

Preferences of men who have sex with men for performing anal self-examination for the detection of anal syphilis in Australia: A discrete choice experiment

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Summary

Background Regular anal self-examination could potentially reduce syphilis transmission by detecting anal syphilis earlier among men who have sex with men (MSM). This study aimed to examine the preferences of MSM on performing anal self-examination to detect anal syphilis.

Methods An online survey with a discrete choice experiment (DCE) was distributed to MSM attending a sexual health clinic and through social media in Australia between June and November 2020. The DCE examined the preferred attributes of anal self-examination that would encourage MSM to perform anal self-examination. Data were analysed using a random parameters logit (RPL) model.

Findings The median age of 557 MSM who completed the survey was 35 (inter quartile range, 27-45). The choice to perform anal self-examination was most influenced by two attributes: the accuracy of anal self-examination to diagnose anal syphilis, and the frequency of anal self-examination, followed by the type of instruction materials to perform anal self-examination, waiting time for medical review, and type of support received if abnormalities were found. Using the most preferred attributes, 98% of people would conduct anal self-examination compared with 35% when the least preferred anal self-examination attributes were offered.

Interpretation If anal self-examination were recommended for anal syphilis screening, it will be important to consider preferences of MSM: men were more likely to undertake anal self-examination if the frequency was once a month and there was higher accuracy of detecting anal syphilis.

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Introduction

Syphilis is a bacterial sexually transmitted infection (STI) with increasing incidence in high-income and middle-income countries, especially among men who have sex with men (MSM), since the early 2000s.¹⁻⁴ In Victoria, Australia, the notification of syphilis infection has likewise risen among MSM,^{5,7} with the current

incidence rate of syphilis at 8.8 per 100-person-years among MSM taking pre-exposure prophylaxis (PrEP).⁸

Syphilis is divided into stages: primary, secondary, latent, and tertiary, with different signs and symptoms associated with each stage.⁹ Sexual practices and the site of primary syphilis lesions influence the stage of infection that syphilis is diagnosed. Studies have shown that MSM and women are less likely to be diagnosed with primary syphilis than heterosexual men^{5,10,11} and that MSM who practised receptive anal sex were four times more likely to have secondary syphilis than those who practised insertive anal sex.¹² These findings imply that primary syphilis occurs at the site of inoculation which is commonly the anus among MSM who practise receptive anal sex. They are likely to miss primary anal syphilis, due to the occult nature of the location of

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Research in context

Evidence before this study

Syphilis is a sexually transmitted infection (STI) that is re-emergent in many countries. Anal self-examination to detect anal syphilis is a new idea that has not been explored previously for syphilis detection. It has been examined for anal cancer screening in men who have sex with men (MSM), with studies suggestive of high acceptability from MSM.

We searched PubMed for studies up to 24th September 2021 to look for quantitative studies of preferences for anal self-examination and syphilis detection. We used the search terms: ('anal self-examination' OR 'self-examination of anus') AND ('preference' OR 'discrete choice experiment' OR 'DCE'). We found no studies using discrete choice experiments (DCEs) that reported preferences for anal self-examination.

Added value of this study

As part of a series of studies examining the use of anal self-examination to detect anal syphilis in MSM, we conducted qualitative interviews and an exploratory survey to examine the acceptability of anal self-examination. While these studies provide us with the perceptions and acceptability of anal self-examination as well as a list of wanted attributes, DCEs will provide us with valuable data on which attributes to prioritise when designing a guideline for maximum uptake. Currently, there are no DCE studies on anal self-examination and therefore, our study used an online survey with DCE to elicit preferences of MSM on performing anal self-examination and the support they would like to have if they detect abnormality during an examination. The findings will help us to understand important attributes to maximise uptake of this practice if anal self-examination were to be recommended as a regular practice in addition to the standard 3-monthly STI screening for MSM.

Implications of all the available evidence

There are limited studies on anal self-examination with existing studies focusing on the role of anal self-examination in anal cancer screening for MSM in the literature. This indicates that the utility of anal self-examination for anal syphilis detection is a new research topic. The anal cancer screening studies showed that most MSM are willing to perform anal self-examination, although the self-examination might not be suitable or acceptable to practise for certain subgroups. We extrapolated that similar challenges are likely to be encountered in implementing anal self-examination for anal syphilis detection even if anal self-examination is proven effective.

