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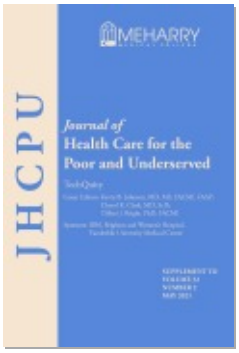

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Managing Technology, Content, and User Experience: An mHealth Intervention to Improve Women's Health Literacy after Incarceration

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Every year, more than 3.2 million women come into contact with the criminal legal system in the United States.[1] Representing the fastest-growing incarcerated group, women with criminal legal histories are more likely to report chronic conditions, such as cancer, hypertension, heart disease, and diabetes.[2] Around 67% of females in jails reported ever having a chronic condition.[3] On top of these health issues, many women are affected by sexual trauma, poverty, drug addition, mental illness, and limited access to medical care.[4]

The majority of incarcerated women are between the ages of 18 and 44.[1] Women with incarceration histories bear a greater burden of sexual and reproductive health problems such as abnormal Pap test histories, cervical cancer, unintended pregnancies, and sexually transmitted infections (STIs).[1,5,6] In addition, there is a growing number of women in jails and prisons who are 55 and older, a group of women who have lower rates of up-to-date mammograms compared with the general population.[7,8] When released from jail, women must face these and other health and social problems as they reorient themselves back into the community.[9,10]

Community reentry presents an opportune moment for health intervention in that it gets women to think about changing circumstances at a high-risk time[11] and may provide women with resources to see those changes through. Researchers have found that women with past criminal legal histories are often savvy health care users, though woefully underinsured in some regions of the U.S.[12] Although most incarcerated women are knowledgeable about behavioral health issues to some extent, many have beliefs about women's health that are outdated, often affected by family, medical, or social beliefs about screening regimens, or in some cases their own trauma histories.[13] These

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women also have multiple barriers to following through on recommended screening and prevention—specifically, their own housing, substance use, and mental health problems.[13] [14] It is within this context that we designed an mHealth intervention to address women's health literacy, that is, the knowledge, beliefs, and self-efficacy required to look after one's health and take action (for example, engaging in preventive behaviors related to STIs or cancer screening).[14,15]

Health literacy is a complex construct and depends on a multitude of dynamic factors, from information access to cognitive ability.[16,17] Health literacy involves addressing the intersection between individual traits, societal structures, norms, and the health care system. It has been used to explain health disparities and health outcomes, and has informed the development of interventions designed to reduce disparities.[18–20] According to Paasche-Orlow and Wolf, the causal pathways between limited health literacy and health outcomes can be traced along three major pathways: 1) access and utilization of health care, 2) provider-patient interaction, and 3) self-care.[21] Most women leaving jails and prisons have health literacy needs that encompass multiple pathways and may not have adequate access to resources or a knowledgeable social support network.[14,22] Furthermore, poverty, family disruptions, and substance abuse have been associated with lower health literacy.[23,24] Most adults initiate access to health services when a health problem arises that interferes with normal daily activities, a moment when health literacy deficiencies are made most relevant.[25] Interventions addressing preventive health behaviors may prove easier to implement, as they are not compounded by imminent disease and urgency.

Today, these interventions often take advantage of the ubiquity of web and mobile communications, which decrease information access barriers, and may increase motivation, self-sufficiency, and knowledge acquisition, and promote behavioral change.[26,27] A recent review of health literacy interventions found that small group sessions are still the primary intervention method, but SMS [short message service], social media interventions, and multi-media learning are gaining in popularity.[28] The targeted populations for mHealth interventions are mostly Internet savvy and use either their own or public devices for web access and searches of health information.[29] Previous research has found a preference for multimedia among women leaving jail, specifically; such an intervention has the advantage of rapid deployment, tailoring, and low-cost scalability.[30]

Video has gained renewed interest lately as an enhanced method to promote health literacy, either through sharing of user experiences,[31–33] or through dedicated health education to increase knowledge and comprehension.[34] Health information presented as video has also been shown to lead to greater behavior change related to preventive screening compared with traditional methods (pamphlets and flyers), especially for audiences with lower health literacy[35,36] (defined as adults who have difficulties in obtaining, understanding, and acting on health information and services, and also have decreased ability to make appropriate health decisions on their own).[37] One specific advantage that video has over traditional interventions is that visual storytelling is an important facilitator in the delivery of abstract data and concepts.[38] The phenomenon through which viewers identify with the characters in the story and immerse themselves in the narrative has been called *transportation*. Transportation is a strong driver of engagement, often used in cinematic productions.[39,40] Furthermore, research has shown

that short stories are effective instructional tools, circumvent attention deficit, and can bridge cultural and knowledge divides.[41,42] We used tailored storytelling to develop a culturally grounded narrative for women leaving jail.

