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Evaluating psychometric determinants of willingness to adopt sexual health patient portal services among Black college students: A mixed-methods approach

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Abstract

Objectives: To describe, using mixed-methods, perceptions of access to sexually transmitted infection test results via electronic personal health record (PHR) and correlates of willingness to adopt its use.

Participants: Students at a mid-Atlantic historically Black college.

Methods: Focus-groups and interviews were conducted to explore themes on sexual health-related PHR-use (n=35). Codes were operationalized into survey measures assessing beliefs in a cross-sectional sample (n=354). Exploratory factor analysis identified latent factors among survey items. Multiple logistic regression models measured correlates of adoption willingness.

Results: Three qualitative themes emerged on relative advantages, barriers, and functionality of PHRs. 57.6% of survey participants were willing to use PHRs for sexual health services. Reliable latent factors, centering on PHR convenience and functionality, were positively associated with adoption willingness.

Conclusions: Data highlights interest among Black college-age youth in adopting PHRs for comprehensive sexual health-related services. Adoption may be boosted with tailored designs responsive to expressed service needs.

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Declaration of Interest Statement

The authors have no conflicts of interest to disclose.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee.

Keywords

Patient portal adoption; minority youth; health disparities; HIV/STIs; Health IT

Introduction

Reported cases of sexually transmitted infection (STI) annual increased for the fourth consecutive year in the United States (US); reaching a record high in 2017.¹ STIs, including HIV, annually account for over \$16 billion in taxpayer costs with half of the cases among youth ages 15-24 years.¹ Black youth have STI rates 4.0 – 16.8 times higher than White counterparts and addressing these disparities are a public health priority.²⁻⁴ The role of socio-structural factors, which limit access to health care, is well-documented in potentiating racial disparities in STIs. Social and cultural discrimination, provider bias, déclassé quality of care, discourage some Black youth from seeking care and attenuates trust in healthcare systems.⁵⁻⁷ These and other multi-level barriers, such as stigma associated with STI testing, and financial constraints have traditionally marginalized Black youth from sexual and reproductive health care service.⁸⁻¹⁰ Among Black college-aged youth, males tend to participate far less in preventive STI behaviors, such as testing and believe it is less important to talk with partners about testing compared to female counterparts.^{8,11} The patchwork of disparity-contributing forces at play highlights the need for novel approaches that resonate with Black college-aged youth to address disparities moving forward. Patient portals offer promise to counteract factors propagating sexual health disparities by supporting STI prevention norms, including building knowledge and awareness, promoting healthy communication, and linking patients to sexual health services.¹¹

Electronic personal health records (abbreviated as PHRs) or online medical records, which are accessed through electronic health record (EHR) patient portals, enable individuals and caregivers to access their health information.¹² As of 2017, 52% of individuals nationwide have been offered online access to their medical records by a health provider; 85% of those who accessed their online medical record used it to view test results in the past year.¹² However, the adoption of PHRs remains low. Nationally, PHR utilization averaged around 28% as of 2017.¹² Further, underrepresented minorities are among the lowest patient portal activation and utilization.¹³⁻¹⁵

PHR-based interventions have worked to improve health-related behaviors among patient cohorts.¹⁶⁻¹⁸ Similar interventions may be designed to reduce STI racial disparities. However, the need remains for behavioral research on psychometric determinants of willingness to adopt the use PHRs for sexual health services. Promoting patient portal adoption and PHR utilization among Black youth is foundational to future Health IT interventions focused on improving sexual health outcomes. Intentions to use PHRs are generally determined by the perceived benefits of improving health.¹⁹ The overall goal of the study, the first of its kind among college-aged Black youth, is to determine health beliefs about patient portal use for sexual health services. We employ formative qualitative and quantitative research methods to identify latent variables of PHR use; further testing the variables as determinants of willingness to adopt PHRs.

