BMJ Open

Chlamnet Study II: "To be on the safe side" – a qualitative study regarding beliefs and experiences of internet-based self-sampling for Chlamydia trachomatis and Neisseria gonorrhoeae testing

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-041340
Article Type:	Original research
Date Submitted by the Author:	05-Jun-2020
Complete List of Authors:	Grandahl, Maria; Uppsala University, Women's and Children's Health Larsson, Margareta; Uppsala University, Women's and Children's Health Hermann, Björn; Uppsala University, Section of Clinical Bacteriology, Department of Medical Sciences
Keywords:	PUBLIC HEALTH, QUALITATIVE RESEARCH, INFECTIOUS DISEASES, SEXUAL MEDICINE, REPRODUCTIVE MEDICINE

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Chlamnet Study II: "To be on the safe side" – a qualitative study regarding beliefs and experiences of internet-based self-sampling for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* testing

Maria Grandahl[1], Margareta Larsson[1], Björn Herrmann[2]

[1]Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

[2]Section of Clinical Bacteriology, Department of Medical Sciences, Uppsala University, Uppsala, Sweden

Correspondence to Maria Grandahl, Uppsala University, Department of Women's and Children's Health, 751 85, Uppsala, Sweden; maria.grandahl@kbh.uu.se

Word count, Text: 3050; Abstract: 292

Keywords: *Chlamydia trachomatis*; testing; user perspective; risk-benefits; sexual behaviour

ABSTRACT

Objectives In Sweden, an increasing number of tests for sexually transmitted infections are conducted. Self-sampling services are provided free of charge at the national eHealth website. Our aim was to get a deeper understanding of users' beliefs and experiences of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) self-sampling services.

Methods This qualitative study is part of the national project "Internet-based chlamydia and gonorrhoea self-sampling test", conducted in Sweden. Individuals ordering a CT/NG self-sampling test at home from the eHealth website were invited to participate. Out of 114 individuals who agreed, a purposeful sample including 20 females and males aged 18–49 years (mean 30.8) participated in a telephone interview in 2019.

Results The test service for CT/NG was highly appreciated by men and women of different ages. Round-the-clock accessibility, avoiding clinical visits, ease of use, confidentiality, and a rapid test result were reasons for this appreciation. Language, uncertainty about the correct sampling procedure, unreliable postal services, and concerns about handling of personal data were mentioned as barriers. Reasons for testing were checking after unprotected sex, symptoms, checking a partner's fidelity, or a regular routine – "to be on the safe side". Knowledge about the infections and their consequences was limited; some considered them severe, especially if they could threaten fertility, others were less concerned. Disclosing an infection was described as emotionally stressful. Participants had high self-efficacy in relation to the test and would not hesitate to use the service again, even if it involved a cost.

Conclusions Internet-based CT/NG self-sampling at home was highly appreciated and was used for individual health reasons, but also out of concern for others' health and for society as a whole. The benefits seem to outweigh the barriers and the service should therefore continue to be widely offered.

Strengths and limitations of this study

- This study is based on a theoretical framework, The Health Belief Model and aimed to get a deeper understanding of users' beliefs and experiences of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) self-sampling services.
- A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing.
- We conducted telephone interviews with a purposeful sample of individuals' of different sex and sexual identity.
- A limitation was that interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.
- As in all qualitative research, the aim is not to generalise but the results might be useful in similar settings.

INTRODUCTION

From a public health perspective, it is of paramount importance to promote and address sexual and reproductive health, since it concerns a large proportion of the population. There is a growing interest in offering gender-sensitive, effective internet-based care options to improve accessibility, equity and cost-effectiveness.[1-3] Targeting both women and men at risk of sexually transmitted infections (STIs) may have lifelong importance for the individual and considerable implications for public health.[4]

One such internet-based initiative is the offer of free-of-charge testing for *Chlamydia trachomatis* (CT*)/Neisseria gonorrhoeae* (NG) with self-sampling at home. The service has been tested in some countries as a study project or in routine diagnostics.[5-9] In Sweden it is currently provided by the public health care service and is available in all counties, through two national e-Health websites.[10] Individuals with a confirmed infection are directed to a clinic for free treatment and partner notification.

An earlier Swedish study showed that users were mostly young people with high sexual risk behaviour.[11] A recent study found that self-sampling, when compared with clinic-based sampling, comprised 22% of all CT tests in 2017 and accounted for 20% of all detected CT cases.[10] The positivity rate was similar to clinic-based testing (5.5% vs 5.1%), as was the proportion of men using the service (33.7% vs 30.8%).

A review of users' experiences of self-sampling concluded that self-sampling was appreciated by those using it.[12] However, the review included only ten studies with home-based sampling and none of them was conducted in Sweden. Our aim was therefore to gain a deeper understanding of users' beliefs and of their experiences of the home-based self-sampling service currently offered in Sweden.

METHODS

Design and setting

The present qualitative interview study is part of the project "Internet-based chlamydia and gonorrhoea self-sampling test", undertaken in Uppsala county, a region with a population of 368 000. The study follows Standards for Reporting Qualitative Research[13] and is reported according to COREQ Checklist (Supplemental File).[14]

Sample and procedure

Eligible participants were individuals ≥15 years of age who had ordered a CT/NG self-sampling test from the national eHealth website. They were invited to participate in a telephone interview. Those interested provided their name, address and mobile phone number, and completed a consent form online. In all, 114 individuals agreed to participate, and of these, 20 men and women with a wide range of ages and representing different sociodemographic areas were included in the study, based on the estimation that we needed about 20 interviews to reach information power (i.e. adequate information on the topic).[15]

The interviews were conducted in 2019, lasted between 30 and 52 minutes and were audio-recorded using the application 'TapeACall Pro'. Each interview started with brief information about the study. The interviews were transcribed verbatim and no repeat interviews were carried out. The interviewers (MG and ML) are health professionals and PhDs with experience of qualitative methods and the topics in question.

Interview guide

We used a semi-structured interview guide, based on a previous study about STIs and sexual health.[16] Study-specific questions were constructed based on previous research and on a quantitative internet-based questionnaire that is part of this project.[17] Two pilot interviews resulted in minor changes to the guide. In summary, the questions focused on the informant's beliefs and experiences of using the CT/NG self-sampling test, with a special emphasis on chlamydia (table 1).

Theoretical framework – the Health Belief Model (HBM)

The HBM is useful in understanding factors that influence health behaviour.[18] The model includes the following central constructs: *perceived susceptibility, perceived severity, perceived benefit, perceived barriers and individual behaviour*. In addition, sociodemographic factors such as age, sex and ethnicity, and also knowledge, can influence the individual's behaviour. Important concepts in the theory are *cues to action*, which can motivate individuals to alter their behaviour, and *self-efficacy* – the ability of the individual to perform certain behaviour. In addition, the authors suggest a modification of the model to include *modified behaviour.*

Analysis

We used a deductive approach[19] with key concepts from the HBM to analyse and discuss our findings. The transcripts were read in order to get an overall picture of the data. Units of meaning were extracted, condensed and labelled with a colour mark. These units were then sorted into suitable HBM categories by two researchers working individually. Finally, all the authors discussed the categories until consensus was reached.

Ethical considerations

This study was approved by the Swedish Ethical Review Authority (Dnr. 2018/250). All participants received written information and provided consent online.

Patient and Public Involvement statement

By definition patients are involved in this interview study. Before commencement, the interview guide was tested on representatives of the public, i.e. individuals similar to the target group. For details see Sample and procedure.

RESULTS

In total, 11 females and 9 males, 18–49 years of age (mean 30.8), participated. The participants had different sexual identities (hetero- and homosexual) and diverse countries of birth and cultural backgrounds. The findings are presented according to the HBM concepts and are summarised in figure 1.

Modifying factors

A plethora of modifying factors such as individual personality, sexual identity, sexual behaviour, current relationship status, health awareness and country of birth seemed to influence use of the self-sampling test. Individual emotional factors such as being shy and feeling discomfort during physical examination were also mentioned. Moreover, trust or distrust in one's partner, as well as previous experience of infidelity or betrayal or encountering unknown sex partners via dating applications, were factors expressed.

In many relationships it happens that … you become aware of infidelity because of a positive chlamydia test (Woman, aged 25).

I am not very comfortable with someone else touching my penis. My first thought was: Will this hurt or won't it? (Man, aged 21)

Knowledge

Participants had limited knowledge about chlamydia and were unsure of its consequences. Most stated that CT was a common STI with few or no symptoms. They did not know how the infection could affect health, but believed that if untreated it could threaten fertility. Some stated that they were unsure how CT was transmitted, whether it was transmitted through body fluids, by oral sex or if women have sex with women. There were uncertainties about whether CT was a bacterium and how it was treated.

I don't know how it would feel if I had it, if you get symptoms, which I don't think you do. And then I don't know the consequences. I actually know very little (Woman, aged 47).

I have never heard any of my male friends saying that they have ordered it (the test kit), so I don't know if it (the infection) exists among guys (Man, aged 23).

Severity

Most participants expressed the view that a chlamydia infection would be serious, especially for emotional reasons. They would feel guilty and that they were betraying others. Registration of cases under the Communicable Diseases Act was appreciated as a means of

preventing spread of infections in the population. Compulsory contact tracing, however, was demanding. The entire procedure was cumbersome, the worst part being disclosing a chlamydia infection to previous and/or current partners. These participants considered that fertility was important and that infertility would be the worst thing that could happen to them. Others were less bothered. They just needed antibiotic treatment and then everything would be OK.

I really, really want to have children. So, even if … because I am in a same-sex relationship, which makes it even harder. But still, it is very, very important for me to be able to have a child (Man, aged 38).

I would find it hard, but not the end of the world. You don't die from it. The worst part would be disappointing people … that you have caused harm to someone (Woman, aged 18).

Susceptibility

Participants had different perceptions of their own risk of contracting chlamydia. Some believed the risk was low, since they had a long-term relationship with one partner or claimed that they chose their sexual partners with care. Others stated that their risk was significant, since they were sexually active with different partners without condom protection and/or said that you could never know who to trust. They considered that condom use was cumbersome and that sex was better without it.

I divorced four years ago. Before that I had a steady partner for 16 years. So then I did not think about it at all. But now, when I have been single, I have dated quite a lot and mostly had unprotected sex (Man, aged 43).

Benefits – self

Participants found it convenient to order the test kit online and considered it easy to use. Being able to perform the test at home at a time of one's choosing was appreciated. Some described the advantage of not having to visit a health service clinic when living in a small community where it was difficult to maintain confidentiality. Avoiding showing one's genitals to a health professional was also mentioned. The test being free of charge was another benefit. The packaging was discreet and did not disclose that the contents had to do with a sexually transmitted infection. Participants felt that they received the result reasonably fast and that it was easy to check for it online.

The instructions were clear, you just follow the steps. You can do it any time, when you want. You do not need to go somewhere or stay away from work … or talk to somebody. You do not need to feel ... embarrassed (Woman, aged 22).

Benefits – others

Participants described several benefits for other people. Young people and immigrants were seen as more vulnerable and could benefit from the free, confidential service. A public health aspect was also mentioned. An easy-to-use self-sampling service could increase the number of tests and enable contact tracing and treatment, thus avoiding spread of the

infection in society. Some participants had used the home sampling service several times and argued it should be used every time after unprotected sex in order to protect not only themselves, but also others.

Everybody should be able to take a test, without having to consider the cost … the possibility to protect oneself – and to protect against carrying around a disease (Woman, aged 23).

Perceived barriers

Some barriers were mentioned. Language could be an obvious one, and one participant actually went to a health service clinic in order to have the procedure explained. Participants expressed the view that not having the possibility of counselling could be a disadvantage. Not knowing whether they were performing the self-sampling correctly or whether the test would be handled properly caused some worries, as did unreliable postal services and insecure storing of personal data. Some would have liked an extra swab in the kit in case of a mistake. Participants also mentioned that they did not know exactly where to turn in case of an infection. Another disadvantage was that the test only covers two infections, chlamydia and gonorrhoea.

Maybe it is not 100% reliable? I may not do it the right way … you can be unsure whether the test could end up in the hands of someone unauthorised … it is still personal data. Those are the things you discuss (Woman, aged 35).