In this article we show the process of developing an mHealth intervention to improve women's health literacy after incarceration. In doing so, we provide practitioners with a step-by-step guide on how to approach such a task. Second, we provide initial empirical data to justify the benefits of an mHealth intervention developed using the proposed processes, thus providing a preliminary confirmation of its value for the development of mHealth interventions.

The following hypotheses drive this study:

H1: Women leaving jail would think an online mHealth resource is an easy way to get women's health information.

H2: Women leaving jail would enjoy engaging in video and gaming content.

H3: Engaging with the mHealth intervention will enhance the content-specific knowledge, beliefs, and self-efficacy required to look after one's health and take action.

Methods

Overview. The purpose of the SHE WOMEN mHealth intervention (www.shewomen.org) was to develop a rich, comprehensive, engaging, and scalable online training solution tailored for women leaving jail, while concomitantly being able to collect usability data for evaluation and feedback. Content is open only to participants until efficacy testing with a randomized controlled clinical trial is complete. The following requirements constituted the framework for the intervention development:

Content.

1) Must address four areas of women's health issues identified by previous research as being important for the target audience: cervical cancer, breast health, reproductive health, and STIs. These areas of concentration stemmed from previous research with the target population and was driven by the needs and wants of women in jail.[14]
2) Content management should be modular and allow for a multitude of options when creating and delivering content.

Audience.

1) Information should be tailored to the socioeconomic and cultural characteristics of the target audience and should be appropriate for low content-specific health literacy audiences. Previous research had found relatively high health health literacy levels based on a standardized assessment with women in jail, but low content-specific literacy.[20]
2) Multimedia presentation of the information should maximize the audience's engagement, promote retention, and build knowledge.

Technology.

1) Information delivery must be asynchronous, and participants should be able to go through the materials at their own pace.

2) Must have a simple, intuitive and scalable user interface, adapted for both desktop as well as mobile web browsing.
3) Offer secure and encrypted access of users to the intervention.
4) Must include SMS and email notifications and a rewards system to promote usage.
5) Must include an asynchronous communication component, so users can interact with the research team.
6) Should log every relevant participant action and response.
7) Must include an administrative dashboard to allow the research team to monitor use, retrieve data, and run reports.

Website development. The development of the website for the intervention followed a stepwise approach, keeping the framework mentioned earlier at the center of the design process. An initial step was a detailed review of existent Content Management Systems (CMS) to explore the possibility of using one as an option for content distribution and participant data collection. While several options were considered (Wordpress, Joomla, Drupal) that had good media delivery capabilities, none could ensure the level of integration with research data collection, participant feedback, and interaction required by this project. Consequently, it was decided to build the web application supporting the intervention and data collection for the SHE Women research from the ground up to fit the needs of the project. The programming was informed by the previous experience of the developers in producing web interventions for underserved populations, and the direct input of an educational technologist specialized in adult learning.[43]

In addition to the technology aims mentioned above, the following decision points were paramount for the programming team:

- Build a single web application with two components: a participant-facing interface and a research team administrative interface.
- Design as a website to offer the widest availability and consistent experience across the diverse hardware and software platforms expected to be used for access.
- Allow dynamic content creation and editing by the research team. This included elements of text, media, and interactive games and knowledge quizzes.

The server-side component was built using Python, with the data stored in a PostgreSQL database. On the front end, the technologies were basic HTML, CSS, and Javacript, with limited use of libraries and a significant portion of the Javascript code written by hand to avoid large downloads and potential incompatibilities. The site was hosted on Amazon Web Services (AWS) for superior performance, access, support, and reasonable and flexible price structure.

Content development. Content development was performed concomitantly with web development, both components going through several revisions based on feedback from stakeholders, which included investigators with content and clinical expertise, as well as former research participants representing the target audience. The data collection and participant interaction requirements were the first two components that the programming team focused on, which informed the choice of programming language, web hosting solution and database structure. Each of the four women's health areas for the intervention was assigned to a module, which constituted the container for the