Materials and methods

Study overview

The Electronic Sexual Health Information Notification and Education (eSHINE) Study is an exploratory mixed-methods investigation that examined perceptions about using online medical records to share and discuss STI test results with sex partners.¹¹ Qualitative phase (N = 35) and quantitative phase (N = 354) participants were students ages 18-25 years at a Historically Black College and University (HBCU) within the United States (US) mid-Atlantic region. Participants were recruited by the first author using several methods, such as distributing study flyers at heavily trafficked campus locations, university-wide e-mail announcements, posting study posters around campus, speaking at student organization meetings and events, and offering raffle prizes in addition to remuneration as an incentive. At the time of the study, neither the campus health center nor local STI clinic offered clients PHR access. A constructivist lens was applied to understand perceptions of patient portals as a channel for engaging clients in sexual health services, particularly, use of PHRs to view STI test results.²⁰ Diffusion of innovation theory (DOI) purports that the key elements determining adoption are the innovation and its attributes, the adopters, communication channels, time, and social systems.²¹ The initial qualitative research phase of Exploratory Mixed-Methods design was structured to allow the study population to identify the variables and constructs most relevant to patient portal use in sexual health – a useful strategy for research questions lacking prior study.²⁰ We present thematic findings from our qualitative study describing perceived attributes of the innovation, primarily its relative advantages, service features, and barriers to its adoption. Then, we develop psychometric measures of sexual health-related PHR use and determine the correlates of PHR adoption willingness.

Qualitative methods

A purposeful sample of Black college-age students was recruited between May and July 2014. The sample consisted of students representing a mix of class standings (freshman, sophomore, etc.), majors, student-athletes, heterosexual men and women, men who have sex with men, and members of Greek-lettered organizations. Audio-recorded focus group discussions (FGDs) and individual interview sessions were moderated by the first author inside private conference rooms located on the university's campus. FGDs lasted an average of 70 minutes and were used to recruit participants for one follow-up individual in-depth interview session. Interview sessions averaged 45 minutes in length. A total of three FGDs (n=6; n=10; n=17) and 18 individual in-depth interview sessions were conducted. Qualitative phase participants received USD 25 per session.

FGDs began by showing participants a video demonstration via YouTube describing Quest360, a web- and mobile-based service for Quest Diagnostics laboratory allowing users to view laboratory test results. Later, participants were shown a webpage for Hula, a company (at the time of the study) that provided users with online access to STI test results. FGDs explored perceptions on several aspects of PHR and patient portal use for sexual health services. Sessions concluded by inviting participants to schedule an interview session for an additional USD 25. Interview sessions were used to review and probe on FGD topics for congruency and contradictions in a setting away from peers. Demographic and sexual

risk behavior information was also collected during interviews to respect the privacy and sensitivities of sexual health topics.

Drawing from Grounded Theory methods of zig-zagging between data collection and analysis, FGD and interview recordings were immediately reviewed following sessions by the first author to construct field notes and inform questions in subsequent sessions.²² Transcripts and field notes were uploaded to ATLAS.ti.²³ Qualitative analyses included reading through transcripts and field notes, identifying useful quotes, creating memos, coding segments of information, assigning labels to codes, and the grouping of codes into broad themes.²² Qualitative results present three thematic categories on PHR use for sexual health services: Relative Advantage of PHRs, Barriers to PHR and Patient Portal Adoption, and Patient Portal Functionality.

Survey development

A cross-sectional study was conducted to generalize the initial qualitative study findings. Survey items measuring perceptions related to PHR use were constructed by operationalizing individual codes within emergent qualitative research themes (mentioned above) into quantitative variables.²⁴ Variables were measured using 7-point Likert scales evaluating behavioral constructs from an integrative model of behavioral prediction (i.e. behavioral beliefs, self-efficacy beliefs, behavioral intentions) and binary yes/no response items.^{25,26} The primary outcome measure of interest, willingness to adopt PHRs for viewing STI results, was defined as whether participants would receive STI results using PHRs. Responses ranged from “strongly disagree” to “strongly agree” (scored -3 to 3). Responses were dichotomized as *willing* (“strongly agree” or “agree”) and *unsure/unwilling* (“strongly disagree” to “somewhat agree”) for logistic regression.

Data on background variables, including demographic information (age, gender, class year), healthcare-seeking behaviors, and STI testing history were also collected in the survey. Binary (yes/no) items identified barriers to using PHR services. Barriers included, (1) Personal privacy breach (2) Digital device memory space limitations (3) Difficulty in use (4) Inaccurate health record information and (5) Price of PHR. Healthcare utilization measures (yes/no) indicate health services used in 12 months before the study, including visits to a primary care provider, on-campus infirmary, emergency department (ED) and urgent care, and STI clinic.