Self-efficacy

The participants had high self-efficacy in their use of the service. They felt confident about taking the sample and sending it by post to the lab. However, some disclosed that they had not sent the test and one informant had dropped the swab on the floor. Even if self-sampling overall was considered convenient, waiting for the test result was stressful. Most would be willing to pay for the test, about €10–30 was considered appropriate. However, a charge would probably lead to fewer tests. Participants believed they were able to take the test earlier via the self-sampling service compared with visiting a clinic, and most were prepared to use it again.

… even if it involved a cost, let us say 100 to 200 Swedish crowns, I would still order the test because the service is so easy and convenient (Man, aged 22).

Cues to action

Participants had become aware of the self-sampling service either from the internet or from friends. They took the test to ensure that they were healthy after unprotected sex. Some had experienced symptoms. Another reason was to exclude a potential infection before engaging in a new relationship. They emphasised the importance of avoiding spreading an infection to others. Checking whether a partner had been unfaithful was also mentioned; a positive chlamydia test would be seen as a proof of unfaithfulness. Others had made it a routine to take a test regularly – "to be on the safe side".

I had left a long relationship and had a new partner. So I wanted to be 100% sure, as I had been earlier (Woman, aged 26).

Modified behaviour

The participants discussed whether the home-based self-sampling method could lead to modified sexual behaviour. Some said they had learned a lot and/or become worried and were motivated to use a condom more frequently, while others did not have any intention to change. The fact that the test was free of charge, in contrast to condoms, led some participants to argue in favour of a moderate charge so that testing would not replace condom use. Most participants would use the service again, either as their normal routine or in case of future need.

Now I'm into protecting myself a bit better as long as I don't have a stable partner. The day after (a negative test result) I took cookies to school and we celebrated. Lesson learned, you could say (Woman, aged 18).

I have started to think about testing for HIV too, even if it is not that widespread, but still … This has been an eye-opener for me, you could say, and it never hurts to take a test (Man, aged 30).

DISCUSSION

The free-of-charge self-sampling test service for CT/NG was highly appreciated by the participants owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result. Barriers included language, uncertainty about the procedure, unreliable postal services and insecure handling of personal data. Checking after unprotected sex or a regular routine – "to be on the safe side" – were key reasons for ordering the test.

A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing. Our previous work showed this service to be widely used and to play an important role in CT/NG detection,[10] and an internet-based questionnaire showed that users greatly appreciate the service and that their behaviour indicates that they are at risk of STIs.[17] The criteria for assessing trustworthiness were considered. Credibility was achieved by purposeful sampling of informants, continuous analysis of the data, description of the entire process and supporting quotes. To avoid lone researcher bias, two authors individually read the transcripts and sorted the data into categories. To increase dependability, the analytical process was rigorous and systematic; all data were thoroughly analysed.

A limitation, as in all qualitative research where the aim is not to generalise, is that the results may not be transferable to other settings or societies different from Sweden. Another limitation was that telephone interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.

We found the HBM useful in all phases of the project – in developing the interview guide as well as in the analysis and interpretation of the data – and below we discuss the findings according to this model and in relation to other studies.

Several individual factors and personal knowledge about the infection seemed to influence the decision to use the self-sampling service. This has also been shown in other studies.[20-22] The participants discussed perceived threat, the combination of beliefs about severity and susceptibility, with infertility and emotional distress being particularly prominent. This is in agreement with other studies.[23-24] If the threat is perceived as significant, willingness to act upon it increases.

Our study also showed that users reflect on benefits and barriers in relation to the service. Interestingly, the benefits mentioned were not only for oneself but also for others and for society as a whole. This finding is in contrast to another Swedish study, which showed that young men who took a chlamydia test were not particularly concerned about passing on the infection to others.[25] The barriers mentioned by our participants are in line with what other studies have shown.[12,26] The HBM postulates that a certain behaviour is more likely to occur if the benefits outweigh the barriers.[18] It is therefore important to remove as many barriers as possible. Translation of the information into other languages could be one obvious improvement.

Our participants had often learned about the service through the internet, by actively searching for information, but also unintentionally. Friends were also mentioned, in line with other studies which show that individuals tend to put considerable trust in friends.[27-28] Most participants had high self-efficacy in their use of the service, even if they had some doubts about where to turn in the event of a positive test result. A study from the US showed that most people were in favour of receiving a test result online,[29] and another US study concluded that introducing a home-based self-sampling service would be appreciated.[30]

Some of our participants described the testing procedure as an eye-opener and intended to protect themselves better in the future, whereas others said they would continue to rely on regular testing as a routine. Findings from a large trial in the Netherlands indicate that sexual behaviour can change in two ways after internet-based testing. Those with a positive test result seemed to become more cautious, in contrast to those who had a negative test result, who tended to adopt riskier behaviour.[31] These findings are intriguing and would need to be confirmed in further studies.

In summary, CT/NG infection was considered severe if it could lead to infertility. The test was mainly taken as an individual health check after unprotected sex, but also out of concern for others' health and for society overall, to avoid spreading an infection. The benefits of the self-sampling test service outweighed the barriers, owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result, and the service should therefore continue to be widely offered.

Acknowledgements We would like to thank all the individuals that participated in the study.

Funding The study was funded by the Public Health Agency of Sweden.

Competing interests None declared.

Patient consent Obtained.

Contributorship statement MG, ML and BH designed the study, BH was responsible for data collection, MG and ML conducted interviews, carried out the analysis, and composed the initial manuscript. All authors contributed to the finalisation of the manuscript.

Data sharing statement No additional data available.

REFERENCES

1. Minichiello V, Rahman S, Dune T, *et al*. E-health: potential benefits and challenges in providing and accessing sexual health services. *BMC Public Health* 2013;13:790.
2. Burns K, Keating P, Free C. A systematic review of randomised control trials of sexual health interventions delivered by mobile technologies. *BMC Public Health* 2016;16:778.
3. Woodhall SC, Sile B, Talebi A, *et al*. Internet testing for *Chlamydia trachomatis* in England, 2006 to 2010. *BMC Public Health* 2012;12:1095.
4. World Health Organization. Global health sector strategy on sexually transmitted infections, 2016–2021. Geneva: World Health Organization; 2016. Available at: http://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/ (accessed 28 Nov 2017).
5. Ostergaard L, Moller JK, Andersen B, *et al*. Diagnosis of urogenital *Chlamydia trachomatis* infection in women based on mailed samples obtained at home: multipractice comparative study. *BMJ* 1996;313:1186–9.
6. Novak DP, Karlsson RB. Simplifying chlamydia testing: an innovative *Chlamydia trachomatis* testing approach using the internet and a home sampling strategy: population based study. *Sex Transm Infect* 2006;82:142–7.
7. Fajardo-Bernal L, Aponte-Gonzalez J, Vigil P, *et al*. Home-based versus clinic-based specimen collection in the management of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections. *Cochrane Database Syst Rev* 2015;316.
8. National Chlamydia Screening Programme (NCSP). Information, data, guidance and resources about the NCSP. Available at: www. gov.uk/government/collections/ nationalchlamydia-screening-programme-ncsp (accessed 14 April 2020).
9. Queensland Government home Sexual health. Available at: https://www.qld.gov.au/health/staying-healthy/sexual-health/chlamydia-test (accessed 14 April 2020).

10. Söderqvist J, Gullsby K, Stark L, *et al*. Internet-based self-sampling for *Chlamydia trachomatis* testing: a national evaluation in Sweden. *Sex Transm Infect* 2020;96:160-165.
11. Novak D, Novak M. Use of the Internet for home testing for *Chlamydia trachomatis* in Sweden: who are the users? *Int J STD AIDS* 2012;23:83–7.
12. Paudyal P, Llewellyn C, Lau J, *et al*. Obtaining self-samples to diagnose curable sexually transmitted infections: a systematic review of patients' experiences. *PLoS One* 2015; 24;10:e0124310.
13. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245-51.
14. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349-57.
15. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. Qual Health Res 2016;26:1753–60.
16. Grandahl M, Neveus T, Dalianis T, *et al*. 'I also want to be vaccinated!' - adolescent boys' awareness and thoughts, perceived benefits, information sources, and intention to be vaccinated against Human papillomavirus (HPV). *Hum Vaccin Immunother* 2019;15:1794–802.
17. Grandahl M, Mohammad J, Larsson M, *et al*. Chlamnet Study I: Users' opinions of internet-based self-sampling tests for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in Sweden. Submitted.
18. Champion VL, Skinner Sugg C. The Health Belief Model. In: Glantz K, Rimer B, Viswanath K, ed. *Health behavior and health education: theory, research and practice* 4th ed. San Francisco, CA. USA: Jossey-Bass 2008.
19. Elo S, Kyngas H. The qualitative content analysis process. *J Adv Nurs* 2008;62:107–15.

20. Op de Coul EL, Götz HM, van Bergen JE, *et al*. Who participates in the Dutch chlamydia screening? A study on demographic and behavioral correlates of participation and positivity. *BMC Public Health* 2006;1;6:221.

21. Barnard S, Free C, Bakolis I, *et al*. Comparing the characteristics of users of an online service for STI self-sampling with clinic service users: a cross-sectional analysis. *Sex Transm Infect* 2018;94:377–83.

22. Balfe M, Brugha R, O'Connell E, *et al*. Men's attitudes towards chlamydia screening: a narrative review. *Sex Health* 2012;9:120–30.

23. Pavlin NL, Gunn JM, Parker R, *et al*. Implementing chlamydia screening: what do women think? A systematic review of the literature. *BMC Public Health* 2006:1;6:221.

24. Duncan B, Hart G, Scoular A, *et al*. Qualitative analysis of psychosocial impact of diagnosis of *Chlamydia trachomatis*: implications for screening. *BMJ* 2001;27;322:195–9.

25. Ekstrand M, Tydén T, Larsson M. Exposing oneself and one's partner to sexual risk-taking as perceived by young Swedish men who requested a chlamydia test. *Eur J Contracept Reprod Health Care* 2011;16:100–7.

26. Lorimer K, McDaid L. Young men's views toward the barriers and facilitators of internet-based *Chlamydia trachomatis* screening: Qualitative study. *J Med Internet Res* 2013; 3;15(12):e265

27. Niu Z, Jeong DC, Willoughby JF. Friends over Doctors? The influences of source and perceived customization on college drinking. *Health Commun* 2020;10:1–11.

28. Hendry NA, Brown G, Dowsett GW, *et al*. Association between sexually transmissible infection testing, numbers of partners and talking to partners and friends about sexual health: survey of young adults. *Sex Health* 2017;14:378–82.

29. Gibbs J, Aicken CRH, Sutcliffe LJ, *et al*. Mixed-methods evaluation of a novel online STI results service. *Sex Transm Infect* 2018;94:622–24.

30. Pearson WS, Kreisel K, Peterman TA, *et al*. Improving STD service delivery: Would American patients and providers use self-tests for gonorrhea and chlamydia? *Prev Med* 2018;115:26–30.

31. Soetens LC, van Benthem BH, Op de Coul EL. Chlamydia test results were associated with sexual risk behavior change among participants of the chlamydia screening implementation in the Netherlands. *Sex Transm Dis* 2015;42:109–14.