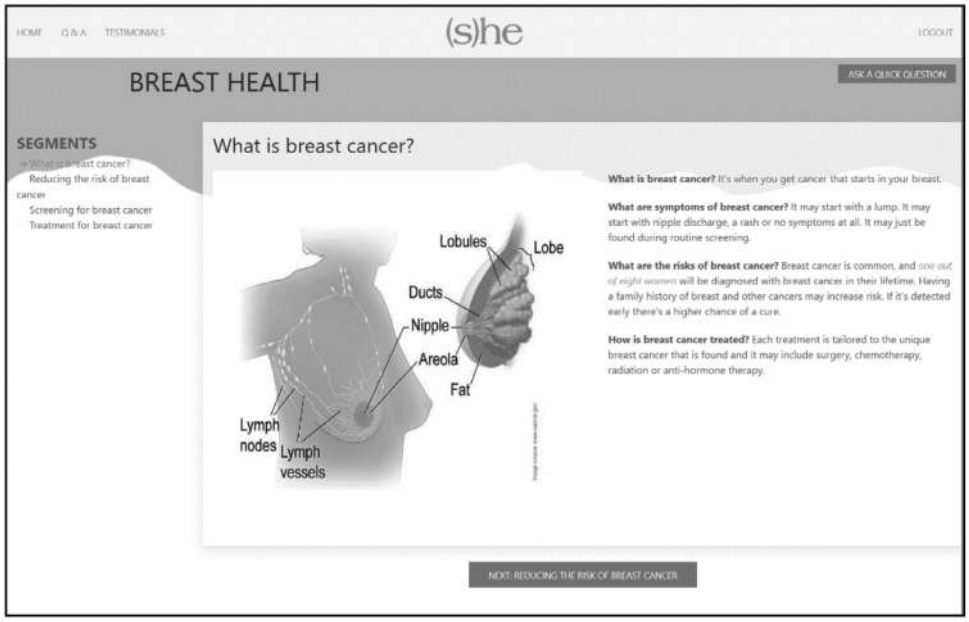

Figure 1. SHEWomen website: example of content including text and images.

specifically developed content. A first draft of the multimedia content was prepared by the research team in collaboration with content and clinical experts on each of the four topics. The first round of content development relied heavily on Centers for Disease Control and Prevention and U.S. Preventive Services Taskforce screening recommendations.[44] The team had weekly meetings over a period of four months to discuss and prepare the content that we wanted to include in each section. To maximize retention and promote user engagement, the researchers explored different media that included text, quizzes, and videos, and assigned them specifically for each one of the modules. Thirty-six segments were developed, which covered all the relevant information for the intervention's four topics. After being reviewed by the team, it was decided that 15 of the segments would be produced as video, while the rest would be delivered as a combination of text, images, and games/quizzes (Figure 1 and Figure 2).

Scripts were written for each of the videos by team members with experience in health education for the target population, and expert and participant review of the content was sought throughout this process. Some of the videos used an expert speaker to deliver information about the topic (Figure 3), while others employed role-playing and storytelling to immerse the participant in the story (Figure 4).

For filming, nine team members were recruited to star on the videos. While the researchers attempted to recruit women from the target population to participate in filming as actors, only one woman was able to participate during the designated filming days. To promote authenticity, cast members were required to learn their parts, as the use of a teleprompter was deliberately avoided. Filming for the intervention was completed in three days. All filming was completed prior to the COVID-19 lockdowns. The videos were professionally directed, recorded and edited. To avoid monotony, videos

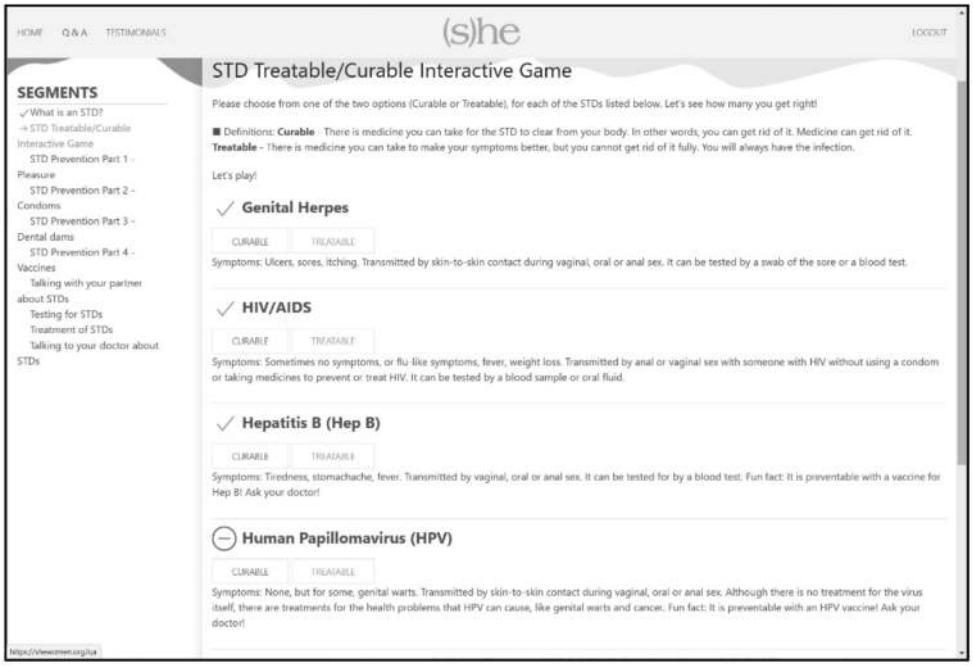

Figure 2. SHEWomen website: example of content including an interactive game.