Measuring the preferences of the general population of MSM and identifying MSM subgroups who might or might not benefit from the recommendation and the preferences of these subgroups will assist in targeted promotion and efficient resource allocation. We found that higher uptake of anal self-examination was more likely if the frequency of anal self-examination was once

a month and there was higher accuracy of detecting anal syphilis. These findings will help shape upcoming studies that assess the effectiveness and cost-effectiveness of anal self-examination in detecting anal syphilis and future policy implementation.

syphilis lesion, therefore only present to medical services when they have symptoms of secondary syphilis or if these symptoms are missed, then the infection will only be detected at their next STI screening. Early treatment of MSM with primary syphilis will reduce the duration of syphilis infectiousness and indirectly prevent the infection in sexual partners.

Testing frequency is important in determining early detection of syphilis. A mathematical model predicted reduction in the number of syphilis diagnoses if testing frequency was increased to four times per year (three monthly) from once per year.¹³ However, since PrEP became widely available, men taking PrEP were undergoing three monthly STI screening including syphilis serology. Peel et al. reported a substantial number of primary and secondary syphilis cases were diagnosed at interim visits instead of at three monthly regular STI screening for MSM taking PrEP.¹⁴ This suggests that three monthly regular screening as recommended by modelling for STI control^{13,15,16} might not be sufficient for syphilis control, and we should seek alternative methods to increase early detection of syphilis and therefore improve syphilis control in addition to regular screening. Based on findings that men practising receptive anal sex are likely to miss primary anal syphilis lesions, we proposed a hypothesis that targeting these men will improve early detection of syphilis. If men examined their anus regularly, they might be able to detect primary anorectal lesions and present for treatment, thereby reducing the duration of infectiousness.

Measures to curb the epidemic of syphilis among MSM, such as incorporating regular three monthly screening in STI guidelines,¹⁷ reminder systems for STI screening, and opt-out syphilis testing in men living with HIV during their regular health check,¹⁸ have not been sufficient to control syphilis.^{19,20} New strategies are needed to counter the syphilis epidemic in addition to existing public health control measures. Anal self-examination, although a new concept for syphilis detection, is a practice recommended among MSM aged over 50 who are living with HIV to detect early anal cancer.²¹⁻²³ A qualitative study conducted by the authors reported anal self-examination was an acceptable method for anal syphilis detection among 20 MSM at a sexual health clinic setting.²⁴

To understand the preferences of MSM in utilising anal self-examination as a preventative measure to detect anal syphilis, we conducted a discrete choice experiment (DCE) study. This study is part of a series of anal self-examination study examining its acceptability

and preferences by MSM and the effectiveness of anal self-examination to detect anal syphilis. DCE is a method to elicit preferences and quantify them²⁵. DCEs enable researchers to describe how individuals value selected attributes of services or goods by asking them to choose between different hypothetical alternatives.²⁶ DCEs are increasingly popular in health economics and particularly useful when a “product” or a “service” is not yet available on the market.^{27,28} Moreover, preferences can be measured quantitatively using a DCE, providing insights into preferences at subpopulation levels. DCEs can thus be used to predict the uptake of an anal self-examination program with trade-off attributes that closely resemble what providers can offer and what the targeted audience might prefer.

Although the use of anal self-examination for the detection of syphilis is still in the early stages of research, identifying and understanding MSM's preferences (choices) can help us structure future anal self-examination studies and targeted recommendations for anal self-examination in the future if proven effective. Our study aims to explore and quantify MSM's preferences for adopting anal self-examination as a routine practice for early syphilis detection.

Methods

Study population and recruitment

MSM who attended Melbourne Sexual Health Centre (MSHC), a public sexual health clinic in Victoria, Australia, between June and November 2020 were invited to participate in the survey. We recruited clients who identified as men who have sex with men (gay, bisexual, other men who have sex with men) and gender diverse who were not transgender residing in Australia, age 18 or older and had sex with a man in the last 12 months. We excluded those who identified as transmen or transwomen or birth-assigned female sex. SMS messages containing a link to the survey were sent to eligible men and gender diverse clients who attended MSHC and consented to receive an SMS about research during their computer-assisted self-interview check-in process. The survey was also advertised on social media through our research centre, including on Twitter and Facebook, and through social networks of community-based organisations (Thorne Harbour Health & Living Positive) using social media. An anonymous online survey that included electronic consent following the participant information online was designed using the Qualtrics platform (Qualtrics, Provo, UT). The survey started with an explanation of anal self-examination and reasons for conducting the study. We then asked for consent to participate in the survey by choosing the “Agree” or “Disagree” button, which was compulsory before moving to the next step of the survey. If a participant chose “Disagree”, the survey would be terminated.