FIGURE LEGENDS

Figure 1 Findings according to the Health Belief Model

Table 1 Interview guide

Guiding questions for the telephone interview	HBM concept
How did you find out about the self-sampling service?	Cues to action
What are your views on home-based self-sampling for STIs?	Individual beliefs
What are the benefits?	Benefits
What are the barriers?	Barriers
What do you know about CT/NG?	Knowledge
What are the risks with CT/NG?	Knowledge/Severity
How severe would an infection be for you?	Severity
How do you perceive your own risk of CT/NG?	Susceptibility
What made you order the test kit now?	Cues to action
How did you find using the kit?	Self-efficacy
What are your thoughts about the kit in relation to privacy?	Barriers
What are your thoughts about the results?	Barriers
What do you think about the time from order to result?	Benefits/barriers
What do you think about home-based self-sampling in relation to clinical sampling?	Benefits/barriers
How often do you consider one should take such a test?	Individual beliefs
How much would you be willing to pay for a test if it involved a cost?	Self-efficacy
Would you use the service again and/or recommend it to others?	Self-efficacy

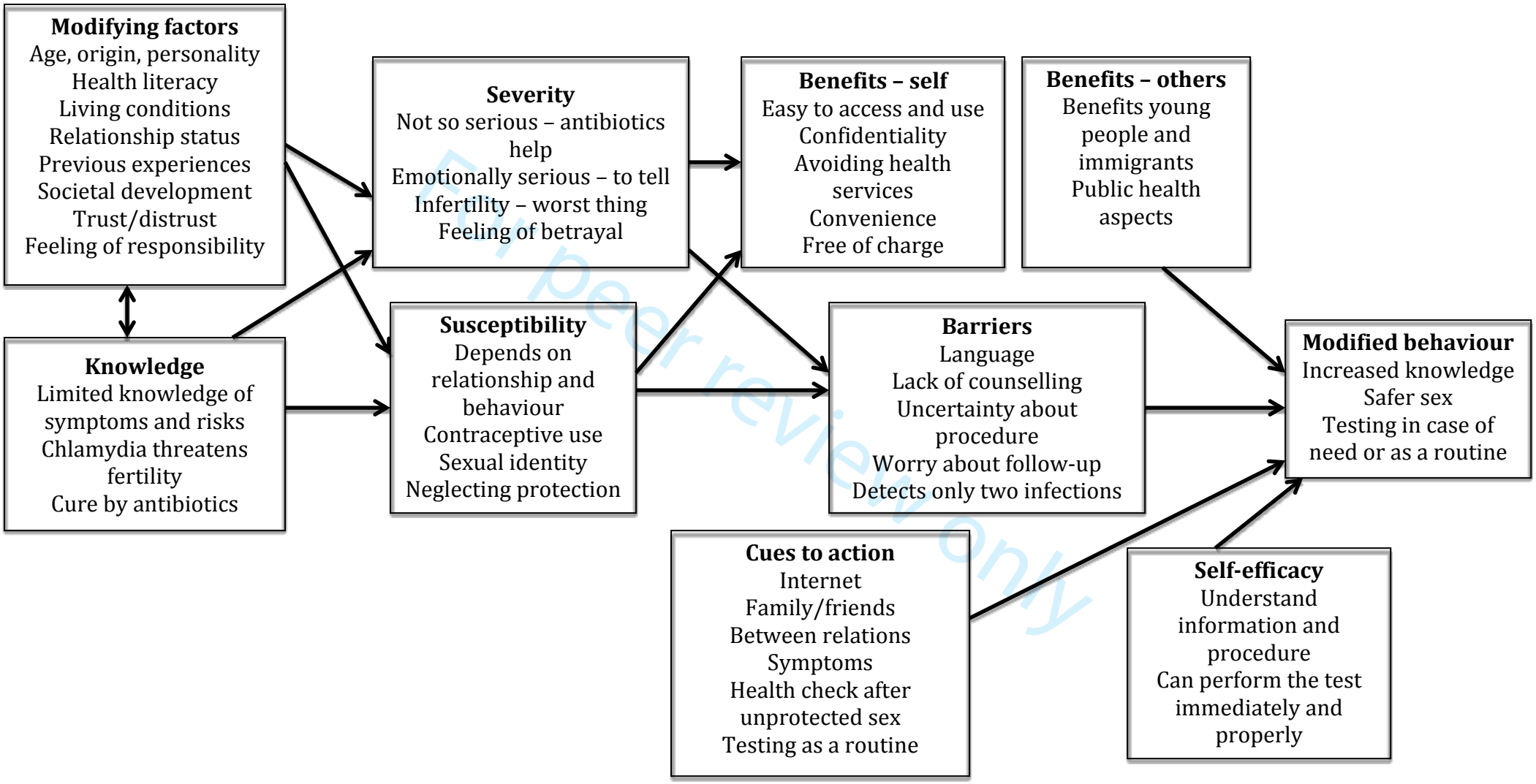

Figure 1. Findings according to the Health Belief Model

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Methods, Sample and procedure page 4.
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Methods, Sample and procedure, page 4.
3. Occupation	What was their occupation at the time of the study?	Methods, Sample and procedure
4. Gender	Was the researcher male or female?	
5. Experience and training	What experience or training did the researcher have?	Methods, Sample and procedure, page 4.
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	No
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Ethical considerations and page 4.
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Ethical considerations and page 4.
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Methods, Theoretical framework – the Health Belief Model (HBM), page 5.
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive,	Methods, page 4.

	snowball	
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Methods, page 4.
12. Sample size	How many participants were in the study?	Methods, page 4.
13. Non-participation	How many people refused to participate or dropped out? Reasons?	Methods
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Methods, page 4.
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Methods, page 4.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Results, page 6.
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods pages 4-5 and Table 1
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	Methods
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods page 4.
20. Field notes	Were field notes made during and/or after the interview or focus group?	Methods pages 4-5. The interviewer made a summary of what was said in the end of the interview and also made some field notes after each interview.
21. Duration	What was the duration of the interviews or focus group?	Methods, page 4.
22. Data saturation	Was data saturation discussed?	Yes, see Methods page 4.
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No, see Methods.
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two authors (MG and ML), see Methods pages 4-5.
25. Description of the coding tree	Did authors provide a description of the coding tree?	Figure 1
26. Derivation of themes	Were themes identified in advance or derived from the data?	Yes, we used a deductive approach, see Methods page 5.

27. Software	What software, if applicable, was used to manage the data?	We did not us a software such as NVivo in the present study.
28. Participant checking	Did participants provide feedback on the findings?	No, see Methods.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Yes, see Results pages 6-12.
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, see Results pages 6-12.
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes, see Results pages 6-12 and Figure 1.
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes, diverse views among the parents are presented in the Results. The authors have suggested a modification of the model to include modified behaviour. See results pages 6-12.

BMJ Open

"To be on the safe side" – a qualitative study regarding beliefs and experiences of internet-based self-sampling for Chlamydia trachomatis and Neisseria gonorrhoeae testing

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-041340.R1
Article Type:	Original research
Date Submitted by the Author:	24-Nov-2020
Complete List of Authors:	Grandahl, Maria; Uppsala University, Women's and Children's Health Larsson, Margareta; Uppsala University, Women's and Children's Health Herrmann, Björn; Uppsala Universitet Disciplinary Domain of Medicine and Pharmacy, Clinical Microbiology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Infectious diseases, Qualitative research, Sexual health
Keywords:	PUBLIC HEALTH, QUALITATIVE RESEARCH, INFECTIOUS DISEASES, SEXUAL MEDICINE, REPRODUCTIVE MEDICINE

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

"To be on the safe side" – a qualitative study regarding beliefs and experiences of internet-based self-sampling for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* testing

Maria Grandahl[1], Margareta Larsson[1], Björn Herrmann[2]

[1]Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

[2]Section of Clinical Bacteriology, Department of Medical Sciences, Uppsala University, Uppsala, Sweden

Correspondence to Maria Grandahl, Uppsala University, Department of Women's and Children's Health, 751 85, Uppsala, Sweden; maria.grandahl@kbh.uu.se

Word count, Text: 3923; Abstract: 292

Keywords: *Chlamydia trachomatis*; testing; user perspective; risk-benefits; sexual behaviour

ABSTRACT

Objectives In Sweden, an increasing number of tests for sexually transmitted infections are conducted. Self-sampling services are provided free of charge at the national eHealth website. Our aim was to get a deeper understanding of users' beliefs and experiences of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) self-sampling services.

Methods This qualitative study is part of the national project "Internet-based chlamydia and gonorrhoea self-sampling test", conducted in Sweden. Individuals ordering a CT/NG self-sampling test at home from the eHealth website were invited to participate. Out of 114 individuals who agreed, a purposeful sample including 20 females and males aged 18–49 years (mean 30.8) participated in a telephone interview in 2019.

Results The test service for CT/NG was highly appreciated by men and women of different ages. Round-the-clock accessibility, avoiding clinical visits, ease of use, confidentiality, and a rapid test result were reasons for this appreciation. Language, uncertainty about the correct sampling procedure, unreliable postal services, and concerns about handling of personal data were mentioned as barriers. Reasons for testing were checking after unprotected sex, symptoms, checking a partner's fidelity, or a regular routine – "to be on the safe side". Knowledge about the infections and their consequences was limited; some considered them severe, especially if they could threaten fertility, others were less concerned. Disclosing an infection was described as emotionally stressful. Participants had high self-efficacy in relation to the test and would not hesitate to use the service again, even if it involved a cost.

Conclusions Internet-based CT/NG self-sampling at home was highly appreciated and was used for individual health reasons, but also out of concern for others' health and for society as a whole. The benefits seem to outweigh the barriers and the service may therefore continue to be widely offered.

Strengths and limitations of this study

- This study is based on a theoretical framework, The Health Belief Model and aimed to get a deeper understanding of users' beliefs and experiences of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) self-sampling services.
- A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing.
- We conducted telephone interviews with a purposeful sample of individuals' of different sex and sexual identity.
- A limitation was that interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.
- As in all qualitative research, the aim is not to generalise but the results might be useful in similar settings.

INTRODUCTION

From a public health perspective, it is of paramount importance to promote and address sexual and reproductive health, since it concerns a large proportion of the population. There is a growing interest in offering gender-sensitive, effective internet-based care options to improve accessibility, equity and cost-effectiveness.[1-3] Targeting both women and men at risk of sexually transmitted infections (STIs) may have lifelong importance for the individual and considerable implications for public health.[4]

One such internet-based initiative is the offer of free-of-charge testing for *Chlamydia trachomatis* (CT*)/Neisseria gonorrhoeae* (NG) with self-sampling at home. The service has been tested in some countries as a study project or in routine diagnostics.[5-9] In Sweden it is currently provided by the public health care service and is available in all counties, through two national e-Health websites.[10] Individuals with a confirmed infection are directed to a clinic for free treatment and partner notification.

An earlier Swedish study showed that users were mostly young people with high sexual risk behaviour.[11] A recent study found that self-sampling, when compared with clinic-based sampling, comprised 22% of all CT tests in 2017 and accounted for 20% of all detected CT cases.[10] The positivity rate was similar to clinic-based testing (5.5% vs 5.1%), as was the proportion of men using the service (33.7% vs 30.8%).

A review of users' experiences of self-sampling concluded that self-sampling was appreciated by those using it.[12] However, the review included only ten studies with home-based sampling and none of them was conducted in Sweden. A recent survey among 1785 users of the service in Sweden showed that users were happy with the self-sampling test service and sexual risk behaviours motivated use of the test. [13] Our aim with this qualitative study was to complement those quantitative findings in order to gain a deeper

understanding of users' beliefs and of their experiences of the home-based self-sampling service currently offered in Sweden.

METHODS

Design and setting

The present qualitative interview study is part of the project "Internet-based chlamydia and gonorrhoea self-sampling test", undertaken in Uppsala county, a region with a population of 368 000. The study follows Standards for Reporting Qualitative Research[14] and is reported according to COREQ Checklist (Supplemental File).[15]

Sample and procedure

We used a strategic approach aiming to include a broad sample. We wanted to explore as many different voices as possible. Eligible participants were individuals ≥15 years of age who had ordered a CT/NG self-sampling test from the national eHealth website. [13] They were invited to participate in a telephone interview. Those interested provided their name, address and mobile phone number, and completed a consent form online. In all, 114 individuals agreed to participate, and of these, 20 men and women with a wide range of ages and representing different sociodemographic areas (by post code) were included in the study, based on the estimation that we needed about 20 interviews to reach information power (i.e. adequate information on the topic).[16]

The interviews were conducted in 2019, lasted between 30 and 52 minutes and were audio-recorded using the application 'TapeACall Pro'. Each interview started with brief information about the study. The interviews were transcribed verbatim and no repeat

interviews were carried out. The interviewers (MG and ML) are health professionals and PhDs with experience of qualitative methods and the topics in question.

Interview guide

We used a semi-structured interview guide, based on a previous study about STIs and sexual health.[17] Study-specific questions were constructed based on previous research and on a quantitative internet-based questionnaire that is part of this project.[13] Two pilot interviews resulted in minor changes to the guide. In summary, the questions focused on the informant's beliefs and experiences of using the CT/NG self-sampling test, with a special emphasis on chlamydia (table 1).

