

Design Recommendations for an Inclusive Online Sexual Health Clinic for Blind and Partially Sighted People

Danita Mooney

UCL Interaction Centre, University College London, UK, Danita.mooney.21@ucl.ac.uk

Maryam Bandukda

Global Disability Innovation Hub, UCL Interaction Centre, University College London, UK, M.bandukda@ucl.ac.uk

Dilisha Patel

Global Disability Innovation Hub, University College London, UK, Dilisha.patel@ucl.ac.uk

Sexually transmitted infections are highly prevalent in the UK, and chlamydia, which is largely asymptomatic, is the most common. Digital health is being integrated into health services provision to support the increasing demand for testing and treatment. However, with this integration, there is a need to ensure that the design, development, and deployment of digital health platforms are inclusive and accessible for all. This paper explores the needs of blind and partially sighted people when using an online sexual health clinic through interviews with seven blind and partially sighted people. The findings identified key barriers and facilitators that impact the accessibility of online sexual health clinics, including the accessibility of the visual content, particularly for self-testing and the need to consider the privacy of disclosing sexual health information. We align with the principles of Universal Design and, as such present design recommendations to inform the design of inclusive online sexual health interventions.

CCS CONCEPTS • **Human-centred computing** ~ **Accessibility** ~ **Empirical studies in accessibility**

Additional Keywords and Phrases: Visual Impairment, Sexual Health, Web Accessibility, Inclusive Design, Digital Health

1 INTRODUCTION

There are 2 million blind or partially sighted (BPS) people in the UK [28]; their use of assistive technology enables inclusion and participation in health services [2,3]. As healthcare moves towards digital platforms to provide information and services, there are concerns that this may widen the digital divide and increase health inequalities by excluding those who already have difficulties accessing healthcare online, such as BPS people [15]. We explore this using a case study of accessing sexual healthcare online.

Sexually transmitted infections (STIs) are a significant public health issue, with chlamydia remaining the highest transmitted STIs in the UK.[11]. Contrary to widespread belief, disabled people are as sexually active as the wider population but tend to have poor sexual health outcomes and are at greater risks of STIs [6]. Much of this can be attributed to difficulties accessing information and sexual health services: [10]. Digital health and wellbeing interventions can potentially reduce barriers to accessing care for both BPS people and the wider population and should be designed and developed inclusively to ensure that all can benefit from the outset [16]. This paper explores access to an online sexual health clinic (eSHC) designed to remotely sample, test and enable individuals to receive treatment for STIs. The eSHC delivers care for chlamydia through an online clinical pathway. This paper presents findings from an interview study with BPS to explore barriers and facilitators in accessing an eSHC and outlines design recommendations to ensure the eSHC is effective and accessible for BPS people. Our paper uses person-first language as this is how participants described themselves.

2 RELATED WORK

2.1 Online Sexual Health Clinic

Sexually transmitted infections are a major public health issue with the harm of untreated infections, which can lead to significant health consequences and onward transmission [2]. In England, there are high rates of STIs despite control measures already in place, such as free testing facilities and contraception [25]. Testing for STIs through telephone and Internet-based consultations, led to an increase in diagnosis via these services from 17% in 2019 to 36% in 2020 [25]. This presents an important case for eSHCs to support public health needs. Online sexual health clinics could play an important role in addressing the high demand for sexual health services by enabling access to STI screening and reducing diagnosis times through triaging patients who are minimally symptomatic or asymptomatic online [12]. Chlamydia remains the most diagnosed STIs in England due to mainly being asymptomatic [25]. To provide effective care, an online clinical pathway was created by a multidisciplinary team of experts in sexual health and digital health interventions [11]. During this study, an early iteration of the eSHC was introduced to participants, which has since been developed [9]. The pathway shared with the users were as follows. Users would register with the eSHC and order a self-sampling kit, which requires a person to take a urine sample and/or vaginal or rectal swab to be sent to a lab. If a person tests positive for chlamydia, they are notified on the eSHC and begin an online consultation managed by a prescribing algorithm. This algorithm investigates an individual's medical history to assess whether receiving treatment without in-person interaction is clinically safe. In addition, the eSHC offers partner notification and a follow-up telephone call with a sexual health advisor to offer support.