Quantitative methods

Between January and May 2015, participants were recruited to complete a self-administered online survey hosted by Qualtrics.²⁷ To access the online survey, a secured web-link was sent to the university email address of enrolled participants. At the survey introduction, participants were presented with a three-response multiple-choice question that required them to correctly define PHRs as electronic applications that allows online access to medical records. Participants with correct responses were permitted to proceed with the survey, participants with incorrect responses were directed to try again until selecting the correct response. Collectively, the questionnaire was comprised of 116 items and took an average of 30-45 minutes for participants to complete. Quantitative survey participants received USD

20 upon completion of the survey. A full copy of qualitative and quantitative research phase data collection protocols is available in Online Supplemental Material Appendix.

Statistical analysis

The survey included sixteen items measuring belief constructs (scored -3 to 3) within domains of PHR relative advantages, adoption barriers, and functionality. To identify latent constructs and reduce data, exploratory factor analysis (EFA) was conducted on the 16 items. A principal components analysis (PCA) was initially conducted to determine the number of factors to retain.²⁸ Following Comrey and Lee, 0.55 was used as a “good” factor-loading cutoff.²⁹ Factor loadings ranged from 0.65 to 0.89 in our analysis. Promax rotation was used to simplify the data structure as inter-scale correlation was greater than 0.32.³⁰ Meaningful interpretability of factors and the scree plot method with eigenvalues greater than one (1) was used as the basis for factor retention.²⁹

Raw scores for variables loading above 0.55 onto a factor were summed to estimate latent factor scores.²⁹ To measure the internal reliability of the scales, Cronbach’s alpha values were calculated using 0.7 as a cutoff.³¹ Scale reliability coefficients were also calculated by PHR adoption willingness (willing vs. unsure/unwilling) and gender (male vs. female). The Kaiser-Meyer-Olkin (KMO) score for measuring of sampling adequacy was calculated.³²

To build the binomial multiple logistic regression model, chi-square analyses were conducted on healthcare-seeking practice and sexual risk behavior a priori variables anticipated to be associated with the willingness to adopt PHR-delivered STI results. The variable retention criterion for the final multiple logistic regression model was set to $p < .20$ and also adjusted for participant gender. Online survey data were analyzed using Stata Release 14 statistical software.³³ Statistical significance was defined as $P < .05$.

Results

Qualitative results

Although the study’s purpose was to focus on exploring the use of PHRs to view and share STI test results, FGDs and interview discussions often expanded to patient portal functionality – defined as additional sexual health-related services valuable to patient portal capacity. Participants supporting PHR use viewed it as a way to optimize access and engagement with sexual health. Participants opposing use were largely concerned about personal health information being breached. Some participants with privacy concerns were unsure about PHR adoption; one participant described being “on the fence”. Three themes emerged on sexual health-related use of patient portals: Relative Advantage of PHRs, Barriers to PHR and Patient Portal Adoption, and Patient Portal Functionality. Thematic descriptions, salient codes, and quotations mapped with perceived intention to use PHRs to view STI test results are presented in Table 1.

Quantitative results

Sample characteristics—1,093 students registered for the eSHINE Study Online Survey and were sent secure survey links using the university’s student email server. Surveys

started, completed, and completed without missing data, were $n=501$, $n=380$, and $n=354$, respectively. The final sample consisted of 167 male and 187 female participants with a median age of 20 years. Few reported viewing test results using an online medical record (13.6%; 48/354). Nearly half of the sample (153/354) reported STI screening in the seven months prior to the study; 16.7% (59/354) reported a history of STI diagnosis. An estimated 68.1% of participants (241/354) reported a primary care provider visit and 24.6% (87/354) reported an ED visit in the 12 months prior to the study. Fear of personal privacy breach (42.9%; 152/354) and concern about out-of-pocket costs (43.2%; 153/354) were the most frequently reported barriers to adopting PHR use (Table 2). The most valued conceptual PHR features were resources for finding test centers (86.7%) and tools for managing sexual health (85.6%) were the most valued services to include in PHR products (Table 2).

Participants with positive scores in favor of adoption constituted 57.6% (204/354) of the sample - Table 2. A quarter of participants (96/354) neither agreed nor disagreed on intentional beliefs to adopt PHR-delivered results. Mean scores were higher among male participants (mean =0.84, SD =1.46) compared to female participants (mean=0.65, SD=1.48); however, the difference was not statistically significant, $t(352)=1.21$, $P=.23$ – not shown.