Theoretical framework – the Health Belief Model (HBM)

The HBM is useful in understanding factors that influence health behaviour.[18] The model includes the following central constructs: *perceived susceptibility, perceived severity, perceived benefit, perceived barriers and individual behaviour*. In addition, sociodemographic factors such as age, sex and ethnicity, and also knowledge, can influence the individual's behaviour. Important concepts in the theory are *cues to action*, which can motivate individuals to alter their behaviour, and *self-efficacy* – the ability of the individual to perform certain behaviour. In addition, the authors suggest a modification of the model to include *modified behaviour.*

Analysis

We used a deductive approach[19] with key concepts from the HBM to analyse and discuss our findings. The transcripts were read in order to get an overall picture of the data. Units of

meaning were extracted, condensed and labelled with a colour mark. These units were then sorted into suitable HBM categories by two researchers working individually. Finally, all the authors discussed the categories until consensus was reached.

Ethical considerations

This study was approved by the Swedish Ethical Review Authority (Dnr. 2018/250). All participants received written information and provided consent online.

Patient and Public Involvement statement

The present study is part of a larger study. [10, 13] Three university students were engaged in project design. Furthermore, the questionnaire used in the previous survey [13] was tested on two patients in a pilot study and thereafter the questionnaire was slightly modified. By definition patients are involved in this interview study. Before commencement, the interview guide was tested on representatives of the public, i.e. individuals similar to the target group resulting in minor changes in the Interview guide (table 1).

RESULTS

In total, 11 females and 9 males, 18–49 years of age (mean 30.8), participated. The participants had different sexual identities (hetero- and homosexual) and diverse countries of birth and cultural backgrounds. The findings are presented according to the HBM concepts and are summarised in figure 1.

Modifying factors

A plethora of modifying factors seemed to influence use of the self-sampling test, some personal, others more of a relational or contextual nature. Individual factors included personality, sexual identity, health awareness and emotions such as shyness and physical discomfort.

I am a bit shy to go to the health center …. [my country] it is a bit different from Sweden. (Woman, #12)

I am not very comfortable with someone else touching my penis. My first thought was: Will this hurt or won't it? (Man, #2)

Relational factors were sexual behaviour, current relationship status, trust or distrust in one's partner, as well as previous experience of infidelity or betrayal.

In many relationships it happens that … you become aware of infidelity because of a positive chlamydia test. (Woman, #7)

Contextual factors such as country of birth, previous health care experiences, economy and encountering unknown sex partners via dating applications were also mentioned.

People who are like newly here, they have maybe like a lot of stigma about sex and stuff like that. So they wouldn't tell, even to the doctors. From the culture I came from, they are not open about the sexuality. (Man, #15)

Knowledge

Knowledge about the infection:

Participants had limited knowledge about chlamydia and were unsure of its consequences. Most stated that CT was a common STI with few or no symptoms but should be reported according to the Diseases Act. They had mostly learned about CT and STIs on line, but also mentioned sexuality education in school. They did not know how the infection could affect

health, but believed that if untreated it could threaten fertility. Some stated that they were unsure how CT was transmitted, whether it was transmitted through body fluids, by oral sex or if women have sex with women. There were uncertainties about whether CT was a bacterium and how it was treated.

I don't know how it would feel if I had it, if you get symptoms, which I don't think you do. And then I don't know the consequences. I actually know very little. (Woman, #18)

Knowledge about the testing service was mostly adequate and came from different sources: internet, other media, school, friends, health care providers and also through their own previous experience.

I know about the procedure, I receive the letter, I know what to do, I send it back. Within a couple of weeks I will know what to do, if I have it or not. (Man, #19)

I have never heard any of my male friends saying that they have ordered it (the test kit). (Man, #6)

Severity

Emotional severity

Most participants expressed that a chlamydia infection would be serious, especially for emotional reasons. They would feel guilty and that they were betraying others. Compulsory contact tracing was demanding. The entire procedure was cumbersome, the worst part being disclosing a chlamydia infection to previous and/or current partners. Others were less bothered. They just needed antibiotic treatment and then everything would be OK.

I would find it hard, but not the end of the world. You don't die from it. The worst part would be disappointing people … that you have caused harm to someone. (Woman, #1)

Physical severity

The participants considered that fertility was important and that infertility would be the worst thing that could happen to them.

It becomes an existential issue, because what meaning is there then to life? (in case of infertility) So it goes deep. (Man, #10)

I really, really want to have children. So, even if … because I am in a same-sex relationship, which makes it even harder. But still, it is very, very important for me to be able to have a child. (Man, #10)

Societal severity

Several participants voiced concerns about a spread of the infections in society. CT was perceived as increasing and risk taking without condom use often in combination with alcohol consumption was considered common. The fact that the Communicable Diseases Act includes these infections was a sign that society take hem seriously and the compulsory registration of cases was appreciated as a means of preventing spread of infections in the population.

I think it (the registration of cases) is good…It is still a disease than can influence and damage for a long time. (Man, #9)

Susceptibility

Participants had different perceptions of their own risk of contracting chlamydia. Some believed the risk was low, since they had a long-term relationship with one partner or claimed that they chose their sexual partners with care. Others stated that their risk was

significant, since they were sexually active with different partners without condom protection and/or said that you could never know who to trust. They considered that condom use was cumbersome and that sex was better without it.

I divorced four years ago. Before that I had a steady partner for 16 years. So then I did not think about it at all. But now, when I have been single, I have dated quite a lot and mostly had unprotected sex. (Man, #17)

Benefits

Benefits self

Participants found it convenient to order the test kit online and considered it easy to use. Being able to perform the test at home at a time of one's choosing was appreciated. Some described the advantage of not having to visit a health service clinic when living in a small community where it was difficult to maintain confidentiality. Avoiding showing one's genitals to a health professional was also mentioned. The test being free of charge was another benefit. The packaging was discreet and did not disclose that the contents had to do with a sexually transmitted infection. Participants felt that they received the result reasonably fast and that it was easy to check for it online.

The instructions were clear, you just follow the steps. You can do it any time, when you want. You do not need to go somewhere or stay away from work … or talk to somebody. You do not need to feel ... embarrassed. (Woman, #4)

Benefits – others

Participants described several benefits for other people. Young people and immigrants were seen as more vulnerable and could benefit from the free, confidential service. A public

health aspect was also mentioned. An easy-to-use self-sampling service could increase the number of tests and enable contact tracing and treatment, thus avoiding spread of the infection in society. Some participants had used the home sampling service several times and argued it should be used every time after unprotected sex in order to protect not only themselves, but also others.

Everybody should be able to take a test, without having to consider the cost … the possibility to protect oneself – and to protect against carrying around a disease. (Woman, #6*)*

Perceived barriers

Some barriers were mentioned, some personal, others more of a technical nature or related to a possible unmet care need.

Personal barriers

Language could be an obvious one, and one participant actually went to a health service clinic in order to have the procedure explained.

If you have problems with reading and low level of school education. (Woman, #12)

Technical barriers

Not knowing whether they were performing the self-sampling correctly or whether the test would be handled properly caused some worries, as did unreliable postal services and insecure storing of personal data. Some would have liked an extra swab in the kit in case of a mistake.

Maybe it is not 100% reliable? I may not do it the right way … you can be unsure whether the test could end up in the hands of someone unauthorised … it is still personal data. Those are the things you discuss. (Woman, #7)

Unmet care need

Participants expressed that not having the possibility of counselling could be a disadvantage. They also mentioned that they did not know exactly where to turn in case of an infection. Another disadvantage was that the test only covers two infections, chlamydia and gonorrhoea.

Could maybe be problematic that you are not automatically connected to any clinic. (Woman, #1)

Questions may have needed to be asked both from my side and from yours. A broader spectrum of diseases would perhaps be needed. (Man, #17)

Self-efficacy

Self-efficacy in handling the test and obtaining the result

The participants had high self-efficacy in their use of the service. They felt confident about taking the sample and sending it by post to the lab. However, some disclosed that they had not sent the test and one informant had dropped the swab on the floor. Participants believed they were able to take the test earlier via the self-sampling service compared with visiting a clinic, and most were prepared to use it again. Even if self-sampling overall was considered convenient, waiting for the test result was stressful.

It is not difficult, with the swab… how to place it and how to send it in. You just read, point by point how to do it. (Woman, #16)

I simply forgot, it just lay there in the envelope. So, you have no one to check that it really is done. (Man, #9)

Self-efficacy in relation to a potential cost

Most would be willing to pay for the test, about €10–30 was considered appropriate. However, a charge would probably lead to fewer tests.

… even if it involved a cost, let us say 100 to 200 Swedish crowns, I would still order the test because the service is so easy and convenient. (Man, #5)

Cues to action

Participants mentioned different aspects that had served as cues to action for them.

Awareness of the availability of the service

The participants' expressed that they had become aware of the self-sampling test by chance when web surfing on the Internet or when visiting health related websites. Others had become aware of the self-sampling service either from friends or from health care providers.

It was on the national e-health web site. I had logged in to book another appointment and then I read about the home test. So I just "Ah that sounds good". (Man, #10)

Health related reasons

Many took the test to ensure that they were healthy after unprotected sex. Some had also experienced symptoms. Others had made it a routine to take a test regularly – "to be on the safe side". Several emphasised the importance of avoiding spreading an infection to others.

…and it is so severe that you should absolutely not spread it on, or hide it to someone. (Man, #9)

Relational aspects

Another reason to take a test was to exclude a potential infection before engaging in a new relationship. Checking whether a partner had been unfaithful was also mentioned; a positive chlamydia test would be seen as a proof of unfaithfulness.

I had left a long relationship and had a new partner. So I wanted to be 100% sure, as I had been earlier. (Woman, #7)

Modified behaviour

Modified sexual behaviour

The participants discussed whether the home-based self-sampling method could lead to modified sexual behaviour. Some said they had learned a lot and/or become worried and were motivated to use a condom more frequently, while others did not have any intention to change. The fact that the test was free of charge, in contrast to condoms, led some participants to argue in favour of a moderate charge so that testing would not replace condom use.

Now I'm into protecting myself a bit better as long as I don't have a stable partner. The day after (a negative test result) I took cookies to school and we celebrated. Lesson learned, you could say. (Woman, #1)

Modified testing routines

Most participants would use the service again, either as their normal routine or in case of future need.

I have started to think about testing for HIV too, even if it is not that widespread, but still … This has been an eye-opener for me, you could say, and it never hurts to take a test. (Man, #11)

DISCUSSION

The free-of-charge self-sampling test service for CT/NG was highly appreciated by the participants owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result. Barriers included language, uncertainty about the procedure, unreliable postal services and insecure handling of personal data. Checking after unprotected sex or a regular routine – "to be on the safe side" – were key reasons for ordering the test.

A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing. The present study is part of a larger project with access to a population with recent experience of the internet-based self-sampling service.[13] Thus, we could use a strategic sample of individuals. Our previous work showed this service to be widely used and to play an important role in CT/NG detection,[10] and an internet-based questionnaire showed that users greatly appreciate the service and that their behaviour indicates that they are at risk of STIs.[13] The criteria for assessing trustworthiness were considered. Credibility was achieved by purposeful sampling of informants, continuous analysis of the data, description of the entire process and supporting quotes. To avoid lone researcher bias, two authors individually read the transcripts and sorted the data into categories. To increase dependability, the analytical process was rigorous and systematic; all data were thoroughly analysed.

A limitation, as in all qualitative research where the aim is not to generalise, is that the results may not be transferable to other settings or societies different from Sweden. Another limitation was that telephone interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.

We found the HBM useful in all phases of the project – in developing the interview guide as well as in the analysis and interpretation of the data. However, using HBM both as a

guide in designing the study and as an analytical tool may entail a risk for circular reasoning and not being open to unexpected findings. Below we discuss the findings according to this model and in relation to other studies.

Several individual factors and personal knowledge about the infection seemed to influence the decision to use the self-sampling service. This has also been shown in other studies.[20-22] The participants discussed perceived threat, the combination of beliefs about severity and susceptibility, with infertility and emotional distress being particularly prominent. This is in agreement with other studies.[23-24] If the threat is perceived as significant, willingness to act upon it increases.

Our study also showed that users reflect on benefits and barriers in relation to the service. Interestingly, the benefits mentioned were not only for oneself but also for others and for society as a whole. This finding is in contrast to another Swedish study, which showed that young men who took a chlamydia test were not particularly concerned about passing on the infection to others.[25] The barriers mentioned by our participants are in line with what other studies have shown.[12,26] The HBM postulates that a certain behaviour is more likely to occur if the benefits outweigh the barriers.[18] It is therefore important to remove as many barriers as possible. Translation of the information into other languages could be one obvious improvement. However, closing the gap in health inequality due to lower socioeconomics and illiteracy is more challenging. Health literacy, the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions including risk perceptions, have an impact. Even if health information is available in different languages, individuals might have difficulties to understand and appraise the health service offered. Consequently the

National eHealth service may not reach the population at large. It is essential to reach out to vulnerable groups and provide health information through different arenas and sources including face-to-face information in the school health, at Youth Health Clinics and in the Primary Care setting. We believe that free of charge self-tests have the potential to reach individuals of different socioeconomic status, in rural areas and in the end, decrease health inequity in Sweden.