2.2 Access to sexual health services for BPS People

Barriers BPS people face to accessing sexual health services are a symptom of a broader issue: health provision is primarily designed for the needs of the sighted population [13,21]. This means health and medical information is presented in inaccessible formats not tailored to their needs [34]. This reduces health literacy, which could lead to greater risks of STI transmission [21]. BPS face barriers to in-person sexual health services due to physical constraints on travelling to clinics independently, which can reduce autonomy if reliant on sighted assistance [17], and societal stigmas preventing BPS people from asking for help [10]. Other known barriers include medical information or directions written on packaging or health campaigns that BPS people cannot parse [7]. Sex education in schools is often inaccessible for pupils with visual impairment as the content is largely visual [3,20], leaving BPS people feeling excluded and confused. Despite growing evidence that young adults with visual impairments are sexually active, 57% compared to 65% of young adults without disabilities, lack of accessible information leads to insufficient knowledge of sexual health. Whilst BPS people have voiced a need for more information on STDs, contraception, fertility and bodily organs [8], the insufficiency of inclusively designed educational content can lead to exclusion and marginalisation [31].

2.3 Accessibility of digital health

The rapid growth in digital health information can facilitate access to health information and services for BPS people [4]. Digital interfaces enable information presentation in accessible formats compatible with assistive technology [34], enabling BPS people to perceive and understand information. Web Content Accessibility Guidelines (WCAG) [35] are developed to ensure content accessibility for screen readers and people with low vision. A recent modification to WCAG 2.0 2018 ensures interfaces improve accessibility for those with a visual impairment [35]. Of particular concern is when visual information such as images, tables and diagrams in scientific articles are not accessible to BPS who use screen

readers [29]. However, healthcare tends to use scientific images to explain conditions; thus, these elements must be interpreted in text for those who cannot engage with visual content.

Whilst research on digital health interventions for BPS people is increasing, their use of digital sexual health remains under-researched. This research aims to fill this gap by answering the research question: what are the design recommendations towards an eSHC to ensure it is accessible for blind and partially sighted users?

3 METHODS

Interviews with seven BPS people, aged 23-61 (1 female; 6 male), were conducted online, lasting approximately one hour. Participants were recruited through convenience sampling, with posts on social media and relevant charity organisations. Four participants identified as partially sighted, and three as blind. All but one participant used assistive technology online, including a braille display, screen readers, audio voiceovers and video magnifiers. A participant screening questionnaire was sent to understand a participant's level of visual impairment and whether they used accessible technology online so their needs would be considered in data collection.

The interviews explored previous experiences searching for sexual health information online and a walk-through of the eSHC to explore participants' preferences. The walk-through was based on a fictitious scenario of receiving a positive chlamydia result. First, questions about accessing online health information, including sexual health, were explored. This was followed by a walk-through, in which participants were given audio descriptions of the steps and options of an eSHC prototype that an individual would expect to encounter when interacting with an eSHC pathway.

Interviews were audio recorded with consent. Transcripts were anonymised, reviewed, and corrected, aiding familiarisation with the data. Transcripts were analysed using NVivo software using thematic analysis [5]. A deductive analysis was undertaken to specifically understand BPS' barriers and facilitators towards using online health clinics to inform design recommendations. Transcripts were coded, which were grouped using affinity mapping. Initial codes included *Information Gaps*, *Web accessibility* and *privacy and stigma*. Further discussion and collaboration with the research team organised the codes into meaningful themes, of which the key barriers and facilitators are presented.

3.1 Ethical Considerations

This study received ethical approval from the departmental committee (UCLIC/1819/006/). Participants were assured that only topics related to using an eSHC would be explored in the interviews, and all data collected would be appropriately anonymised.

4 FINDINGS

Interviews explored accessing general health information and services online, specifically in the context of sexual health; findings cover the expressed barriers and facilitators in both topics, followed by design recommendations for inclusive design.