The survey included questions on sociodemographic characteristics (age, gender, educational level, sexual orientation), sexual practices (sexual positions such as receptive anal sex), whether they had previous syphilis, previous anal self-examination experience, and their preference and practice of anal self-examination for those who had ever performed anal self-examination and likely preference and practice of anal self-examination for those who had never performed anal self-examination, and the discrete choice experiment (DCE) questions. Only the results of the DCE study were included in this paper, the additional outcomes of the survey will be published elsewhere²⁹. Men who agreed to participate were randomly assigned to one of two separate blocks of the DCE, which examined preferences for performing anal self-examination. No financial incentives were offered for the completion of the survey.

Design of the DCE

We conducted qualitative interviews with 20 MSM to explore their attitudes towards anal self-examination to detect syphilis.²⁴ The interviews provided data on which attributes were most important to include in the DCE. We also considered data from a literature review and policy relevance to finalise the list of attributes and levels (Table 1). The experimental design contained 12 choice sets which we blocked into two so each participant would only see six choice sets to reduce respondent fatigue. Each participant was presented with six choice sets; each choice set consisted of three unlabelled alternatives, i.e., scenarios A, B & C, with one alternative being an opt-out, i.e., not wanting any of the options presented (Table 2). We used NGENE Software (Version 1.2.1, Choicemetrics, USA) to construct a D-efficient experimental design to maximise the information from each choice set. The survey was piloted on 20 MSM, however, no changes were made to the final attributes and levels.

Statistical analysis

Descriptive statistics using STATA software (version 16.1, StataCorp) summarised participants' sociodemographic characteristics.

All model estimations for preference data were performed using NLOGIT 6 (version 6, Econometric Software Inc, USA). We chose the random parameters logit model (RPL) because of the panel nature of data (i.e., to account for correlation introduced by repeated observations from each participant) and to relax the assumptions of the independence from irrelevant alternatives. Using the RPL model, we assumed preference heterogeneity exists across our population sample and that choices made by the same participant are correlated.^{25,30} The models were estimated using a maximum likelihood approach with 500 Halton draws.

Attributes	Levels
Preferred frequency of anal self-examination	Once a week Once a month Once every 3 months Once a year
Medical Support if an abnormality was found	See sexual health physician See general practitioner See nurse Online chat
Wait time to get a medical review for an abnormality	Same day 3 days 7 days
Instructions for performing self-examination	Online video Demonstration by a doctor on yourself during a consultation Verbal explanation by a doctor Written instructions
Accuracy of anal self-examination to detect syphilis	100% of early syphilis detected 50% of early syphilis detected 25% of early syphilis detected

Table 1: Attributes and levels of the DCE.

Parameters were set to have an underlying normal distribution. We calculated the log-likelihood and Akaike information criteria to assess model fit.

The attribute levels were effects coded.³¹ We used effects coding as there were multiple levels of attributes and effects coding facilitates reliable estimates of main effects and interaction effects and allows for estimation of all levels.

Using the simulation function in NLOGIT,³² we estimated the probabilities of people choosing to perform anal self-examination under various scenarios (i.e., best anal self-examination scenario with the best combination of preferred attributes, worst anal self-examination scenario, and likely standard recommendation) using data from the RPL models.

Heterogeneity of preferences

To explore the heterogeneity of preferences, we created RPL models with interaction terms (age, sex

position, living with HIV, taking PrEP, past history of syphilis infection, prior experience of anal self-examination, and education level) for attribute levels with statistically significant coefficients and standard deviations ($p < 0.10$).

To interpret preference data, the coefficients represent the strength of preference for the attribute level (a higher magnitude of a positive coefficient represents an attribute that is preferred whilst a higher magnitude of a negative coefficient represents an attribute that is not preferred). If the standard deviation for an attribute level is statistically significant, this indicates a heterogeneous spread of preferences for this attribute level. Odds ratios can also be calculated using the exponent of the coefficients. The attribute with the largest range in its coefficients indicates the relative importance of that attribute for the behaviour (i.e., performing anal self-examination).