Our participants had often learned about the service through the internet, by actively searching for information, but also unintentionally. Friends were also mentioned, in line with other studies which show that individuals tend to put considerable trust in friends.[27-28] Most participants had high self-efficacy in their use of the service, even if they had some doubts about where to turn in the event of a positive test result. A study from the US showed that most people were in favour of receiving a test result online,[29] and another US study concluded that introducing a home-based self-sampling service would be appreciated.[30]

Some of our participants described the testing procedure as an eye-opener and intended to protect themselves better in the future, whereas others said they would continue to rely on regular testing as a routine. Findings from a large trial in the Netherlands indicate that sexual behaviour can change in two ways after internet-based testing. Those with a positive test result seemed to become more cautious, in contrast to those who had a negative test result, who tended to adopt riskier behaviour.[31] These findings are intriguing and would need to be confirmed in further studies. It is also important to note that the findings presented here are opinions and experiences of the adopters of the self-sampling service. There is thus a need for similar research among people who have chosen not to use an on-line service and explore their views as well.

In summary, CT/NG infection was considered severe if it could lead to infertility. The test was mainly taken as an individual health check after unprotected sex, but also out of concern for others' health and for society overall, to avoid spreading an infection. The benefits of the self-sampling test service outweighed the barriers, owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result, and the service may therefore continue to be widely offered.

Acknowledgements We would like to thank all the individuals that participated in the study.

Funding The study was funded by the Public Health Agency of Sweden in 2018, no specific funding number is available. The funders of the study had no role in study design, data collection, data analysis, data interpretation or the writing of the report.

Competing interests None declared.

Patient consent Obtained.

Contributorship statement MG, ML and BH designed the study, BH was responsible for data collection, MG and ML conducted interviews, carried out the analysis, and composed the initial manuscript. All authors contributed to the finalisation of the manuscript.

Data sharing statement All data relevant to the study are included in the article or uploaded as supplementary information.

REFERENCES

1. Minichiello V, Rahman S, Dune T, *et al*. E-health: potential benefits and challenges in providing and accessing sexual health services. *BMC Public Health* 2013;13:790.
2. Burns K, Keating P, Free C. A systematic review of randomised control trials of sexual health interventions delivered by mobile technologies. *BMC Public Health* 2016;16:778.
3. Woodhall SC, Sile B, Talebi A, *et al*. Internet testing for *Chlamydia trachomatis* in England, 2006 to 2010. *BMC Public Health* 2012;12:1095.
4. World Health Organization. Global health sector strategy on sexually transmitted infections, 2016–2021. Geneva: World Health Organization; 2016. Available at: http://www.who. int/reproductivehealth/publications/rtis/ghss-stis/en/ (accessed 28 Nov 2017).
5. Ostergaard L, Moller JK, Andersen B, *et al*. Diagnosis of urogenital *Chlamydia trachomatis* infection in women based on mailed samples obtained at home: multipractice comparative study. *BMJ* 1996;313:1186–9.
6. Novak DP, Karlsson RB. Simplifying chlamydia testing: an innovative *Chlamydia trachomatis* testing approach using the internet and a home sampling strategy: population based study. *Sex Transm Infect* 2006;82:142–7.
7. Fajardo-Bernal L, Aponte-Gonzalez J, Vigil P, *et al*. Home-based versus clinic-based specimen collection in the management of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections. *Cochrane Database Syst Rev* 2015;316.
8. National Chlamydia Screening Programme (NCSP). Information, data, guidance and resources about the NCSP. Available at: www. gov.uk/government/collections/ nationalchlamydia-screening-programme-ncsp (accessed 14 April 2020).
9. Queensland Government home Sexual health. Available at: https://www.qld.gov.au/ health/staying-healthy/sexual-health/chlamydia-test (accessed 14 April 2020).

10. Söderqvist J, Gullsby K, Stark L, *et al*. Internet-based self-sampling for *Chlamydia trachomatis* testing: a national evaluation in Sweden. *Sex Transm Infect* 2020;96:160-165.
11. Novak D, Novak M. Use of the Internet for home testing for *Chlamydia trachomatis* in Sweden: who are the users? *Int J STD AIDS* 2012;23:83–7.
12. Paudyal P, Llewellyn C, Lau J, *et al*. Obtaining self-samples to diagnose curable sexually transmitted infections: a systematic review of patients' experiences. *PLoS One* 2015; 24;10:e0124310.
13. Grandahl M, Mohammad J, Larsson M, et al. Users' opinions of internet-based self-sampling tests for Chlamydia trachomatis and Neisseria gonorrhoeae in Sweden. Acta Derm Venereol 2020; 100: adv00315. doi: 10.2340/00015555-3677
14. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245-51.
15. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349-57.
16. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. Qual Health Res 2016;26:1753–60.
17. Grandahl M, Neveus T, Dalianis T, *et al*. 'I also want to be vaccinated!' - adolescent boys' awareness and thoughts, perceived benefits, information sources, and intention to be vaccinated against Human papillomavirus (HPV). *Hum Vaccin Immunother* 2019;15:1794–802.
18. Champion VL, Skinner Sugg C. The Health Belief Model. In: Glantz K, Rimer B, Viswanath K, ed. *Health behavior and health education: theory, research and practice* 4th ed. San Francisco, CA. USA: Jossey-Bass 2008.
19. Elo S, Kyngas H. The qualitative content analysis process. *J Adv Nurs* 2008;62:107–15.

20. Op de Coul EL, Götz HM, van Bergen JE, *et al*. Who participates in the Dutch chlamydia screening? A study on demographic and behavioral correlates of participation and positivity. *BMC Public Health* 2006;1;6:221.

21. Barnard S, Free C, Bakolis I, *et al*. Comparing the characteristics of users of an online service for STI self-sampling with clinic service users: a cross-sectional analysis. *Sex Transm Infect* 2018;94:377–83.

22. Balfe M, Brugha R, O'Connell E, *et al*. Men's attitudes towards chlamydia screening: a narrative review. *Sex Health* 2012;9:120–30.

23. Pavlin NL, Gunn JM, Parker R, *et al*. Implementing chlamydia screening: what do women think? A systematic review of the literature. *BMC Public Health* 2006:1;6:221.

24. Duncan B, Hart G, Scoular A, *et al*. Qualitative analysis of psychosocial impact of diagnosis of *Chlamydia trachomatis*: implications for screening. *BMJ* 2001;27;322:195–9.

25. Ekstrand M, Tydén T, Larsson M. Exposing oneself and one's partner to sexual risk-taking as perceived by young Swedish men who requested a chlamydia test. *Eur J Contracept Reprod Health Care* 2011;16:100–7.

26. Lorimer K, McDaid L. Young men's views toward the barriers and facilitators of internet-based *Chlamydia trachomatis* screening: Qualitative study. *J Med Internet Res* 2013; 3;15(12):e265

27. Niu Z, Jeong DC, Willoughby JF. Friends over Doctors? The influences of source and perceived customization on college drinking. *Health Commun* 2020;10:1–11.

28. Hendry NA, Brown G, Dowsett GW, *et al*. Association between sexually transmissible infection testing, numbers of partners and talking to partners and friends about sexual health: survey of young adults. *Sex Health* 2017;14:378–82.

29. Gibbs J, Aicken CRH, Sutcliffe LJ, *et al*. Mixed-methods evaluation of a novel online STI results service. *Sex Transm Infect* 2018;94:622–24.

30. Pearson WS, Kreisel K, Peterman TA, *et al*. Improving STD service delivery: Would American patients and providers use self-tests for gonorrhea and chlamydia? *Prev Med* 2018;115:26–30.

31. Soetens LC, van Benthem BH, Op de Coul EL. Chlamydia test results were associated with sexual risk behavior change among participants of the chlamydia screening implementation in the Netherlands. *Sex Transm Dis* 2015;42:109–14.

FIGURE LEGENDS

Figure 1 Findings according to the Health Belief Model

Table 1 Interview guide

Guiding questions for the telephone interview	HBM concept
How did you find out about the self-sampling service?	Cues to action
What are your views on home-based self-sampling for STIs?	Individual beliefs
What are the benefits?	Benefits
What are the barriers?	Barriers
What do you know about CT/NG?	Knowledge
What are the risks with CT/NG?	Knowledge/Severity
How severe would an infection be for you?	Severity
How do you perceive your own risk of CT/NG?	Susceptibility
What made you order the test kit now?	Cues to action
How did you find using the kit?	Self-efficacy
What are your thoughts about the kit in relation to privacy?	Barriers
What are your thoughts about the results?	Barriers
What do you think about the time from order to result?	Benefits/barriers
What do you think about home-based self-sampling in relation to clinical sampling?	Benefits/barriers
How often do you consider one should take such a test?	Individual beliefs
How much would you be willing to pay for a test if it involved a cost?	Self-efficacy
Would you use the service again and/or recommend it to others?	Self-efficacy

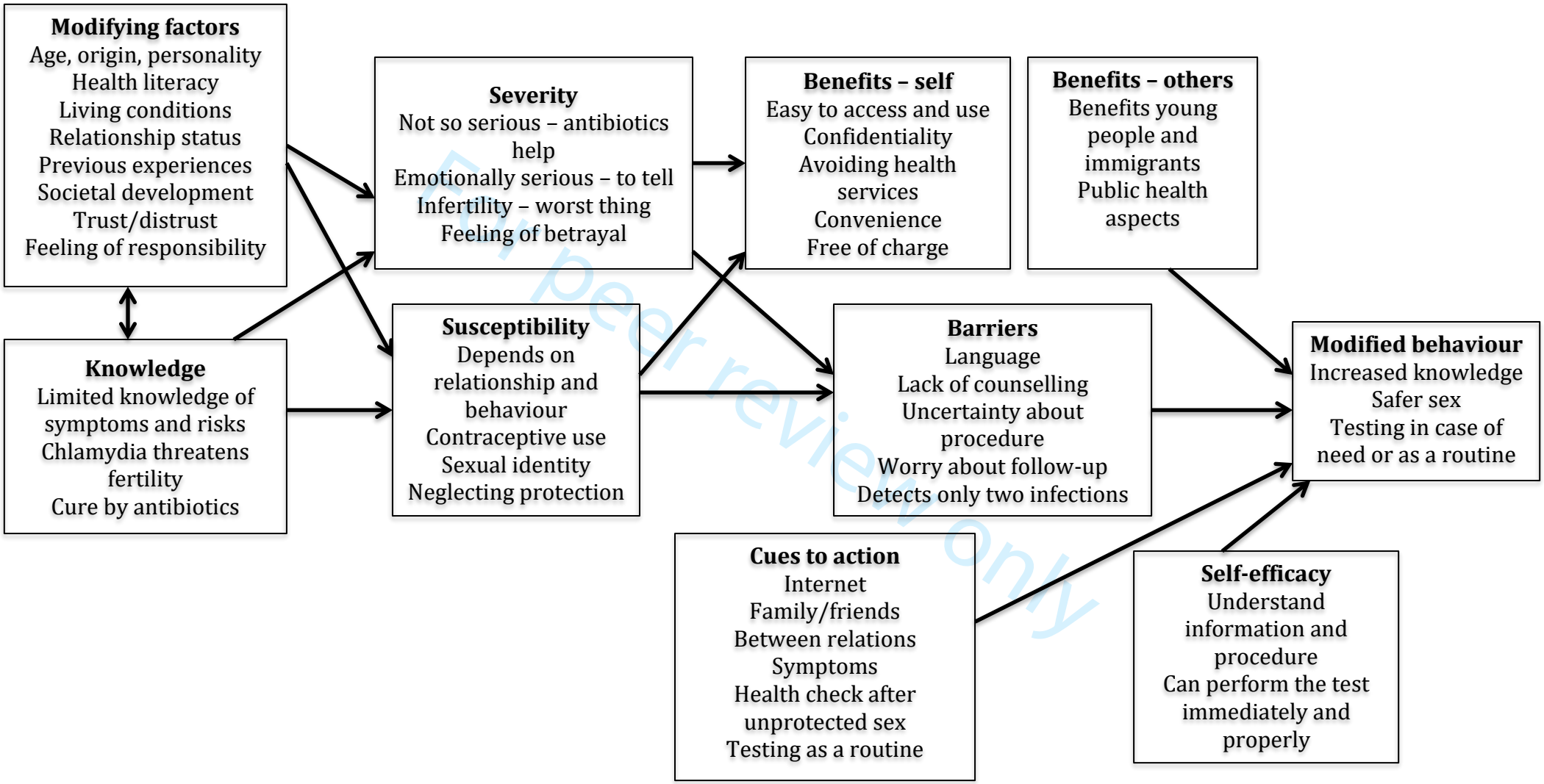

Figure 1. Findings according to the Health Belief Model

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		Section
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Methods, Sample and procedure
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Methods, Sample and procedure
3. Occupation	What was their occupation at the time of the study?	Methods, Sample and procedure
4. Gender	Was the researcher male or female?	
5. Experience and training	What experience or training did the researcher have?	Methods, Sample and procedure
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	No
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Ethical considerations
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Methods Ethical considerations
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Methods, Theoretical framework – the Health Belief Model (HBM)
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Methods
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Methods
12. Sample size	How many participants were in the study?	Methods

