

Figure 1:
Student reported dissemination results.

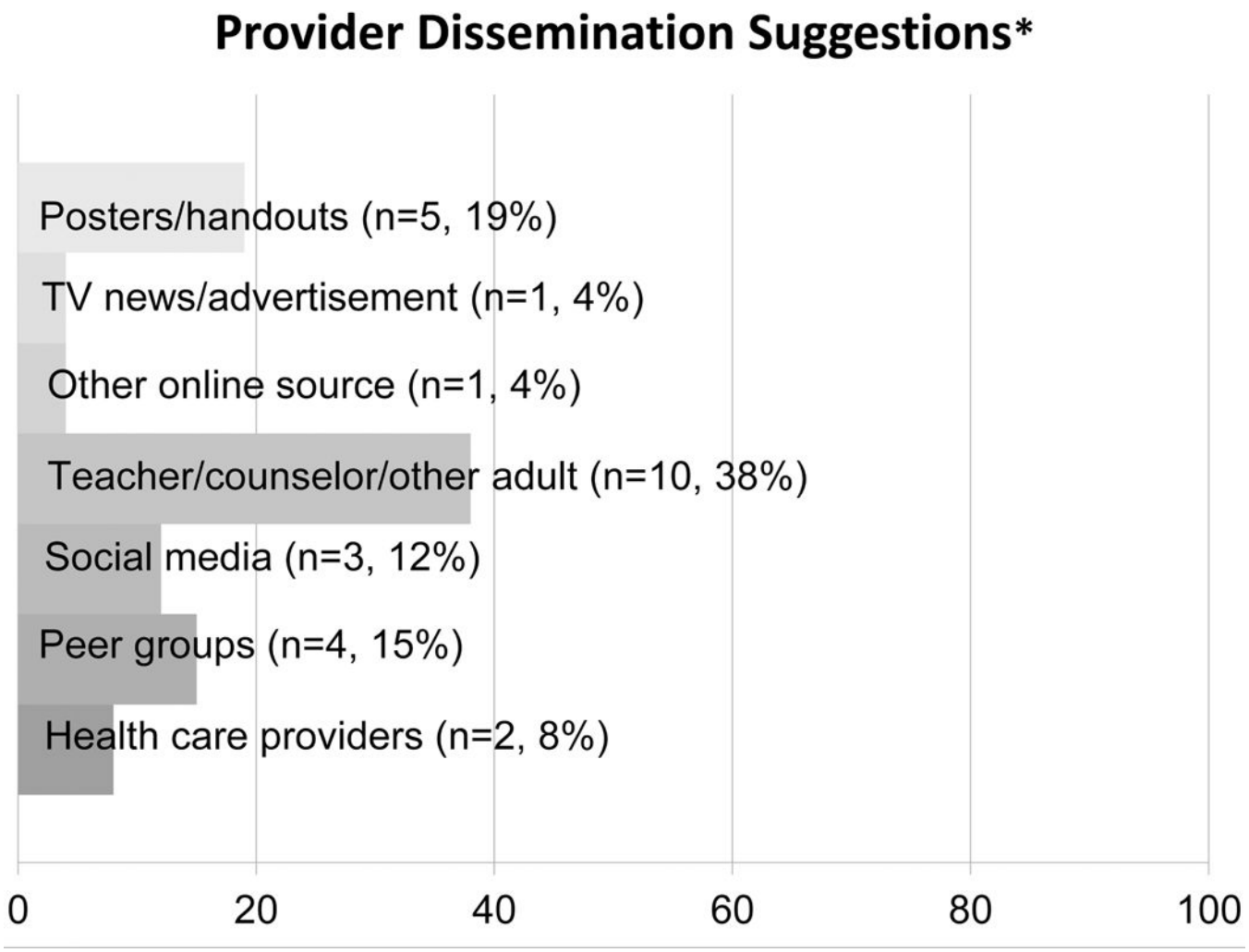

Figure 2:
Provider reported dissemination strategies from interviews.
*n=26 unique strategies coded during analysis

Table 1:

Demographic characteristics of student and service provider participants (n, [%]).

	Students (*n*=49)	Service providers (*n*=6)
Age (mean)	22.4[1]	29.8[2]
Gender		
Female	41 (83.7)	6 (100)
Male	8 (16.3)	0 (0)
Post-secondary institution type		
Public 4-year college/university	13 (26.5)	n/a
Private 4-year college/university	13 (26.5)	
2-year/community college/technical school	23 (46.9)	
Race		
Asian	6 (12.2)	0 (0)
Black/African American	3 (6.1)	0 (0)
White/Caucasian	34 (69.4)	5 (83)
Mixed/other	6 (12.2)	1 (17)
Ethnicity		
Hispanic	8 (16.3)	0 (0)
Non-Hispanic	41 (83.7)	6 (100)
Relationship status		
Single	12 (24.5)	n/a
Dating	30 (61.2)	
Married	6 (12.2)	
Separated/Divorced/Widowed	1 (2.0)	

[1]Mean, range 18–29

[2]Mean, range 26–43

Table 2:

Student reported applicability and usability data (mean scores).

Please rate your agreement with the following statements: (*n*=47)	
The bMORESafe app was easy to navigate & use.	4.09
The design of the bMORESafe app was visually appealing.	4.02
The information was easy to understand.	4.11
The information was relevant to me/my peers.	3.91
I would use the bMOREsafe app if I needed it in the future.	4.00
I would recommend the bMORESafe app to my family, friends, and/or peers.	3.85
Please rate the usefulness of the following components of the bMORESafe app: (*n*=45)	
What if I Have Been Forced to Have Sex?	3.98
Get Medical Help & Prevent STDs	4.09
GPS Directions to Hospital	4.09
What if I Have Been Hurt by my Partner?	4.02
What if I Don’t Want to Tell the Police?	4.13
What if I Just Need Someone to Talk to?	4.04
Local Hotline/Resources	4.22
National Domestic Violence Hotline	4.16
National Sexual Assault Hotline	4.27
What if I’m Concerned About a Friend?	4.18

Table 3:

Comparison of Student and Provider Data

	Students	Providers
Acceptability	Q: *I would recommend the bMORESafe app to my family, friends, and/or peers* ≠ Mean score: 3.85 (lowest overall mean rating of any item)	≠ Providers would recommend to students ≠ Safety concerns were raised about the issue of an app for sexual violence and dating violence
Usability	Q: *The bMORESafe app was easy to navigate & use* = Mean score: 4.09	Appreciated the straight forward nature of the app = "I see it as being very user-friendly in terms of being able to ask very clear, straightforward, simple language to guide their pathway towards resources."
Dissemination	Most likely to download the app if they heard about it from peers ≠ n=32, 65%	Adult led dissemination strategies most commonly suggested ≠ n=10, 38%

= areas in which student and providers gave similar feedback or responses

≠ areas in which students and providers had differing feedback or responses