Psychometric Results—The PCA analysis produced four eigenvalues greater than 1 with three points above the Parallel Analysis threshold. Together, the three components explained 60.8% of the variance; with eigenvalues ranging from 1.81 to 5.84, thus, suggesting a minimum three-factor structure for the EFA. The overall EFA KMO score was 0.8740, suggesting the data was adequate for factor analysis. Items measuring beliefs about the vulnerability to privacy breach and privacy concerns as a barrier to utility failed to load above the 0.55 threshold. In total, four items did not load above the 0.55 threshold and were excluded; no items cross-loaded above 0.4. Descriptions of emergent factors, mean scores, the variance accounted for by factors, and internal reliability measures are presented below. A complete list of factor loadings and corresponding survey items included in latent variable analysis can be found in the Online Supplemental Materials Appendix. The following section describes three emergent EFA factors. Table 3 presents internal reliability coefficients and mean scores for the two retained factors. Cronbach's alpha was calculated by willingness to adopt PHR delivered STI results and gender.

The Sexual Health Engagement factor, (mean=5.91, SD=4.11) estimates beliefs that PHRs, (1) present a more convenient method for managing health records, (2) increase health awareness, (3) enable healthy decision making, and (4) agreeability with managing medical records with PHRs. Consisting of 4 items, this factor accounts for 49.2% of the variance; higher scores indicate stronger perceptions of adoption benefit to sexual health engagement. The Informational Resource Compatibility factor, (mean=4.56, SD=4.58) estimates the intention to use PHRs as a resource for finding information on, (1) STI prevention, (2) transmission, and (3) treatment. Consisting of 3 items and accounting for 37.2% of the variance; higher factor scores indicate stronger intentions to use PHRs as a hub for STI information. The mean scores for both factors were significantly higher among participants willing to adopt PHRs for STI result delivery ($P<.001$). Effect size by willingness to adopt

PHR delivered STI results were $d=1.11$ for Sexual Health Engagement and $d=0.62$ Informational Resource Compatibility. There were no significant differences by gender.

The Service Valuation factor accounted for 54.8% of the variance and was not retained in the multiple logistical regression models because it lacks meaningful interpretability as a variable under domains of willingness to adopt PHR-delivered STI results. It also failed to meet the $p < 0.20$ threshold in our Chi-square analysis. Therefore, statistics for corresponding items were presented in Table 2 under valuation of PHR and patient portal services.

Binomial multiple logistic regression on willingness to adopt PHRs for STI

test results—Table 4 shows that identifying personal privacy breach as a barrier was one of the strongest predictors of willingness to adopt PHRs in our adjusted model. These participants are significantly less likely to adopt PHRs (aOR=0.29; 95% CI 0.10 to 0.87; $P=.03$). Both Sexual Health Engagement and Informational Resource Compatibility were associated with willingness to adopt PHR delivered results (Table 4). In our adjusted model, one unit increases in *Sexual Health Engagement* and *Informational Resource Compatibility* scales were associated with 36% (95% CI: 1.20 to 1.55; $P < 0.001$) and 12% (95% CI 1.03 to 1.21; $P < .01$) increases in the odds of being willing to adopt PHRs. Participants with an ED visit 12 months before the study had a 65% lower odds of being willing to adopt PHRs (95% CI 0.16 to 0.75; $P < .01$).

Discussion

Principal findings

We investigated online medical records as a path to improve normative behaviors and engagement with sexual health care services among Black youth. Mixed-methods findings demonstrate an interest in adopting patient portals for comprehensive sexual health-related services among Black college-age youth. Our latent factor scales, Sexual Health Engagement, and Informational Resource Compatibility are statistically reliable. Scale measures differ significantly by adoption willingness and provide more substantive understandings of the perceived sexual health value of patient portals. For adopters, PHRs was viewed as an innovative and more convenient platform to engage in sexual health care and build sexual health knowledge and awareness. Participants envision patient portals as a channel to deliver comprehensive and tailored sexual health services, such as educational resources on STI transmission, treatment, and prevention. Desired patient portal features include the ability to communicate with healthcare providers and receive counsel for positive STI test results. These findings are supported by other research that has demonstrated the support for online access to HIV and STI test results among adolescents and residents of low income and urban settings.^{34, 35}

Our study supports a growing body of literature on receptiveness to technology-based STI interventions including, tools to build knowledge, deliver test results, collect patient-reported metrics, and communication skills-building through web- and mobile-based interventions among MSM and adolescent girls.³⁶⁻³⁸ Findings may very well complement intervention research focused on encouraging patient portal adoption and utilization among youth from

minority communities.³⁵ Planning such clinical interventions may incorporate our psychometrics to compare effectiveness in marketing PHR adoption to patient populations.