13. Non-participation	How many people refused to participate or dropped out? Reasons?	Methods
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Methods
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Methods
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Results
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods and Table 1
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	Methods
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods page
20. Field notes	Were field notes made during and/or after the interview or focus group?	Methods The interviewer made a summary of what was said in the end of the interview and also made some field notes after each interview.
21. Duration	What was the duration of the interviews or focus group?	Methods
22. Data saturation	Was data saturation discussed?	Yes, see Methods
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No, see Methods
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two authors (MG and ML), see Methods
25. Description of the coding tree	Did authors provide a description of the coding tree?	Figure 1
26. Derivation of themes	Were themes identified in advance or derived from the data?	Yes, we used a deductive approach, see Methods
27. Software	What software, if applicable, was used to manage the data?	We did not us a software such as NVivo in the present study
28. Participant checking	Did participants provide feedback on the findings?	No, see Methods
Reporting		
29. Quotations presented	Were participant quotations presented to	Yes, see Results

	illustrate the themes/findings? Was each quotation identified? e.g. participant number	
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, see Results
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes, see Results and Figure 1.
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes, diverse views among the participants are presented in the Results. The authors have suggested a modification of the model to include modified behaviour. See results.

BMJ Open

"To be on the safe side" – a qualitative study regarding users' beliefs and experiences of internet-based self-sampling for Chlamydia trachomatis and Neisseria gonorrhoeae testing

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-041340.R2
Article Type:	Original research
Date Submitted by the Author:	14-Dec-2020
Complete List of Authors:	Grandahl, Maria; Uppsala University, Women's and Children's Health Larsson, Margareta; Uppsala University, Women's and Children's Health Herrmann, Björn; Uppsala Universitet Disciplinary Domain of Medicine and Pharmacy, Clinical Microbiology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Infectious diseases, Qualitative research, Sexual health
Keywords:	PUBLIC HEALTH, QUALITATIVE RESEARCH, INFECTIOUS DISEASES, SEXUAL MEDICINE, REPRODUCTIVE MEDICINE

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

"To be on the safe side" – a qualitative study regarding users' beliefs and experiences of internet-based self-sampling for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* testing

Maria Grandahl[1], Margareta Larsson[1], Björn Herrmann[2]

[1]Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

[2]Section of Clinical Bacteriology, Department of Medical Sciences, Uppsala University, Uppsala, Sweden

Correspondence to Maria Grandahl, Uppsala University, Department of Women's and Children's Health, 751 85, Uppsala, Sweden; maria.grandahl@kbh.uu.se

Word count, Text: 3948; Abstract: 292

Keywords: *Chlamydia trachomatis*; testing; user perspective; risk-benefits; sexual behaviour

ABSTRACT

Objectives In Sweden, an increasing number of tests for sexually transmitted infections are conducted. Self-sampling services are provided free of charge at the national eHealth website. Our aim was to get a deeper understanding of users' beliefs and experiences of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) self-sampling services.

Methods This qualitative study is part of the national project "Internet-based chlamydia and gonorrhoea self-sampling test", conducted in Sweden. Individuals ordering a CT/NG self-sampling test at home from the eHealth website were invited to participate. Out of 114 individuals who agreed, a purposeful sample including 20 females and males aged 18–49 years (mean 30.8) participated in a telephone interview in 2019.

Results The test service for CT/NG was highly appreciated by men and women of different ages. Round-the-clock accessibility, avoiding clinical visits, ease of use, confidentiality, and a rapid test result were reasons for this appreciation. Language, uncertainty about the correct sampling procedure, unreliable postal services, and concerns about handling of personal data were mentioned as barriers. Reasons for testing were checking after unprotected sex, symptoms, checking a partner's fidelity, or a regular routine – "to be on the safe side". Knowledge about the infections and their consequences was limited; some considered them severe, especially if they could threaten fertility, others were less concerned. Disclosing an infection was described as emotionally stressful. Participants had high self-efficacy in relation to the test and would not hesitate to use the service again, even if it involved a cost.

Conclusions Internet-based CT/NG self-sampling at home was highly appreciated and was used for individual health reasons, but also out of concern for others' health and for society as a whole. The benefits seem to outweigh the barriers and the service may therefore continue to be widely offered.

Strengths and limitations of this study

- This study is based on a theoretical framework, The Health Belief Model and aimed to get a deeper understanding of users' beliefs and experiences of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) self-sampling services.
- A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing.
- We conducted telephone interviews with a purposeful sample of individuals' of different sex and sexual identity.
- A limitation was that interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.
- As in all qualitative research, the aim is not to generalise but the results might be useful in similar settings.

INTRODUCTION

From a public health perspective, it is of paramount importance to promote and address sexual and reproductive health, since it concerns a large proportion of the population. There is a growing interest in offering gender-sensitive, effective internet-based care options to improve accessibility, equity and cost-effectiveness.[1-3] Targeting both women and men at risk of sexually transmitted infections (STIs) may have lifelong importance for the individual and considerable implications for public health.[4]

One such internet-based initiative is the offer of free-of-charge testing for *Chlamydia trachomatis* (CT*)/Neisseria gonorrhoeae* (NG) with self-sampling at home. The service has been tested in some countries as a study project or in routine diagnostics.[5-9] In Sweden it is currently provided by the public health care service and is available in all counties, through two national e-Health websites.[10] Individuals with a confirmed infection are directed to a clinic for free treatment and partner notification.

An earlier Swedish study showed that users were mostly young people with high sexual risk behaviour.[11] A recent study found that self-sampling, when compared with clinic-based sampling, comprised 22% of all CT tests in 2017 and accounted for 20% of all detected CT cases.[10] The positivity rate was similar to clinic-based testing (5.5% vs 5.1%), as was the proportion of men using the service (33.7% vs 30.8%).

A review of users' experiences of self-sampling concluded that self-sampling was appreciated by those using it.[12] However, the review included only ten studies with home-based sampling and none of them was conducted in Sweden. A recent survey among 1785 users of the service in Sweden showed that users were happy with the self-sampling test service and sexual risk behaviours motivated use of the test. [13] Our aim with this qualitative study was to complement those quantitative findings in order to gain a deeper

understanding of users' beliefs and of their experiences of the home-based self-sampling service currently offered in Sweden.

METHODS

Design and setting

The present qualitative interview study is part of the project "Internet-based chlamydia and gonorrhoea self-sampling test", undertaken in Uppsala county, a region with a population of 368 000. The study follows Standards for Reporting Qualitative Research[14] and is reported according to COREQ Checklist (Supplemental File).[15]

Sample and procedure

We used a strategic approach aiming to include a broad sample of users' of the self-sampling service. We wanted to explore as many different voices as possible. Eligible participants were individuals ≥15 years of age who had ordered a CT/NG self-sampling test from the national eHealth website. [13] They were invited to participate in a telephone interview. Those interested provided their name, address and mobile phone number, and completed a consent form online. In all, 114 individuals agreed to participate, and of these, 20 men and women with a wide range of ages and representing different sociodemographic areas (by post code) were included in the study, based on the estimation that we needed about 20 interviews to reach information power (i.e. adequate information on the topic).[16]

The interviews were conducted in 2019, lasted between 30 and 52 minutes and were audio-recorded using the application 'TapeACall Pro'. Each interview started with brief information about the study. The interviews were transcribed verbatim and no repeat

interviews were carried out. The interviewers (MG and ML) are health professionals and PhDs with experience of qualitative methods and the topics in question.

Interview guide

We used a semi-structured interview guide, based on a previous study about STIs and sexual health.[17] Study-specific questions were constructed based on previous research and on a quantitative internet-based questionnaire that is part of this project.[13] Two pilot interviews resulted in minor changes to the guide. In summary, the questions focused on the informant's beliefs and experiences of using the CT/NG self-sampling test, with a special emphasis on chlamydia (table 1).

Theoretical framework – the Health Belief Model (HBM)

The Health Belief Model (HBM) is useful in understanding factors that influence health behaviour.[18] The model includes the following central constructs: *perceived susceptibility, perceived severity, perceived benefit, perceived barriers and individual behaviour*. In addition, sociodemographic factors such as age, sex and ethnicity, and also knowledge, can influence the individual's behaviour. Important concepts in the theory are *cues to action*, which can motivate individuals to alter their behaviour, and *self-efficacy* – the ability of the individual to perform certain behaviour. In addition, the authors suggest a modification of the model to include *modified behaviour.*

Analysis

We used a deductive approach[19] with key concepts from the HBM to analyse and discuss our findings. The transcripts were read in order to get an overall picture of the data. Units of

meaning were extracted, condensed and labelled with a colour mark. These units were then sorted into suitable HBM categories by two researchers working individually. Finally, all the authors discussed the categories until consensus was reached.

Ethical considerations

This study was approved by the Swedish Ethical Review Authority (Dnr. 2018/250). All participants received written information and provided consent online.

Patient and Public Involvement statement

The present study is part of a larger study. [10, 13] Three university students were engaged in project design. Furthermore, the questionnaire used in the previous survey [13] was tested on two patients in a pilot study and thereafter the questionnaire was slightly modified. By definition patients are involved in this interview study. Before commencement, the interview guide was tested on representatives of the public, i.e. individuals similar to the target group resulting in minor changes in the Interview guide (table 1).

RESULTS

In total, 11 females and 9 males, 18–49 years of age (mean 30.8), participated. The participants had different sexual identities (hetero- and homosexual) and diverse countries of birth and cultural backgrounds. The findings are presented according to the HBM concepts and are summarised in figure 1.

Modifying factors

A plethora of modifying factors seemed to influence use of the self-sampling test, some personal, others more of a relational or contextual nature. Individual factors included personality, sexual identity, health awareness and emotions such as shyness and physical discomfort.

I am a bit shy to go to the health center …. [my country] it is a bit different from Sweden. (Woman, #12)

I am not very comfortable with someone else touching my penis. My first thought was: Will this hurt or won't it? (Man, #2)

Relational factors were sexual behaviour, current relationship status, trust or distrust in one's partner, as well as previous experience of infidelity or betrayal.

In many relationships it happens that … you become aware of infidelity because of a positive chlamydia test. (Woman, #7)

Contextual factors such as country of birth, previous health care experiences, economy and encountering unknown sex partners via dating applications were also mentioned.

People who are like newly here, they have maybe like a lot of stigma about sex and stuff like that. So they wouldn't tell, even to the doctors. From the culture I came from, they are not open about the sexuality. (Man, #15)

Knowledge

Knowledge about the infection:

Participants had limited knowledge about chlamydia and were unsure of its consequences. Most stated that CT was a common STI with few or no symptoms but should be reported according to the Diseases Act. They had mostly learned about CT and STIs on line, but also mentioned sexuality education in school. They did not know how the infection could affect

health, but believed that if untreated it could threaten fertility. Some stated that they were unsure how CT was transmitted, whether it was transmitted through body fluids, by oral sex or if women have sex with women. There were uncertainties about whether CT was a bacterium and how it was treated.