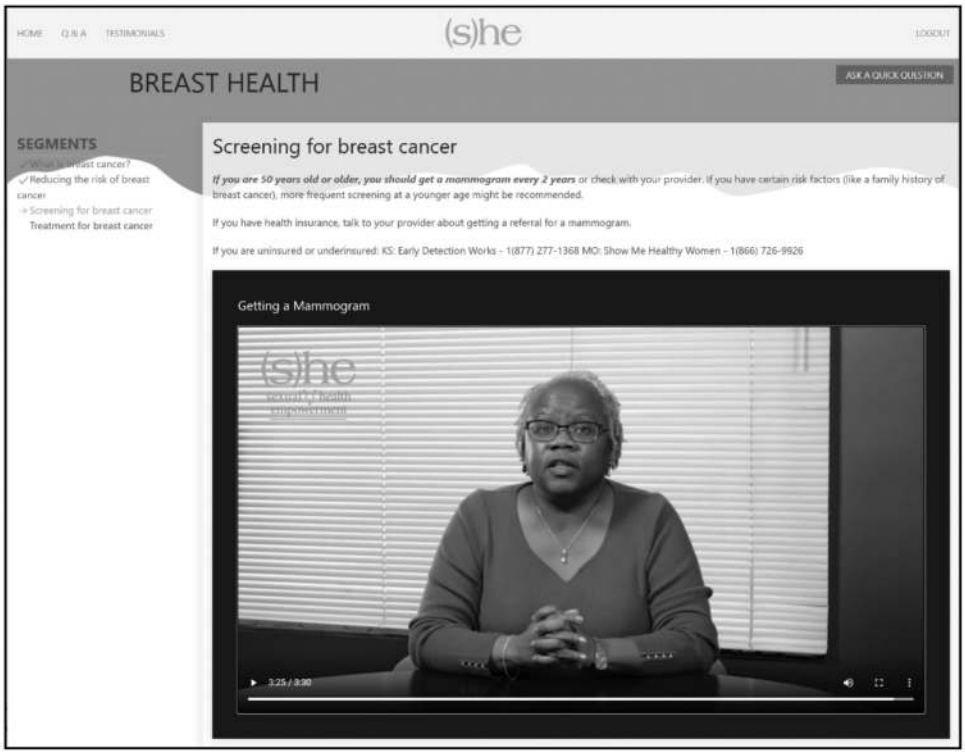

Figure 3. SHEWomen website: example of content including an expert presenter.

Figure 4. SHEWomen website: example of content including role playing.

were filmed in different locations and using diverse camera angles and lighting. Each video required multiple takes.

User interface, navigation, and user interaction. The user interface used a minimalist design, with particular focus on the presentation of intervention components and the progress achieved in completion of the modules. To minimize browser-related incompatibilities, the interface employed mostly text-based links in favor of graphical elements (such as buttons). The landing page provided information about the project, the funding source, a link to local resources, and a dedicated field where women can enter their personal identification number (PIN) to access the website content (Figure 5).

The design allows for future expansion of the public content of the website, which may include multiple pages with information about resources or similar projects.

After logging in, a user dashboard provides the participant with a list of available training modules and information about their progress, as well as rewards that they have earned. For each segment completed, the participant earns a *silver completion badge* (called "vadges" on the website, a play on words given the women's health content, and one celebrated by the team), a *gold vadge* for the completion of a module, and a *blue vadge* for correctly answering each question asked online. The dashboard allows the user to ask questions, as well as to see questions asked by other participants that were answered by the research team. The user can also read testimonials shared online by other users. The questions from participants as well as the testimonials were curated by the research team (Figure 6).

Figure 5. SHEWomen website: landing page.

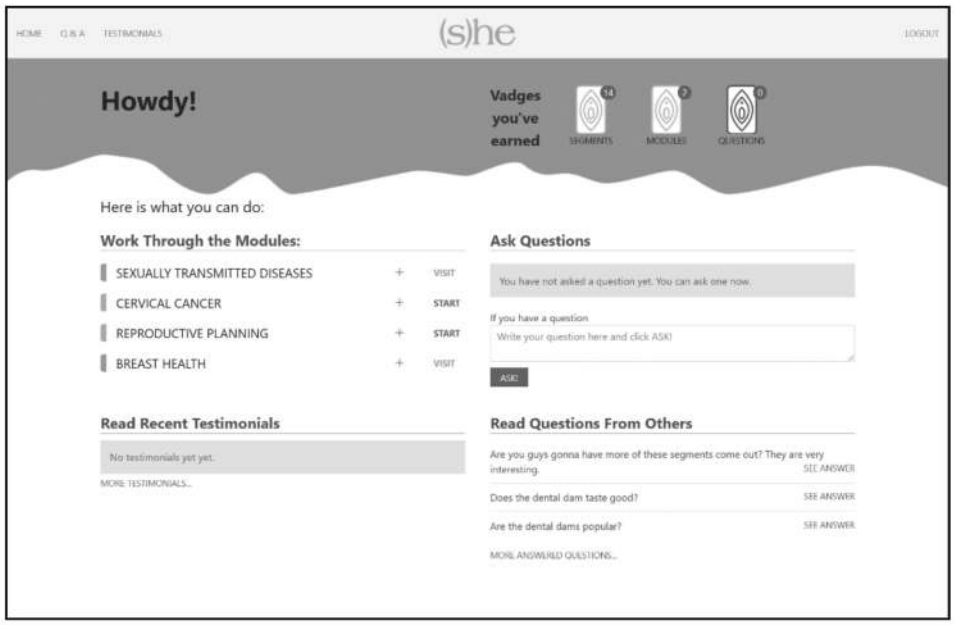

Figure 6. SHEWomen website: user dashboard.