Privacy concerns: A deal-breaker for some, not most

The role of privacy concerns as a barrier to adopting online health records cannot be understated. Privacy was the most salient perceived barrier to use in both our qualitative and quantitative analysis; in fact, privacy concerns were the only barrier that remained significant in the multivariable regression model. While few participants were completely opposed to the use of PHRs for STI test results, many were unsure, likely indicating unresolved privacy concerns. Prior research has also supported that real and perceived vulnerability to unauthorized access to personal information or breach of privacy are salient determinants of PHR adoption.³⁹ Participants willing and unwilling alike acknowledge risks of personal privacy violations with the adoption of PHRs for sexual health services. Concerns about privacy need to be addressed adequately and perpetually in order to optimize the use of PHRs and patient portals. The Health Information Portability and Accountability Act (HIPAA) Privacy Rule, Health Information Technology for Economic and Clinical Health (HITECH), as well as laws against cybercrimes clearly outline regulations and penalties for violating electronic data privacy laws and security standards. However, legal protections against the unauthorized acquisition and transfer of electronic personal health information between persons may be less understood.

Social inequities in access to care, patient portals

Black youth face disparities in access to health care, including access to patient portal services. The availability of online medical records for patients is a healthcare quality measure in the US – however, it has not become a standard at many public clinic settings.⁴⁰ Public STI clinics remain critical venues to STI testing and diagnosis in Black youth – however, such clinics are just as critically underfunded.⁴¹ The issue with no PHR access, as described by qualitative research phase participants, is that young people do not return to clinics for their STI test results unless contacted for positive results. Thus, PHRs serve as a major potential advantage to status quo testing experiences - which renders such youth disconnected from important personal health information. Public clinics and college settings alike may consider implementing patient portal services as a measure to support sexual health engagement and empowerment among Black youth.

Limitations

Qualitative and mixed-methods research design is recommended to understand the adoption of consumer health technologies.³⁹ However, care should be taken in extrapolating findings to broader populations of Black youth since our study sample was limited to students at one university. Further studies are needed to validate our patient portal psychometrics in broader samples of Black youth; and similarly, among other priority populations for STI prevention and management. Still, the need for innovative new strategies to optimize sexual health among our study sample is evidenced by several reported behaviors which potentiate STI transmission and a prevalence of STI diagnosis history in almost a fifth of the sample.¹¹

Further investigations are needed to elucidate the relationship between recent ED visit and PHR adoption beliefs. However, it may suggest a relationship with the difficulty experienced by EDs users in navigating the healthcare system or gaining healthcare access. Another limitation of our study is that home and self-test kits were not explicitly discussed as a method for test seeking in the study. Nevertheless, as the use increases, examining PHRs as a feature of self-test kits may be useful in further evaluating innovation attributes salient to adoption.

Study Implications

Clinical settings may face challenges in getting patients to engage with patient portal systems. Our psychometric scales, the first of its kind on sexual health services among Black college-aged youth, scientifically deducts salient factors impacting adoption decisions. Increasing the adoption of PHRs among youth may likely be augmented with messaging that targets the convenience of online health records, including their value in empowering greater engagement with good sexual health practices. Higher latent variable scores among male participants suggest that engagement through online health record services may be a reasonable gendered-approach to address lower levels of STI healthcare engagement in young Black males.^{8,42} Further, expanding the use of patient portals to deliver personalized feedback using patient-reported sexual health and well-being related outcomes may encourage greater uptake and more regular use.⁴³ Given the high rates of healthcare-seeking practices in our sample, online health records may most broadly be diffused in primary care settings and university health centers.