4.1 Barriers: Awareness and Accessibility of eSHCs

Participants expressed low awareness of accessible sexual health services. All participants showed interest in the novelty of the eSHC. *"I did not know clinics even existed online. I think I knew people could get checked for sexual disease in the hospital"* (P3). All had experienced difficulties accessing content online due to inaccessible website design. This included content incompatible with screen readers or managing dynamic features like pop-ups. One participant shared

that an inaccessible eHealth website prevented them from accessing care online, resulting in them abandoning online care and choosing in-person care. *“It was a patient portal, and the items weren't really intuitively laid out, it was not very clear at all what was going on... it was not clear where you found what and what piece of information...I saw Doctor in person”* (P4). Others reported that health information relies on images without alt. text. *“Diagrams would be harder, somehow write it out or don't use diagrams”* (P4). Another shared concern was whether instructions for self-sampling would be accessible; otherwise, they would be unusable for BPS people. This was independent of the level of residual functional vision. *“Not everyone will be able to follow instructions on a pack, if they are written down”* (P7). **Design Recommendation:** The interface must have accessibility features built-in and be compatible with assistive technology.

4.2 Barriers: Privacy Concerns

Privacy was a key concern when using online health information or navigating online platforms for sexual health needs. Participants shared that personal contacts such as friends, family or carers would have to help them carry out such personal tasks. Reliance on a sighted helper to read instructions on self-sampling was explicitly stated to be a barrier. *“...I might end up being reliant on a sighted person to read those instruction.... So, at home, that's gonna be someone a friend or family? No, you don't really want them in on this. In which case, you'd rather go to the clinic and have an expert do it.”* (P5). There was also a significant concern when using the eSHC whether the platform would use voice to confirm or share diagnoses results. The main concern was about friends or family members reading or hearing the results. There was a preference towards receiving results in a text message due to simplicity, and to enable autonomy of the user as to when they will open the message. One participant stated that their voice-over technology reads out incoming text messages. *“If you use an iPhone, it's got voiceover built in. So speaks notifications, which is really useful, but could be incriminating or revealing of things sometimes when you're in company.”* (P5). So, whilst participants could mute their phone from reading the result to prevent this, they would not know when to expect the result notification; therefore, keeping their phone muted could impact their daily activities. Preferences were favoured for choosing when to interact with the eSHC and not have push notifications.

Design Recommendation: Interface to have multi-modality options for delivering discreet results.

4.3 Facilitators: Audio-based support

A user need shared by all was the controllable option for audio content over other modalities and live chat or email communication as alternatives; participants expressed the importance of having audio options built into the eSHC. *“You know, it may be accessible, and it might not be, even if it is, people might not know how to use the chat service. So, it just takes up more time.”* (P4). Participants preferred audio content to be readily available and not have to use another assistive technology device to use the eSHC as this was how information was mainly consumed; however, with privacy concerns related to sexual health, the option to choose whether and when to have the audio feature enabled was preferred.

Design Recommendation: Audio-based modalities to be available on-demand.

4.4 Facilitators: Accessible care

All participants expressed the benefits of accessing sexual health services remotely, including not having to plan their journeys, not considering which clinics would be accessible, and not needing someone with them. *“Getting to places can be challenging. So yeah, it'd be nice to just do it at home”* (P5). Participants shared that instructions for using the eSHC should have multiple modality options and not only have images-based instructions online, *“You use different*

formats like audio and listen to the steps and follow what the steps are” (P6). Braille-only options are insufficient as not all visually impaired persons can read braille or access a screen reader. Therefore, written or audio instructions should be simple yet specific. “As long as it's clear what goes in what. I'm sure it is self-explanatory” (P5).

Design Recommendation: Instructions must be translated online and in various modalities compatible with assistive technology.

5 DISCUSSION & CONCLUSIONS

This study explored factors impacting access and use of an online sexual health clinic among blind and partially sighted people. The findings highlighted the barriers and facilitators that impact access to digital health, particularly online sexual health services for BPS people. One of the main barriers was the awareness and accessibility of online sexual health information. Without awareness of inclusive systems, BPS are at increased risk of STIs as well as for onward transmission. We also report the importance of web accessibility in mediating digital health's inclusive usability. The findings affirm and extend existing literature [18,29], highlighting how poorly designed interfaces compound the assistive technology BPS people use, creating barriers towards accessing care [14]. We also report concerns about interacting with an eSHC, particularly self-sampling. Self-sampling and receiving diagnosis results raised crucial privacy concerns when interacting with the eSHC. Due to the impact on privacy and autonomy, BPS people could likely be deterred from engaging with the eSHC, further exacerbating the stigma and marginalisation faced by BPS people in many domains. Whilst others have explored how users rely on features that could be consumed by those around them to interact with technology [1], design features need to consider privacy and preserve dignity when providing sexual healthcare [27]. Multimodal interactions are essential to support the inclusivity and autonomy of BPS users by enabling them to choose when they want to interact with the eSHC and adapt the notifications and alerts to their preferences.