The participants can start with whichever of the four modules they like, but once inside a module, they must follow the provided sequence of segments. Furthermore, the application logs the segment that the participant is working on and returns the user to the same position at a future login even if the web page was closed. This ensures the women go through all of a module's segments before having the option to move to another module. We added one-question quizzes at the end of most of the segments to test if the participant engaged with and retained the information. For the segments that include videos, the quiz only appears after the video has ended. Once they answer the quiz question, they are informed if their answer was correct or not, and the right answer is displayed. Asynchronous interaction with the research team was implemented through a dedicated text field embedded within each segment, providing participants with the option to ask questions about the content. The answer appeared on their dashboard once answered by the research team, and a notification was sent to the user. The women were informed about navigation protocols at the start of each module.

Participant management, data collection, and reporting. An administration dashboard (Figure 7) was built and integrated into the website, with separate access from the participant landing page. The dashboard allowed the research team quick access to information about the status of the research study, the progress of the users, last login, as well as newly posted questions and testimonials.

From this dashboard, the administrator can assign roles to team members based on selected access level, register or deregister participants, answer users' questions, and curate testimonials, as well as build content and generate usability reports (Figure 8).

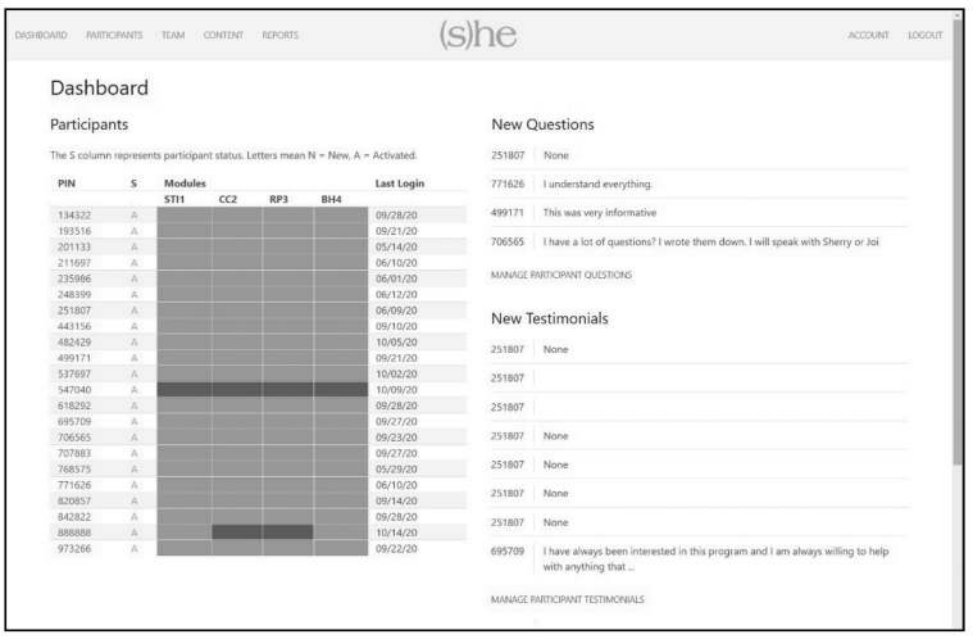

Figure 7. SHEWomen website: administration dashboard.

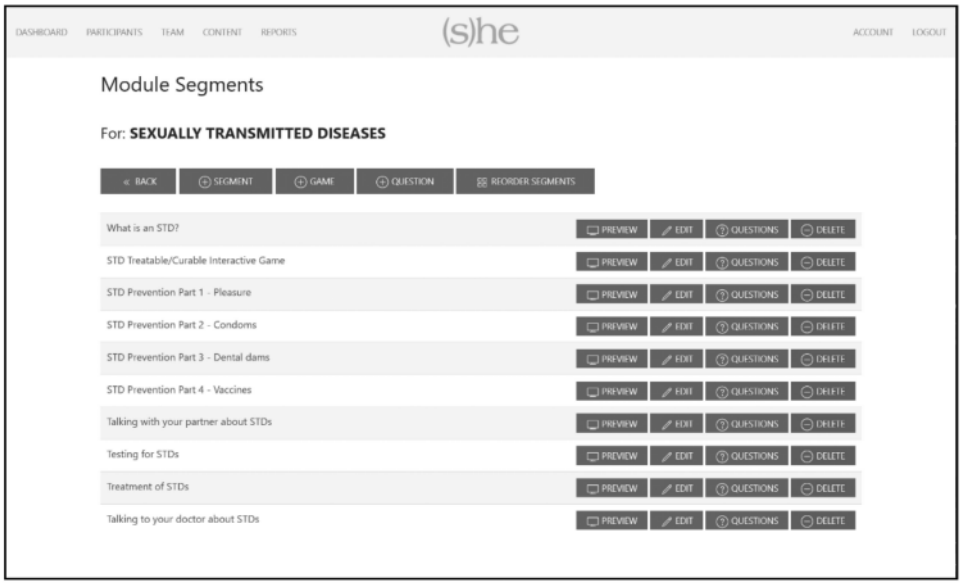

Figure 8. SHEWomen website: content development interface.