We present scientific evidence to move forward with innovative efforts to increase engagement among college-aged Black youth with patient portal sexual health services. Improving testing practices and shifting the stigma on STI testing is at the core of preventing STI transmission. Designing easily accessible patient portals tailored to the health needs of traditionally marginalized populations, like Black college-aged youth, could prove a cost-effective strategy in reducing the economic and social burden of STIs and its disparities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Qualitative findings on willingness to adopt PHR-delivered STI results among eSHINE Study focus group and individual interview participants (n=35)

Thematic Classifications	Codes	Quotations	Willing to adopt (Yes/No)
Relative Advantage of PHRs	More convenient service delivery Improved health awareness Incentivized patient engagement	<p>"Everything is at your fingertips." Male, Interview</p> <p>"Having access to your records, seeing it, it really connects you to your health and health providers. Say you are supposed to get tested every month, you feel good about yourself having a record of it. And that would definitely encourage people to get tested more (...) the running apps encourage people to run more." -Male, Focus group discussion 2</p> <p>"Some people go to the doctor for a test and are too lazy to go find out the result." -Female, Focus group 2</p> <p>"A lot of people go to the doctor but records are mostly kept with the doctor, so this allows people to be more conscious of what is going on with their body." Female, Interview</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Barriers to PHR and Patient Portal Adoption	Mass privacy breach (hackers) Interpersonal privacy breach Out-of-pocket costs Attenuated patient-doctor relationship	<p>"I just don't want none of my personal information sitting on a phone. People take phones all the time, it can get hacked." -Male, Interview</p> <p>"My biggest concern is the security. I just want to make sure that hackers, that nobody can access my information but me. This is the only disadvantage I see." -Female, Focus group 1</p> <p>"If my friend goes through my phone and sees that I actually do have something. That's a disadvantage, unless it has a passcode. That's the only disadvantage." -Female, Interview</p> <p>M: "How much are you willing to pay for this?" P: "Pay?! Nothing! It should be free!" -Female, Interview</p>	<p>No</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Patient Portal Functionality	Counsel and linkages for positive STI results Personally tailored risk assessment and health service delivery	<p>"[Your] doctor is supposed to know everything, if you are handling everything through technology, there is no personal connection." -Female, Focus group discussion 3</p> <p>"The only thing it could be missing is if you come up positive, having something like 'ok, don't worry' or some advice." -Female, Focus group 2</p> <p>"The pretest asks, when was the last you had unprotected sex and it went down the list. If you scored an eleven or five, then you are at high risk or low risk. A little mini survey... would give you more incentive to say, maybe I should get tested because I am on the risky side." -Female, Focus group discussion 2</p>	<p>No</p> <p>Yes</p> <p>Yes</p>

Table 2.

Descriptive statistics and perceptions of PHR delivered sexual health services among students at a historically Black university, eSHINE Study online survey participants (n = 354)

Variable Name	Total (n=354)	Males (n=167)	Females (n=187)	Chi-square	P Value
Age in years	n (%)	n (%)	n (%)		
Median (IQR)	20 (19-22)	20 (19-22)	20 (19-22)		
Academic Classification (current enrollment)					
Freshman	89 (25.1)	57 (34.1)	32 (17.1)	23.64	<.001
Sophomore	82 (23.1)	42 (25.1)	40 (21.4)		
Junior	87 (25.6)	37 (22.2)	50 (26.7)		
Senior	88 (24.9)	31 (18.6)	57 (30.5)		
Graduate student	8 (2.3)	0 (0.0)	8 (4.3)		
STI screening history					
6 months	153 (43.2)	53 (31.7)	100 (53.5)	21.14	<.001
> 6 months	81 (22.9)	39 (23.3)	42 (22.5)		
Never tested	80 (22.6)	51 (30.5)	29 (15.5)		
No history of sexual intercourse	40 (11.3)	24 (14.4)	16 (8.6)		
History of STI diagnosis (lifetime)	59 (16.7)	14 (8.4)	45 (24.1)	15.62	<.001
Healthcare utilization in 12 months prior					
Primary care provider	241 (68.1)	98 (58.7)	143 (76.5)	12.84	<.001
Campus infirmary	115 (32.5)	49 (29.3)	66 (35.3)	1.42	.23
Emergency department or urgent care visit	87 (24.6)	32 (19.2)	55 (29.4)	5.00	.03
HIV/STI clinic	61 (17.2)	24 (14.4)	37 (19.8)	1.81	.18
Ever viewed medical test results electronically	48 (13.6)	17 (10.2)	31 (16.6)	3.08	.08
PHR adoption willingness for viewing STI test results				1.06	0.59
Supports adoption	204 (57.6)	101 (60.5)	103 (55.1)		
Unsure	96 (27.1)	42 (25.1)	54 (28.9)		
Opposes adoption	54 (15.2)	24 (14.4)	30 (16.0)		
Endorsed perceived barriers to PHR adoption (not mutually exclusive)					
Personal privacy breach	152 (42.9)	64 (38.3)	88 (47.1)	2.75	.10
Limited memory space	97 (27.4)	50 (29.9)	47 (25.1)	1.02	.31
Difficult to use	64 (18.1)	26 (15.6)	38 (20.3)	1.34	.25
Inaccurate health record information	122 (34.5)	53 (31.7)	69 (34.5)	1.04	.31
Price of PHR	153 (43.2)	75 (44.9)	78 (41.7)	0.37	.54
Valuation of PHR and patient portal services (Functionality)					
Counsel and resources for individuals with STI infection					
Important	297 (83.9)	127 (76.0)	170 (91.9)	14.42	<.001
Not important/Neutral	57 (16.1)	40 (24.0)	17 (9.1)		
Sexual health management tools					