Identified barriers and facilitators led to a set of design recommendations which, whilst not novel, are often absent from the design of digital health tools. A key tenet of the disability interaction manifesto is co-creation with intended users to promote connection to the technology in question and to move from a situation where digital health excludes and assumes [19,30]. Such design decisions could contribute to reducing structural inequalities faced in health promotions tailored to the sighted population to maximise health equity in digital health interventions [18]. Embedding accessibility guidelines in health interventions early on in the design process is a move towards Universal Design [16], with solutions catering towards those with specific needs and the wider population; as such, this is referred to as ‘design for all’ [22], which can move towards “equitable and agential technology use for disabled people” [32,33]. This research aligns with universal design, as such, identified key barriers and facilitators to using eSHC during design and not once developed and disseminated. Future work should include user testing with other diverse populations, including gender and those with different access needs to ensure inclusivity. We present design recommendations to support the inclusive design of an online sexual health clinic for BPS people, which mainly focuses on accessible online content for use with assistive technology and on-demand multimodality preferences to maintain privacy and dignity when interacting with the eSHC.

6 REFERENCES

1. Tousif Ahmed, Roberto Hoyle, Kay Connelly, David Crandall, and Apu Kapadia. 2015. Privacy Concerns and Behaviors of People with Visual Impairments. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, ACM, 3523–3532.
2. Catherine R Aicken and et al. 2017. Using the ESEXUAL Health Clinic to access chlamydia treatment and care via the internet: A qualitative interview study. *Sexually Transmitted Infections* 94, 4: 241–247.

3. Giulia Barbareschi and Zhouzhe Wu. 2022. Accessing Intimate Interactions: Investigating the need for More Inclusive Sex Education Resources. *CHI Conference on Human Factors in Computing Systems Extended Abstracts*, ACM, 1–6.
4. C. A. Beverley, P. A. Bath, and A. Booth. 2004. Health Information Needs of Visually Impaired People: A Systematic Review of the Literature. *Health and Social Care in the Community* 12, 1: 1–24.
5. Virginia Braun and Victoria Clarke. 2006. Using Thematic Analysis in Psychology. *Vol. 3*: 77–101.
6. Erin A. Brennan and Alan Santinele Martino. 2022. Disability is associated with sexually transmitted infection: Severity and female sex are important risk factors. *The Canadian Journal of Human Sexuality* 31, 1: 91–102.
7. Soyoun Choi and JooYoung Seo. 2020. Trends in Healthcare Research on Visual Impairment and Blindness: Use of Bibliometrics and Hierarchical Cluster Analysis. *Ophthalmic Epidemiology*: 1–8.
8. Hial Doner. 2015. Sexual knowledge, sexual experiences and views on sexuality education among adults with visual disabilities. .
9. Claudia S. Estcourt, Jo Gibbs, Lorna J. Sutcliffe, and et al. 2017. The ESEXUAL Health Clinic System for Management, Prevention, and Control of Sexually Transmitted Infections: Exploratory Studies in People Testing for Chlamydia Trachomatis. *The Lancet Public Health* 2, 4.
10. John Gangle, Leonard Baatiema, Reginald Quansah, and Anthony Danso-Appiah. 2020. Barriers facing persons with disability in accessing sexual and reproductive health services in Sub-Saharan Africa: A systematic review. *SSRN Electronic Journal*.
11. Jo Gibbs, Lorna J. Sutcliffe, Voula Gkatzidou, and et al. 2016. The Eclinical Care Pathway Framework: A Novel Structure for Creation of Online Complex Clinical Care Pathways and Its Application in the Management of Sexually Transmitted Infections. *BMC Medical Informatics and Decision Making* 16, 1.
12. Voula Gkatzidou and et al. 2013. A user-centred approach to inform the design of a mobile application for STI Diagnosis and management. *Electronic Workshops in Computing*.
13. Tracie C. Harrison, Michael Mackert, and Casey Watkins. 2010. Health Literacy Issues Among Women with Visual Impairments. *Research in Gerontological Nursing* 3, 1: 49–60.
14. Silje Havrevold Henni, Sigurd Maurud, Kristin Skeide Fuglerud, and Anne Moen. 2022. The experiences, needs and barriers of people with impairments related to usability and accessibility of digital health solutions, levels of involvement in the design process and strategies for participatory and Universal Design: A scoping review. *BMC Public Health* 22, 1.
15. Paul T. Jaeger. 2012. *Disability and the Internet: Confronting a Digital Divide*. Lynne Rienner Publishers, Boulder, CO.
16. Lucy Jiang and Richard Ladner. 2022. Co-Designing Systems to Support Blind and Low Vision Audio Description Writers. *The 24th International ACM SIGACCESS Conference on Computers and Accessibility*, ACM, 1–3.
17. Alimata Abdul Karimu. 2017. Exploring the Sexual and Reproductive Health Issues of Visually Impaired Women in Ghana. *Reproductive Health Matters* 25, 50: 128–133.