Attributes	Option A	Option B	Option C
Preferred frequency of anal self-examination	Once a week	Once every 3 months	I do not prefer
Medical support if an abnormality was found	Phone consult with a sexual health nurse	See a sexual health doctor	options A or B
Wait time to get a medical review for an abnormality	Same day	3 days	
Instructions for performing anal self-examination	Online video	Demonstration by a doctor on yourself during a consultation	
Accuracy of anal self-examination to detect syphilis	100% early syphilis detected	25% early syphilis detected	

Table 2: Example of a DCE choice set. Imagine that you want to do anal self-examination for syphilis. Which screening program would you prefer? Please choose either Program A, B or neither.

Ethics Approval

Ethical approval was obtained from the Alfred Hospital Ethics committee, Melbourne, Australia (Project 366/20). Ethical approval (THH/CREP 20-013) for community research endorsement was obtained from Thorne Harbour Health, Victoria for promoting the survey in the community network.

Role of funding source

This study was supported by an Australian National Health and Medical Research Council (NHMRC) Investigator Grant (GNT1172873) and there was no direct involvement by NHMRC in our study.

Results

Between June and November 2020, 3,154 text messages were sent to eligible men attending MSHC. Of those, 620 (20%) clicked the survey link and started the survey. Additionally, 89 surveys were received through social media from the community. Hence, a total of 709 participants took part in the study. We excluded 152 (21%) participants because 88 had incomplete surveys, 33 did not provide consent, 19 either lived outside Australia or had missing information of their residence, eight did not have any sexual contact with a man in the last 12 months, and four self-identified as *cis*-female or female gender. A total of 557 men were included in the final analysis. The median duration of time taken to complete the DCE survey was 8 min (IQR: 6-12), and men chose the “opt-out” option in 9.8% of choice tasks.

	Total (N=557) (n, %)	Recruited through social media (N=57) (n, %)	Sexual health clinic (N=500) (n, %)
Age, median (IQR)	35 (27-45)	30 (25-37)	34 (28-46)
<i>Gender</i>			
Male	543 (97%)	56 (98%)	487 (97%)
Non-binary/gender-fluid	9 (2%)	1 (2%)	8 (2%)
Another gender	5 (1%)	0 (0%)	5 (1%)
<i>Sexual orientation</i>			
Gay	503 (90%)	50 (88%)	453 (91%)
Bisexual	48 (9%)	7 (12%)	41 (8%)
Prefer not to report	6 (1%)	0 (0%)	6 (1%)
<i>Highest level of education</i>			
Secondary education	75 (13%)	7 (12%)	68 (14%)
Foundation/diploma	119 (21%)	10 (18%)	109 (22%)
Bachelor's degree/Master's/postgraduate degree	363 (65%)	40 (70%)	323 (64%)
<i>HIV and PrEP status</i>			
Living with HIV	132 (32%)	2 (4%)	130 (26%)
HIV-negative and taking PrEP	204 (37%)	22 (39%)	182 (36%)
HIV-negative and not taking PrEP	201 (36%)	28 (49%)	173 (35%)
Unknown HIV status	20 (4%)	5 (9%)	15 (3%)
<i>Sexual position in anal sex</i>			
Receptive	168 (32%)	14 (25%)	154 (31%)
Versatile	288 (52%)	34 (60%)	254 (51%)
Insertive	91 (16%)	6 (11%)	85 (17%)
No insertive anal sex in last 12 months	10 (2%)	3 (5%)	7 (1%)
<i>Past history of syphilis infection</i>			
Yes	198 (36%)	8 (14%)	190 (38%)
No	359 (64%)	49 (86%)	310 (62%)
<i>Previous experience of anal self-examination</i>			
Yes	183 (33%)	20 (35%)	163 (33%)
No	374 (67%)	37 (65%)	337 (66%)

Table 3: Sociodemographic characteristic of the study population (N=557).

%. percentage.

IQR: interquartile range.

SD: standard deviation.

HIV: human immunodeficiency virus.

PrEP: pre-exposure prophylaxis for HIV.

Another gender: Not specified specific gender in the survey and participants could provide their specific gender if they wanted.

The median age of the participants was 35 (IQR: 27-45) and 99% identified as MSM. More than a third of the participants had past syphilis infection (36%, n=198) and previously performed anal self-examination (33%, n=183) (Table 3).