Variable Name	Total (n=354)	Males (n=167)	Females (n=187)	Chi-square	P Value
Important	303 (85.6)	132 (79.0)	171 (91.4)	11.00	.001
Not important/Neutral	51 (14.4)	35 (21.0)	16 (8.6)		
STI test site locator					
Important	307 (86.7)	135 (80.8)	172 (92.0)	9.51	.002
Not important/Neutral	47 (13.3)	32 (19.2)	15 (8.0)		
Access complete medical/health records					
Important	279 (78.8)	126 (75.4)	153 (81.8)	2.14	.14
Not important/Neutral	75 (21.2)	41 (24.6)	34 (18.2)		
Communication portals with doctors and other healthcare providers					
Important	294 (83.0)	130 (77.8)	164 (87.7)	6.09	.01
Not important/Neutral	60 (17.0)	37 (22.2)	23 (12.3)		

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Table 3.

Internal reliability and mean scores for Sexual Health Engagement and Information Resource Compatibility Scales (n = 354)

STI PHR Utility Sub-scales ^a	Sexual Health Engagement		Informational Resource Compatibility	
	Cronbach's alpha	Mean Scores (SD)	Cronbach's alpha	Mean Scores (SD)
Gender				
Male (n=167)	0.82	6.14 (3.97)	0.86	4.74 (4.17)
Female (n=187)	0.81	5.70 (4.23)	0.89	4.39 (4.92)
Willingness to adopt STI PHRs ^{b,c}				
Unsure/ Unwilling (n=241)	0.77	4.45 (3.87)	0.87	3.65 (4.68)
Willing (n=113)	0.72	9.03 (2.59)	0.86	6.48 (3.72)
Total	0.82	5.91 (4.11)	0.88	4.56 (4.58)

^aInterscale correlations: $r = 0.40$

^{b,c}Effect sizes for willingness to adopt STI PHR categories by scale: ^bSexual Health Engagement $d = 1.11$; ^cInformational Resource Compatibility $d = 0.62$

Table 4.

Unadjusted and adjusted multiple logistic regression on acceptability of PHR delivered STI results among eSHINE Study online survey participants (n = 354)

Predictors	Unadjusted odds ratio (95%CI)	P Value	Adjusted odds ratio (aOR) (95% CI)	P Value
Female	0.70 (0.45, 1.10)	.13	0.71 (0.37, 1.36)	.30
Visited emergency department (ED) in 12 months prior to study	0.60 (0.35, 1.05)	.08	0.35 (0.16, 0.75)	.007
Barriers to PHR adoption				
Personal privacy breach	0.04 (0.03, 0.12)	<.001	0.29 (0.10, 0.87)	.03
Limited memory space	0.07 (0.03, 0.19)	<.001	0.40 (0.13, 1.26)	.12
Difficult to use	0.11 (0.04, 0.31)	<.001	0.46 (0.12, 1.78)	.26
Inaccurate health record information	0.08 (0.04, 0.18)	<.001	1.01 (0.29, 3.58)	.99
Price of PHR	0.08 (0.04, 0.15)	<.001	0.37 (0.13, 1.09)	.07
Factor Scales				
Sexual Health Engagement	1.65 (1.47, 1.84)	<.001	1.36 (1.20, 1.55)	<.001
Informational Resource Compatibility	1.19 (1.11, 1.28)	<.001	1.12 (1.03, 1.21)	.008