In addition to the custom dashboard reports, the system automatically generates a daily email report for the research team with the activity of the day.

Usability testing—the pilot. The purpose of the pilot study was three-fold. First, to explore the usability of the online platform. Second, to gather qualitative feedback from women after they had engaged with the online modules. Third, to conduct an initial appraisal on the impact of the content on women's topic-specific literacy.

Data for the pilot were collected from May 2020 to October 2020; the collection was conducted remotely (by text and phone), due to the social distancing measures imposed by the COVID-19 pandemic. The pilot comprised a random sample of 20 jail-involved women who were active participants in a three-year follow-up phase of a jail-based cervical health literacy intervention.[15] The women were contacted by phone and given information about the SHEWomen website. For those who were interested, we carried out informed consent procedures and gathered additional contact information to complete pre- and post-assessments. To bolster retention, we offered to complete the one-hour baseline survey at that time, or to schedule another time if they were unable. Once the survey was completed, each woman was texted or emailed a unique PIN number to access the website.

The women had three weeks to complete the mHealth intervention. The software would monitor the generated PIN numbers and would send an automatic notification to the research team if a participant failed to activate her account within 72 hours from receiving the PIN number. Following the notification, a research team member would try to contact the participant for up to 10 days, and if unsuccessful, the participant would be dropped from the study. Only one woman from those initially recruited did not complete the study.

Once the participant used her PIN on the website, the system would automatically

monitor the activity associated with that PIN number. If it detected no activity for 72 hours, it would automatically generate a text message and an email to the participant (if phone number and email have been recorded by the participant within the system) with a notification prompting them to log in on the website. If the participant had not accessed content within 24 hours of receiving a prompt, then a second prompt would be sent. If no activity was observed after another 24-hour period, then the staff would try to reach the participant by a phone call, text message, or through a closed Facebook group directly geared to the participant.

Compensation of $25 was provided for all women who completed the mHealth intervention. Following completion, the participants took part in a post-intervention survey, and were also asked to participate in a stakeholder interview where they were asked questions specific to their interaction with the website. In the post-intervention survey, the women were asked to rate the usability of the website (the questions adapted from previously published work[45]) and the acceptability of the information on the website (adapted from previously published work[46]) on a five-point Likert scale (Table 1). They were also asked questions about any limitations they may have experienced using open-ended questions focused on use and design. The semi-structured stakeholder interviews addressed usability, experience with the user interface and the content, potential use of the information, and miscellaneous topics (Box 1). The women who participated in the stakeholder interviews were paid an additional $20 for their contribution.

Results

Quantitative data. Twenty-one women participated in the pilot, 20 of them completing the intervention (Table 2).

Ninety percent of women had consistent use of a phone, with 75% of participants using a mobile device to complete the intervention. Computers and web-connected TV were other devices used by participants to take part in this pilot study (only one woman used a web-connected TV). Ninety-five percent of women had their own Internet connection, all of these stating they had a good Internet service.

A composite website usability index (W) (M=28.9, SD=3.36, Cronbach's Alpha = .737) with a scale between six and 30 was computed out of six statements exploring participant's experience with using the website (1=disagree to 5=agree scale). All the

Table 1.

USABILITY INSTRUMENTS

Usability instruments (5-point Likert scale)
Use website again (2 questions)
Help from medical or computer person needed (2 questions)
Ease of use (3 questions)
Organization of the website
Confidence using website

Box 1.

INTERVIEW GUIDE QUESTIONS

Interview guide questions
What was your least favorite part of the website?
What was your favorite part of the website?
What would you want to see more of? Or add?
What problems have you encountered while on the website?
What can you say was good about your experience with the website?
Any parts of the website you thought were useless?
Was there a time where you used the website to help you with your health?
What did you think of the myth/fact game?
How does this compare to other places or ways you've learned about women's health?
How likely are you to refer this website to other women?
Overall, do you think a website is a good way to get health information?

Table 2.

DEMOGRAPHICS OF STUDY PARTICIPANTS

Demographics table of pilot study participants (N=20)

	Mean	SD
Age	41.4 years	9.5 years
	N	**%**
Race		
Black	8	40
White	7	35
American Indian or Pacific Islander	1	5
Multiracial	4	20
Hispanic ethnicity	3	15
Education		
Less than high school	7	35
Completed high school	6	30
Some college	4	20
Completed college	3	15

women ranked the website on the upper third of the usability index, with 70% of the women rating it 25 or above. All the women agreed that they would use the website more than once. Ninety percent of the participants found the health information easy to understand, with only two women stating that they would need a medical person to help them understand the website. The user interface was easy to use and navigate for 19 out of 20 participants, with only one woman stating that she would probably need a computer person to help her use the website.