Of the 57 men who took the survey through social media from the community, the median age was 30 (IQR: 25-37). Fourteen percent (14%, n=8) reported past syphilis infection and more than a third (35%, n=20) reported previous experience of anal self-examination. Among 500 participants who were recruited through a sexual health clinic, the median age was 34 (IQR: 28-46), and almost 40% (n=190) had past history of syphilis and more than a third (33%, n=163) reported having performed anal self-examination in the past. The comparison in demographics of men who were recruited through social media and through a sexual health clinic was reported in Table 3. Those recruited from the sexual health clinic had greater preference for once-a-month examination, and less preference for once-a-year examination and written instructions (Supplementary Table 1).

Preferences for anal self-examination (Table 4)

The most influential attribute was the accuracy of anal self-examination to detect syphilis, followed by the frequency of anal self-examination, the instruction for anal self-examination, the wait time to get a medical review if an abnormality was found, and the type of medical support received if abnormalities were found. The most preferred anal self-examination was one with 100% accuracy of detecting a syphilis lesion, performed once a month, an online video format for instructions, and same-day review service with a nurse if an abnormality was initially detected. The least preferred anal self-examination was one with lower accuracy (25%), performed once a week, a demonstration by a doctor on the participant during the consultation, and reviewed in seven days via an online chat with a health professional if an abnormality was detected. Those recruited from the sexual health clinic had greater preference for once-a-month examination, and less preference for once-a-year examination and written instructions (Supplementary Table 1).

Attributes	Level	Coefficient (SE)	Standard deviation (SE)
Preferred frequency of anal self-examination	Once a week	-0.86 (0.10)***	1.19 (0.26)***
	Once a month	0.73 (0.09)***	0.02 (0.20)
	Once every 3 months	0.63 (0.1)***	0.80 (0.11)***
	Once a year	-0.50 (0.09)***	0.88 (0.12)***
Medical support if an abnormality was found	See sexual health specialist	-0.07 (0.08)	0.17 (0.26)
	See general practitioner	-0.01 (0.09)	0.04 (0.17)
	See nurse	0.22 (0.10)**	0.02 (0.11)
	Online chat with a health professional	-0.14 (0.07)**	0.16 (0.15)
Wait time to get a medical review for an abnormality	Same day	0.08 (0.06)	0.05 (0.17)
	Appointment in 3 days	0.15 (0.06)**	0.01 (0.100)
	Appointment in 7 days	-0.23 (0.06)***	0.05 (0.14)
Instructions for anal self-examination	Online video	0.32 (0.09)***	0.43 (0.24)*
	Demonstration by a doctor on yourself during consultation	-0.25 (0.08)***	0.41 (0.12)***
	Verbal explanation by a doctor	-0.12 (0.07)***	0.13 (0.17)
	Written instructions	0.05 (0.08)	0.004 (0.13)
Accuracy of anal self-examination to detect syphilis	100% early syphilis detected	1.09 (0.1)***	1.06 (0.24)***
	75% early syphilis detected	0.11 (0.08)	0.01 (0.13)
	50% early syphilis detected	0.09 (0.07)	0.02 (0.11)
	25% early syphilis detected	-1.29 (0.12)***	1.06 (0.11)***
Opt-out [#]		-1.19 (0.73)***	

Table 4: Random parameters logit model of preferences for anal self-examination.

SE: standard error.

AIC/N=1.53, log likelihood function= -2121.59.

*** p value <0.01.

** p value <0.05.

* p value <0.10.

Opt-out refers to scenario where participants did not want to choose either Scenario A or B.

Anal self-examination preferences		Subpopulation	Coefficient (SE)
Frequency of anal self-examination	Once a year	Living with HIV	0.19 (0.10)*
	Once a year	Past history of syphilis	-0.16 (0.09)*
	Once a year	Taking PrEP	-0.16 (0.09)*
	Once a week	Living with HIV	-0.24 (0.12)**
Instructions for anal self-examination	Verbal explanation by a doctor	Taking PrEP	-0.16 (0.09)*

Table 5: Summary of preference heterogeneity according to the subpopulation[^].

*** p value <0.01.
 ** p value <0.05.
 * p value <0.10 SE: standard error PrEP: pre-exposure prophylaxis HIV: human immunodeficiency virus.
[^] only subgroups with significant interactions were presented in the table.