18. Woo Jin Kim, Il Kon Kim, Min Ji Kim, and Eunjoon Lee. 2018. Effect of UX Design Guideline on the information accessibility for the visually impaired in the mobile health apps. *2018 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*: 1103–1106.
19. Urvashi Kokate, Kristen Shinohara, and Garreth W. Tigwell. 2022. Exploring Accessibility Features and Plug-ins for Digital Prototyping Tools. *The 24th International ACM SIGACCESS Conference on Computers and Accessibility*, ACM, 1–4.
20. Chelsea Krupa and Shaniff Esmail. 2010. Sexual Health Education for Children with Visual Impairments: Talking about Sex is not Enough. *Journal of Visual Impairment & Blindness* 104, 6: 327–337.
21. Marc Lüchtenberg, Claudia Kuhli-Hattenbach, Yesim Sinangin, Christian Ohrloff, and Rainer Schalnus. 2008. Accessibility of Health Information on the Internet to the Visually Impaired User. *Ophthalmologica* 222, 3: 187–193.
22. Hans Persson, Henrik Åhman, Alexander Arvei Yngling, and Jan Gulliksen. 2014. Universal design, inclusive design, accessible design, design for all: Different concepts—one goal? on the concept of accessibility—historical, methodological and philosophical aspects. *Universal Access in the Information Society* 14, 4: 505–526.
24. Public Health England. 2015. Local action on Health Inequalities: Improving Health Literacy. .
25. N Ratna, M Glancy, and T Sonubi. 2021. *Sexually transmitted infections and screening for chlamydia in England, 2020*. Public Health England.
26. Georgia Ride and Danielle C. Newton. 2018. Exploring professionals’ perceptions of the barriers and enablers to young people with physical disabilities accessing sexual and reproductive health services in Australia. *Sexual Health* 15, 4: 312.
27. Shruti Sannon and Andrea Forte. 2022. Privacy Research with Marginalized Groups: What We Know, What’s Needed, and What’s Next. *Proceedings of the ACM on Human-Computer Interaction* 6, CSCW2: 1–33.
28. John Slade and Rose Edwards. 2019. Key Information and Statistics on Sight Loss in the UK. .
29. Bruno Splendiani, Mireia Ribera, Roberto Garcia, and Miquel Termens. 2014. Do Physicians Make Their Articles Readable for Their Blind or Low-Vision Patients? An Analysis of Current Image Processing Practices in Biomedical Journals from the Point of View of Accessibility. *Journal of Digital Imaging* 27, 4: 419–442.
30. Synthesis Lectures on Human-Centered Informatics. 2021. *Disability Interactions: Creating Inclusive Innovations*. .
31. Lindokuhle Ubisi. 2020. Using Governmentality and Performativity Theory to Understand the Role of Social Attitudes in Young People with Visual Impairment Access to Sexual and Reproductive Health Services. *Gender & Behaviour* 18, 2.
32. Rua Mae Williams, Louanne Boyd, and Juan E. Gilbert. 2023. Counterinterventions: a reparative reflection on interventionist HCI. *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, ACM.
33. Rua Mae Williams and Chorong Park. 2023. Cyborg Assemblages: How autistic adults construct sociotechnical networks to support cognitive function. *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, ACM.

34. World Health Organization. Global report on assistive technology. Retrieved from <https://apps.who.int/iris/bitstream/handle/10665/354357/9789240049451-eng.pdf>.
35. 2018. Web Accessibility Initiative. Web Content Accessibility Guidelines (WCAG) 2.1. Retrieved from <https://www.w3.org/TR/WCAG21/>