Participants were able to complete the mHealth intervention at their own pace. An analysis of user's logs stored on the server showed that participants logged in an average of 2.3 times to complete the intervention. The *total time for module completion* was 5.13 hours on average (measured from the time work on a module started to its completion as, by design, participants could not start a new module until the one they were currently working on was completed). The *actual work time per module* (based on aggregated segment completion time) was 22.84 minutes. The recorded completion times showed great variation among users, with one outlier taking 143 hours total to complete the mHealth intevention, which was more than double the next slowest-completing participant. Fifty-five percent of participants completed all the modules in less than four hours, and 80% of women took less than 24 hours to complete the mHealth intervention.

Self-reported measures about the appraisal of the content (1=disagree to 5=agree scale), showed that participants considered women's health an important topic to learn about (M=4.85, SD=.366), and that they liked learning about it (M=4.8, SD=.523). They perceived the information as easy to understand (M=4.8, SD=.523), and their confidence that they would remember what they had learned was high (M=4.40, SD=.883). From a behavioral perspective, they would share the information they had learned on the website with friends and family (M=4.80, SD=.523), and stated that they would change their behavior because of what they had learned (M=4.45, SD=.999).

Objective measures of knowledge retention built within the evaluation component of the website yielded correct answers on 89.59% of the content knowledge quizzes in all four domains of cervical health, breast cancer, reproductive health, and STIs.

Qualitative data. The interviews strongly supported the findings from the questionnaires, but also provided a few interesting perspectives that will be used by the team to improve the website prior to formal deployment for the extended intervention. Some of the comments addressed user interface or design issues, such as one woman not liking the placement of the achievement badges (vadges) when they are awarded at the end of a segment, or another participant having problems trying to figure out how to advance to the next section. Others addressed content presentation, with one participant stating that there were too many diagrams, or another stating that reading through the lessons could be challenging for someone with visual impairment.

Videos were a big hit with the audience, being mentioned by almost all participants when asked what their favorite part was, and they wanted more of them. One participant commented that videos of "real people telling it like it is" was her favorite part of the website.

As for the educational content, the women were pleased with the pace and the information, but also made suggestions for adding information or new topics. For ex-

ample, one participant suggested adding "more info on where you can go directly to get help," while another proposed "more info on nutrition for incarcerated women." Another request captured from a couple of participants was to include more resource information about mental health. One woman disliked the domestic violence content and another participant was displeased with some of the reproductive goal setting module, in particular options counseling.

All the access issues were related to available Internet connection, and these went away after the participant moved to another wi-fi network or on a subsequent login. We were pleasantly surprised by the feedback we received on the learning experience: "I learned things I didn't know. I enjoyed the whole website," "Liked the vadge!" and "Learned a lot about HPV and cervical cancer," "I could work at my own pace," and "There was no pressure" were a few of the comments from participants. When asked if using the website helped them with their health, all the feedback was positive, and some women included ways they plan to use the information they had acquired: "I should get a checkup for STD even if I don't have symptoms," "Learning about breast cancer, going back to the website to look at things," "Learned about PrEP (HIV pre-exposure prophylaxis)," "I will share what I have learned on the website with my kids," were some of the users' statements.

Discussion

The aim of this study was to develop and to pilot-test an mHealth intervention to improve women's health literacy after incarceration. The intervention was designed from the ground up to address the specific needs of the population on four women's health topics; the design also met the requirements for rigorous data collection and usability tracking imposed by the research component of the study.

The decision to go with an in-house developing process was driven by the lack of dedicated software that would fulfill the requirements of the planned intervention and associated research. All facets of the development process were driven by health literacy, strategic communication, and adult learning theories, as well as knowledge of the target audience provided by a team with over a decade of experience working with women in the criminal legal system, including direct feedback from women with criminal legal system experience. The team of experts had direct input in the development of the technology and educational content and provided feedback on all stages of the build. Feedback from users was also employed as the user interface and the content were developed.

The successful development, deployment, and pilot-testing of the website shows the value of tailored intervention designs that are both theoretically and practically driven. The health literacy literature supports both the approach of this study and its findings.[47] Although the website is complex and many processes are happening in the background (from activity logs to progress tracking to automated messaging), the user interface is simple and straightforward and was much appreciated by the pilot study participants. The use of intuitive controls and a responsive design allowed for seamless deployment on both desktop and mobile browsers. Three quarters of the pilot study participants completed the mHealth intervention on their mobile phones—which speaks

to the need to develop mobile-based interventions for this population. The COVID-19 pandemic's social distancing requirements have further promoted distance learning; in this context more than ever, web and mobile technologies for the delivery of health literacy interventions are of critical importance.