I don't know how it would feel if I had it, if you get symptoms, which I don't think you do. And then I don't know the consequences. I actually know very little. (Woman, #18)

Knowledge about the testing service was mostly adequate and came from different sources: internet, other media, school, friends, health care providers and also through their own previous experience.

I know about the procedure, I receive the letter, I know what to do, I send it back. Within a couple of weeks I will know what to do, if I have it or not. (Man, #19)

I have never heard any of my male friends saying that they have ordered it (the test kit). (Man, #6)

Severity

Emotional severity

Most participants expressed that a chlamydia infection would be serious, especially for emotional reasons. They would feel guilty and that they were betraying others. Compulsory contact tracing was demanding. The entire procedure was cumbersome, the worst part being disclosing a chlamydia infection to previous and/or current partners. Others were less bothered. They just needed antibiotic treatment and then everything would be OK.

I would find it hard, but not the end of the world. You don't die from it. The worst part would be disappointing people … that you have caused harm to someone. (Woman, #1)

Physical severity

The participants considered that fertility was important and that infertility would be the worst thing that could happen to them.

It becomes an existential issue, because what meaning is there then to life? (in case of infertility) So it goes deep. (Man, #10)

I really, really want to have children. So, even if … because I am in a same-sex relationship, which makes it even harder. But still, it is very, very important for me to be able to have a child. (Man, #10)

Societal severity

Several participants voiced concerns about a spread of the infections in society. CT was perceived as increasing and risk taking without condom use often in combination with alcohol consumption was considered common. The fact that the Communicable Diseases Act includes these infections was a sign that society take them seriously and the compulsory registration of cases was appreciated as a means of preventing spread of infections in the population.

I think it (the registration of cases) is good…It is still a disease than can influence and damage for a long time. (Man, #9)

Susceptibility

Participants had different perceptions of their own risk of contracting chlamydia. Some believed the risk was low, since they had a long-term relationship with one partner or claimed that they chose their sexual partners with care. Others stated that their risk was

significant, since they were sexually active with different partners without condom protection and/or said that you could never know who to trust. They considered that condom use was cumbersome and that sex was better without it.

I divorced four years ago. Before that I had a steady partner for 16 years. So then I did not think about it at all. But now, when I have been single, I have dated quite a lot and mostly had unprotected sex. (Man, #17)

Benefits

Benefits self

Participants found it convenient to order the test kit online and considered it easy to use. Being able to perform the test at home at a time of one's choosing was appreciated. Some described the advantage of not having to visit a health service clinic when living in a small community where it was difficult to maintain confidentiality. Avoiding showing one's genitals to a health professional was also mentioned. The test being free of charge was another benefit. The packaging was discreet and did not disclose that the contents had to do with a sexually transmitted infection. Participants felt that they received the result reasonably fast and that it was easy to check for it online.

The instructions were clear, you just follow the steps. You can do it any time, when you want. You do not need to go somewhere or stay away from work … or talk to somebody. You do not need to feel ... embarrassed. (Woman, #4)

Benefits – others

Participants described several benefits for other people. Young people and immigrants were seen as more vulnerable and could benefit from the free, confidential service. A public

health aspect was also mentioned. An easy-to-use self-sampling service could increase the number of tests and enable contact tracing and treatment, thus avoiding spread of the infection in society. Some participants had used the home sampling service several times and argued it should be used every time after unprotected sex in order to protect not only themselves, but also others.

Everybody should be able to take a test, without having to consider the cost … the possibility to protect oneself – and to protect against carrying around a disease. (Woman, #6*)*

Perceived barriers

Although most participants felt confident in the use of the sampling-test, some barriers were mentioned, some personal, others more of a technical nature or related to a possible unmet care need.

Personal barriers

Language could be an obvious one, and one participant actually went to a health service clinic in order to have the procedure explained.

If you have problems with reading and low level of school education. (Woman, #12)

Technical barriers

Not knowing whether they were performing the self-sampling correctly or whether the test would be handled properly caused some worries, as did unreliable postal services and insecure storing of personal data. Some would have liked an extra swab in the kit in case of a mistake.

Maybe it is not 100% reliable? I may not do it the right way … you can be unsure whether the test could end up in the hands of someone unauthorised … it is still personal data. Those are the things you discuss. (Woman, #7)

Unmet care need

Participants expressed that not having the possibility of counselling could be a disadvantage. They also mentioned that they did not know exactly where to turn in case of an infection. Another disadvantage was that the test only covers two infections, chlamydia and gonorrhoea.

Could maybe be problematic that you are not automatically connected to any clinic. (Woman, #1)

Questions may have needed to be asked both from my side and from yours. A broader spectrum of diseases would perhaps be needed. (Man, #17)

Self-efficacy

Self-efficacy in handling the test and obtaining the result

Most participants described had high self-efficacy in their use of the service. They felt confident about taking the sample and sending it by post to the lab. However, some disclosed uncertainty in handling the procedure, some had not sent the test and one informant had dropped the swab on the floor. Participants believed they were able to take the test earlier via the self-sampling service compared with visiting a clinic, and most were prepared to use it again. Even if self-sampling overall was considered convenient, waiting for the test result was stressful.

It is not difficult, with the swab… how to place it and how to send it in. You just read, point by point how to do it. (Woman, #16)

I simply forgot, it just lay there in the envelope. So, you have no one to check that it really is done. (Man, #9)

Self-efficacy in relation to a potential cost

Most would be willing to pay for the test, about €10–30 was considered appropriate. However, a charge would probably lead to fewer tests.

… even if it involved a cost, let us say 100 to 200 Swedish crowns, I would still order the test because the service is so easy and convenient. (Man, #5)

Cues to action

Participants mentioned different aspects that had served as cues to action for them.

Awareness of the availability of the service

The participants' expressed that they had become aware of the self-sampling test by chance when web surfing on the Internet or when visiting health related websites. Others had become aware of the self-sampling service either from friends or from health care providers.

It was on the national e-health web site. I had logged in to book another appointment and then I read about the home test. So I just "Ah that sounds good". (Man, #10)

Health related reasons

Many took the test to ensure that they were healthy after unprotected sex. Some had also experienced symptoms. Others had made it a routine to take a test regularly – "to be on the safe side". Several emphasised the importance of avoiding spreading an infection to others.

…and it is so severe that you should absolutely not spread it on, or hide it to someone. (Man, #9)

Relational aspects

Another reason to take a test was to exclude a potential infection before engaging in a new relationship. Checking whether a partner had been unfaithful was also mentioned; a positive chlamydia test would be seen as a proof of unfaithfulness.

I had left a long relationship and had a new partner. So I wanted to be 100% sure, as I had been earlier. (Woman, #7)

Modified behaviour

Modified sexual behaviour

The participants discussed whether the home-based self-sampling method could lead to modified sexual behaviour. Some said they had learned a lot and/or become worried and were motivated to use a condom more frequently, while others did not have any intention to change. The fact that the test was free of charge, in contrast to condoms, led some participants to argue in favour of a moderate charge so that testing would not replace condom use.

Now I'm into protecting myself a bit better as long as I don't have a stable partner. The day after (a negative test result) I took cookies to school and we celebrated. Lesson learned, you could say. (Woman, #1)

Modified testing routines

Most participants would use the service again, either as their normal routine or in case of future need.

I have started to think about testing for HIV too, even if it is not that widespread, but still … This has been an eye-opener for me, you could say, and it never hurts to take a test. (Man, #11)

DISCUSSION

The free-of-charge self-sampling test service for CT/NG was highly appreciated by the participants owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result. Barriers included language, uncertainty about the procedure, unreliable postal services and insecure handling of personal data. Checking after unprotected sex or a regular routine – "to be on the safe side" – were key reasons for ordering the test.

A strength of this qualitative study is that it forms an integral part of an evaluation of the concept of internet-based self-sampling for CT/NG testing. The present study is part of a larger project with access to a population with recent experience of the internet-based self-sampling service.[13] Thus, we could use a strategic sample of individuals. Our previous work showed this service to be widely used and to play an important role in CT/NG detection,[10] and an internet-based questionnaire showed that users greatly appreciate the service and that their behaviour indicates that they are at risk of STIs.[13] The criteria for assessing trustworthiness were considered. Credibility was achieved by purposeful sampling of informants, continuous analysis of the data, description of the entire process and supporting quotes. To avoid lone researcher bias, two authors individually read the transcripts and sorted the data into categories. To increase dependability, the analytical process was rigorous and systematic; all data were thoroughly analysed.

A limitation, as in all qualitative research where the aim is not to generalise, is that the results may not be transferable to other settings or societies different from Sweden. Another limitation was that telephone interviewing could only be performed in Swedish and English and did not permit observation of non-verbal communication.

We found the HBM useful in all phases of the project – in developing the interview guide as well as in the analysis and interpretation of the data. However, using HBM both as a

guide in designing the study and as an analytical tool may entail a risk for circular reasoning and not being open to unexpected findings. Below we discuss the findings according to this model and in relation to other studies.

Several individual factors and personal knowledge about the infection seemed to influence the decision to use the self-sampling service. This has also been shown in other studies.[20-22] The participants discussed perceived threat, the combination of beliefs about severity and susceptibility, with infertility and emotional distress being particularly prominent. This is in agreement with other studies.[23-24] If the threat is perceived as significant, willingness to act upon it increases.

Our study also showed that users reflect on benefits and barriers in relation to the service. Interestingly, the benefits mentioned were not only for oneself but also for others and for society as a whole. This finding is in contrast to another Swedish study, which showed that young men who took a chlamydia test were not particularly concerned about passing on the infection to others.[25] The barriers mentioned by our participants are in line with what other studies have shown.[12,26] The HBM postulates that a certain behaviour is more likely to occur if the benefits outweigh the barriers.[18] It is therefore important to remove as many barriers as possible. Translation of the information into other languages could be one obvious improvement. However, closing the gap in health inequality due to lower socioeconomics and illiteracy is more challenging. Health literacy, the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions including risk perceptions, have an impact. Even if health information is available in different languages, individuals might have difficulties to understand and appraise the health service offered. Consequently the

National eHealth service may not reach the population at large. It is essential to reach out to vulnerable groups and provide health information through different arenas and sources including face-to-face information in the school health, at Youth Health Clinics and in the Primary Care setting. We believe that free of charge self-tests have the potential to reach individuals of different socioeconomic status, in rural areas and in the end, decrease health inequity in Sweden.

Our participants had often learned about the service through the internet, by actively searching for information, but also unintentionally. Friends were also mentioned, in line with other studies which show that individuals tend to put considerable trust in friends.[27-28] Most participants had high self-efficacy in their use of the service, even if they had some doubts about where to turn in the event of a positive test result. A study from the US showed that most people were in favour of receiving a test result online,[29] and another US study concluded that introducing a home-based self-sampling service would be appreciated.[30]

Some of our participants described the testing procedure as an eye-opener and intended to protect themselves better in the future, whereas others said they would continue to rely on regular testing as a routine. Findings from a large trial in the Netherlands indicate that sexual behaviour can change in two ways after internet-based testing. Those with a positive test result seemed to become more cautious, in contrast to those who had a negative test result, who tended to adopt riskier behaviour.[31] These findings are intriguing and would need to be confirmed in further studies. It is also important to note that the findings presented here are opinions and experiences of the users' of the self-sampling service. There is thus a need for similar research among people who have chosen not to use an on-line service and explore their views as well.

In summary, CT/NG infection was considered severe if it could lead to infertility. The test was mainly taken as an individual health check after unprotected sex, but also out of concern for others' health and for society overall, to avoid spreading an infection. The benefits of the self-sampling test service outweighed the barriers, owing to its high accessibility, ease of use, confidentiality, convenience and a rapid result, and the service may therefore continue to be widely offered.

Acknowledgements We would like to thank all the individuals that participated in the study.

Funding The study was funded by the Public Health Agency of Sweden in 2018, no specific funding number is available. The funders of the study had no role in study design, data collection, data analysis, data interpretation or the writing of the report.

Competing interests None declared.

Patient consent Obtained.

Contributorship statement MG, ML and BH designed the study, BH was responsible for data collection, MG and ML conducted interviews, carried out the analysis, and composed the initial manuscript. All authors contributed to the finalisation of the manuscript.

Data sharing statement All data relevant to the study are included in the article or uploaded as supplementary information.