Previous research suggests that the intersection of technology and health literacy is fraught with significant barriers related to digital literacy, especially for underserved or at-risk populations.[48,49] While this may be true for some underserved populations in the United States,[50] the women participating in this pilot study had appropriate digital literacy skills, and adequate access to technology to fully engage with the mHealth intervention.

The dedicated technology was supplemented by content that was simple, efficient, and delivered in a format that promoted engagement and stimulated attention and information retention. The content and the presentation of the information was specifically tailored for women leaving jail. Videos were by far the most lauded multimedia content. This is consistent with findings by other researchers who used videos as part of their intervention.[51,52] Although no professional actors were employed, the cast delivered performances that resonated with the audience, as one participant so eloquently called it, "Real people telling it like it is." The use of role-playing, keeping the videos short (under three minutes), as well as professional directing, lighting, and editing contributed to creating an engaging experience. In addition to the role that storytelling played in our content development strategy,[53] keeping videos short was greatly appreciated by the participants. Similar results have been reported by researchers developing other video-centric mHealth interventions.[54]

Over 80% of the women completed the intervention within 24 hours, which shows interest in the topics, but also that they had no major difficulties navigating the website or progressing from one educational module to the next. The attention to health literacy that went into the development of the content was beneficial, as women overwhelmingly considered the information easy to understand, and their confidence in retaining what they had learned was high. On a behavioral level, both the quantitative and qualitative data collected suggest that the intervention had an influence on their preventive approach to women's health. Although the positive effects of health literacy interventions on preventive behaviors have been extensively studied for chronic diseases,[55] such as cardiovascular ailments[56] or diabetes,[57] this study is among the first to address health literacy in the context of an mHealth intervention for women leaving jail.

The flexibility of the programming and the design of the administrative dashboard of the SHEWomen website allows for easy revisions and update of the content, as well as for adding new topics to the mHealth intervention. The research team does regular outreach with the women, periodic analyses of the feedback received through the website, and content and usability index updates are planned accordingly. Concomitantly, the research team may update content based on new evidence-based research, and this new information can be pushed to users through the website or using social media channels. The platform can be easily adapted to be used with other mHealth interventions, and to support other projects for different audiences.

Previous studies looking at best practices for integrating health literacy with mHealth have focused mainly on strategies for content presentation.[58] Nevertheless, content and

presentation are only two sides of the complex enterprise that is developing health literacy mHealth applications. Our findings also provide empirical evidence on the value of multidisciplinary and multi-stakeholder collaboration for the development of a health literacy mHealth intervention.

Based on our experience, we propose the following stepwise process for the development of mHealth applications geared towards improving health literacy on a set topic:

1. Identify technological challenges specific to the target audience. This may include access to devices, Internet access, and digital literacy. This first step should inform both the decision to develop or not an mHealth intervention, as well as the type of intervention to be developed (web, social media, mobile app, SMS, or mixed).
2. Once a decision has been reached following step 1, establish partnerships with experts in technology as well as in content areas, communications, adult learning, instructional design.
3. Set up an advisory board of members from the target audience, to provide feedback on technology, user experience, and content development.
4. Prepare an initial list of specific requirements that should focus on technology, content, and audience—this will inform next phases of development. The content should also include an overview of the specific topics for the intervention.
5. Conduct an audit of existent software solutions to assess if they can be adapted to suit the needs of the intervention, or if a customized application should be built.
6. Conduct an audit of existent content on the topic of the intervention to assess if it can be repurposed or if dedicated content should be created.
7. If a technological solution exists, as well as content that can be repurposed, work with the experts and the advisory board to assemble the intervention, making sure all adequate permissions are obtained for the use of previously-developed content.
8. If a technological solution does not exist, work with the technology partners to select the appropriate platforms for development and implementation. User experience should be paramount in driving the technology development process. Get feedback from the advisory board at every step.
9. If dedicated content must be created, it should be appropriate for the technological solution and the expected user experience. A partnership with a communication/media expert that can advise on content production is recommended. Using professional video and multimedia production services is encouraged. Get feedback from the advisory board at every step.
10. Once the intervention is developed, conduct a pilot test, and fine-tune the intervention based on study results.

Conclusion. Seamless collaboration between stakeholders and considering user experience as the main driver for both technology as well as content development are the key elements in the proposed process for developing and implementing an mHealth intervention. As researchers, we often get carried away by the appeal of a new technology and forget that it is nothing more than a tool, which will not provide ade-

quate results if not used properly. Content is equally important, as technology cannot compensate for content that is not engaging, easy to consume, and appropriate for the audience. The mHealth intervention we developed based on the presented process has the potential to increase the health literacy of the women participating in the study and may have positive behavioral and health effects. A future NIH-funded study will test the application of this modality against a standard of care (health education booklet).[44] In the meantime, this paper provides a framework for the field for the development of a technologically appropriate and user-centered mHealth intervention that builds women's health literacy.

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