REFERENCES

1. Minichiello V, Rahman S, Dune T, *et al*. E-health: potential benefits and challenges in providing and accessing sexual health services. *BMC Public Health* 2013;13:790.
2. Burns K, Keating P, Free C. A systematic review of randomised control trials of sexual health interventions delivered by mobile technologies. *BMC Public Health* 2016;16:778.
3. Woodhall SC, Sile B, Talebi A, *et al*. Internet testing for *Chlamydia trachomatis* in England, 2006 to 2010. *BMC Public Health* 2012;12:1095.
4. World Health Organization. Global health sector strategy on sexually transmitted infections, 2016–2021. Geneva: World Health Organization; 2016. Available at: http://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/ (accessed 28 Nov 2017).
5. Ostergaard L, Moller JK, Andersen B, *et al*. Diagnosis of urogenital *Chlamydia trachomatis* infection in women based on mailed samples obtained at home: multipractice comparative study. *BMJ* 1996;313:1186–9.
6. Novak DP, Karlsson RB. Simplifying chlamydia testing: an innovative *Chlamydia trachomatis* testing approach using the internet and a home sampling strategy: population based study. *Sex Transm Infect* 2006;82:142–7.
7. Fajardo-Bernal L, Aponte-Gonzalez J, Vigil P, *et al*. Home-based versus clinic-based specimen collection in the management of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections. *Cochrane Database Syst Rev* 2015;316.
8. National Chlamydia Screening Programme (NCSP). Information, data, guidance and resources about the NCSP. Available at: www. gov.uk/government/collections/ nationalchlamydia-screening-programme-ncsp (accessed 14 April 2020).
9. Queensland Government home Sexual health. Available at: https://www.qld.gov.au/health/staying-healthy/sexual-health/chlamydia-test (accessed 14 April 2020).

10. Söderqvist J, Gullsby K, Stark L, *et al*. Internet-based self-sampling for *Chlamydia trachomatis* testing: a national evaluation in Sweden. *Sex Transm Infect* 2020;96:160-165.
11. Novak D, Novak M. Use of the Internet for home testing for *Chlamydia trachomatis* in Sweden: who are the users? *Int J STD AIDS* 2012;23:83–7.
12. Paudyal P, Llewellyn C, Lau J, *et al*. Obtaining self-samples to diagnose curable sexually transmitted infections: a systematic review of patients' experiences. *PLoS One* 2015; 24;10:e0124310.
13. Grandahl M, Mohammad J, Larsson M, et al. Users' opinions of internet-based self-sampling tests for Chlamydia trachomatis and Neisseria gonorrhoeae in Sweden. *Acta Derm Venereol* 2020; 100: adv00315. doi: 10.2340/00015555-3677
14. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245-51.
15. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349-57.
16. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. *Qual Health Res* 2016;26:1753–60.
17. Grandahl M, Neveus T, Dalianis T, *et al*. 'I also want to be vaccinated!' - adolescent boys' awareness and thoughts, perceived benefits, information sources, and intention to be vaccinated against Human papillomavirus (HPV). *Hum Vaccin Immunother* 2019;15:1794–802.
18. Champion VL, Skinner Sugg C. The Health Belief Model. In: Glantz K, Rimer B, Viswanath K, ed. *Health behavior and health education: theory, research and practice* 4th ed. San Francisco, CA. USA: Jossey-Bass 2008.
19. Elo S, Kyngas H. The qualitative content analysis process. *J Adv Nurs* 2008;62:107–15.

20. Op de Coul EL, Götz HM, van Bergen JE, *et al*. Who participates in the Dutch chlamydia screening? A study on demographic and behavioral correlates of participation and positivity. *BMC Public Health* 2006;1;6:221.

21. Barnard S, Free C, Bakolis I, *et al*. Comparing the characteristics of users of an online service for STI self-sampling with clinic service users: a cross-sectional analysis. *Sex Transm Infect* 2018;94:377–83.

22. Balfe M, Brugha R, O'Connell E, *et al*. Men's attitudes towards chlamydia screening: a narrative review. *Sex Health* 2012;9:120–30.

23. Pavlin NL, Gunn JM, Parker R, *et al*. Implementing chlamydia screening: what do women think? A systematic review of the literature. *BMC Public Health* 2006:1;6:221.

24. Duncan B, Hart G, Scoular A, *et al*. Qualitative analysis of psychosocial impact of diagnosis of *Chlamydia trachomatis*: implications for screening. *BMJ* 2001;27;322:195–9.

25. Ekstrand M, Tydén T, Larsson M. Exposing oneself and one's partner to sexual risk-taking as perceived by young Swedish men who requested a chlamydia test. *Eur J Contracept Reprod Health Care* 2011;16:100–7.

26. Lorimer K, McDaid L. Young men's views toward the barriers and facilitators of internet-based *Chlamydia trachomatis* screening: Qualitative study. *J Med Internet Res* 2013; 3;15(12):e265

27. Niu Z, Jeong DC, Willoughby JF. Friends over Doctors? The influences of source and perceived customization on college drinking. *Health Commun* 2020;10:1–11.

28. Hendry NA, Brown G, Dowsett GW, *et al*. Association between sexually transmissible infection testing, numbers of partners and talking to partners and friends about sexual health: survey of young adults. *Sex Health* 2017;14:378–82.

29. Gibbs J, Aicken CRH, Sutcliffe LJ, *et al*. Mixed-methods evaluation of a novel online STI results service. *Sex Transm Infect* 2018;94:622–24.

30. Pearson WS, Kreisel K, Peterman TA, *et al*. Improving STD service delivery: Would American patients and providers use self-tests for gonorrhea and chlamydia? *Prev Med* 2018;115:26–30.

31. Soetens LC, van Benthem BH, Op de Coul EL. Chlamydia test results were associated with sexual risk behavior change among participants of the chlamydia screening implementation in the Netherlands. *Sex Transm Dis* 2015;42:109–14.

FIGURE LEGENDS

Figure 1 Findings according to the Health Belief Model

Table 1 Interview guide

Guiding questions for the telephone interview	HBM concept
How did you find out about the self-sampling service?	Cues to action
What are your views on home-based self-sampling for STIs?	Individual beliefs
What are the benefits?	Benefits
What are the barriers?	Barriers
What do you know about CT/NG?	Knowledge
What are the risks with CT/NG?	Knowledge/Severity
How severe would an infection be for you?	Severity
How do you perceive your own risk of CT/NG?	Susceptibility
What made you order the test kit now?	Cues to action
How did you find using the kit?	Self-efficacy
What are your thoughts about the kit in relation to privacy?	Barriers
What are your thoughts about the results?	Barriers
What do you think about the time from order to result?	Benefits/barriers
What do you think about home-based self-sampling in relation to clinical sampling?	Benefits/barriers
How often do you consider one should take such a test?	Individual beliefs
How much would you be willing to pay for a test if it involved a cost?	Self-efficacy
Would you use the service again and/or recommend it to others?	Self-efficacy

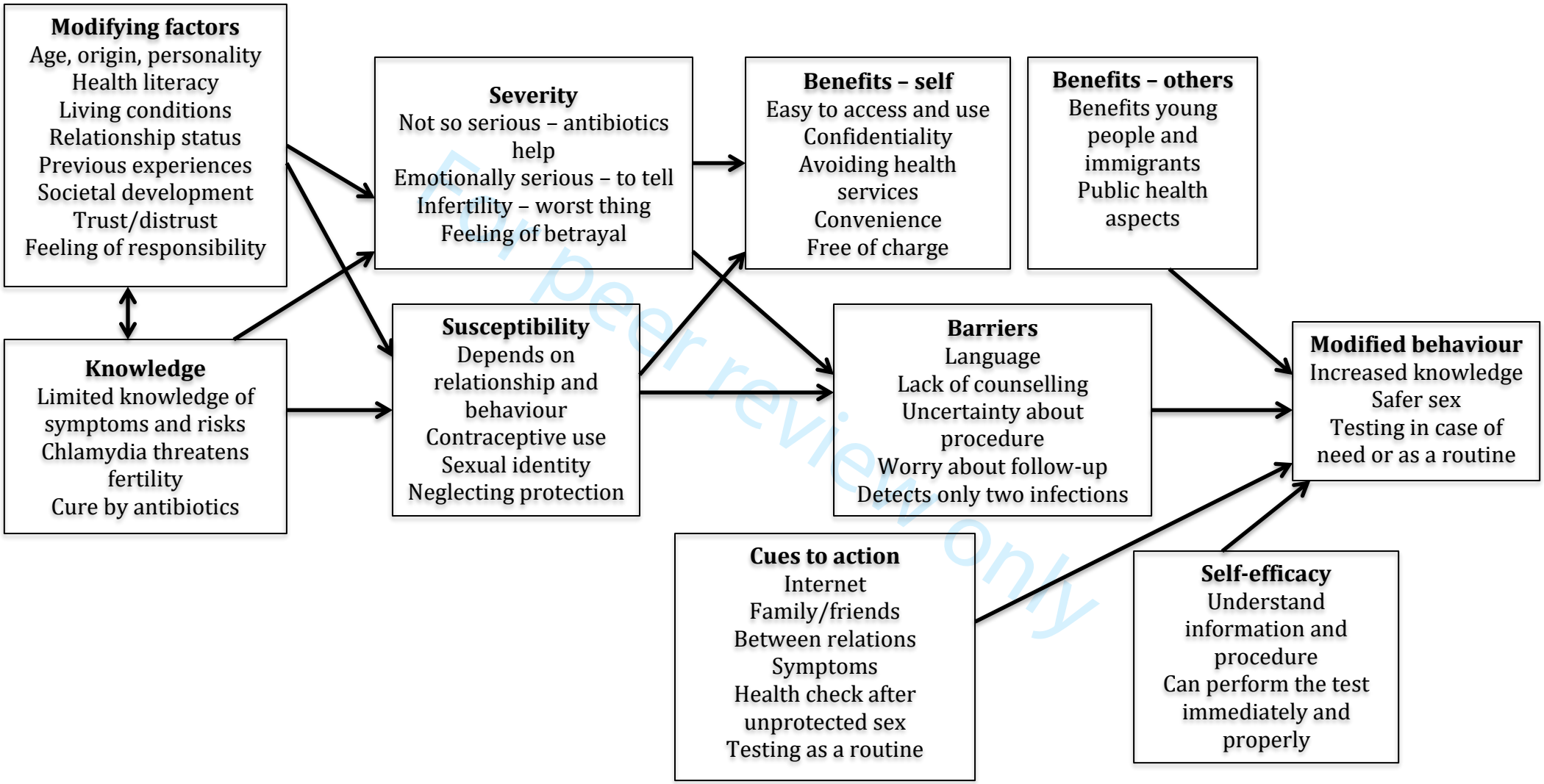

Figure 1. Findings according to the Health Belief Model

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		Section
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Methods, Sample and procedure
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Methods, Sample and procedure
3. Occupation	What was their occupation at the time of the study?	Methods, Sample and procedure
4. Gender	Was the researcher male or female?	
5. Experience and training	What experience or training did the researcher have?	Methods, Sample and procedure
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	No
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Ethical considerations
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Methods Ethical considerations
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Methods, Theoretical framework – the Health Belief Model (HBM)
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Methods
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Methods
12. Sample size	How many participants were in the study?	Methods

13. Non-participation	How many people refused to participate or dropped out? Reasons?	Methods
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Methods
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Methods
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Results
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods and Table 1
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	Methods
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods page
20. Field notes	Were field notes made during and/or after the interview or focus group?	Methods The interviewer made a summary of what was said in the end of the interview and also made some field notes after each interview.
21. Duration	What was the duration of the interviews or focus group?	Methods
22. Data saturation	Was data saturation discussed?	Yes, see Methods
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No, see Methods
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two authors (MG and ML), see Methods
25. Description of the coding tree	Did authors provide a description of the coding tree?	Figure 1
26. Derivation of themes	Were themes identified in advance or derived from the data?	Yes, we used a deductive approach, see Methods
27. Software	What software, if applicable, was used to manage the data?	We did not us a software such as NVivo in the present study
28. Participant checking	Did participants provide feedback on the findings?	No, see Methods
Reporting		
29. Quotations presented	Were participant quotations presented to	Yes, see Results

	illustrate the themes/findings? Was each quotation identified? e.g. participant number	
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, see Results
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes, see Results and Figure 1.
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes, diverse views among the participants are presented in the Results. The authors have suggested a modification of the model to include modified behaviour. See results.