Preference heterogeneity

The preferences for anal self-examination were further explored by examining the underlying heterogeneity in subgroups of age, sex position, living with HIV, taking prep, past history of syphilis infection, prior experience of anal self-examination, and education level (see Supplementary Tables 2-8). There was significant heterogeneity related to the frequency and format of instructions for anal self-examination. Men living with HIV preferred yearly anal self-examination, and these men disliked performing a weekly examination. In contrast, men taking PrEP or with a past history of syphilis infection disliked yearly examination. Men taking PrEP also disliked written instructions for anal self-examination (Table 5). Heterogeneity related to frequency and format of instructions were not explained by age, sex position, previous experience of anal self-examination and education level.

Uptake of anal self-examination using simulation function

In the scenario where the attribute levels were chosen to reflect the real-world context in terms of healthcare access and support and based on the limitations of test accuracy and pathogenesis of infection (Table 6), the predicted uptake was 72%. The most preferred combination of attribute levels improved uptake to 98%, while the least preferred combination of attribute levels decreased uptake to

35%. If we used the current scenario and only changed the accuracy of anal self-examination, this would lead to an uptake of 83% (100% accuracy), 73% (75% accuracy), 72% (50% accuracy), and 47% (25% accuracy). If we used the current scenario and only changed the frequency of anal self-examination, this would lead to an uptake of 72% (once a week), 94% (once a month), 92% (once every 3 months), and 80% (once a year).

Discussion

Understanding how the preferences of MSM for anal self-examination affect the uptake of anal self-examination is crucial for maximising the uptake of any future screening program using anal self-examination to detect anorectal syphilis early. Our study showed the most influential factor for performing anal self-examination was accuracy, followed by anal self-examination frequency. However, there was significant heterogeneity in the accuracy, frequency, and instructions format for performing anal self-examination. Some of this heterogeneity was explained by HIV status, PrEP use and previous syphilis infection. Current literature on anal self-examination focuses on anal cancer screening, and to date, there is no literature on the use of anal self-examination for syphilis detection. Moreover, there was no research using DCEs to examine the trade-offs and preferences of MSM on anal self-examination for

	Current scenario (likely scenario in real-world context)	Best scenario (with most preferred attribute levels)	Worst scenario (with least preferred attribute levels)
Predicted uptake	72%	98%	35%
Preferred frequency of anal self-examination	Once a week	Once a month	Once a week
Medical support if an abnormality was found	See sexual health specialist	See nurse	Online chat
Wait time to get a medical review for an abnormality	3 days	3 days	7 days
Instructions for anal self-examination	Written instructions	Online video	Demonstration by a doctor
Accuracy of anal self-examination to detect syphilis	50% accuracy	100% accuracy	25% accuracy

Table 6: Simulation scenarios and predicted uptake.

screening purposes for STI or anal cancer. Our study is the first study to utilise a DCE to evaluate the trade-offs in preferences of MSM to perform anal self-examination. Our research was built on findings from the studies which showed that three monthly regular screening of syphilis might not be sufficient to control the ongoing rise of syphilis infection among MSM¹⁴ and a more accessible method of early detection is warranted. Moreover, a qualitative study found positive attitudes towards using anal self-examination as a screening method among MSM.²⁴ If anal self-examination is proven to be effective and cost-effective, the findings from our study provides valuable information on preferences of MSM which we could then apply to our recommendations to optimise uptake of anal self-examination as a screening for early syphilis detection.

We found that accuracy and frequency of anal self-examination were the major attributes influencing the choices. Whilst we do not have evidence yet on the accuracy of anal self-examination to detect anal syphilis, knowing the likes and dislikes of MSM will help inform the future recommendations for anal self-examination for optimal uptake in the community if it was shown to be effective in detecting anal syphilis. Moreover, we lack data on the optimal frequency of anal self-examination for anal syphilis detection presently, although untreated penile chancres may last 3-6 weeks.³³ From our study, we found that the most preferred frequency was once a month for anal self-examination. Multiple factors such as natural history of syphilis infection, size of primary anal syphilis lesion, duration of such syphilis lesion in anus and incubation period are important when determining the optimal frequency for anal self-examination. Simulation scenarios are helpful in this context as they provide us information about the likely uptake if we alter various attribute levels. In our study, the scenario that recommended once a week anal self-examination frequency with 50% accuracy for anal self-examination was predicted to have an uptake of 72%, indicating that most men were still likely to perform anal self-examination despite not having 100% accuracy. Improving the accuracy would increase self-examination uptake marginally (73% for 75% accuracy, and 83% for 100% accuracy). Asking men to reduce their examination frequency could improve uptake (72% for once a week to 94% for once a month) but reducing the frequency may reduce the effectiveness of identifying early syphilis. Therefore, the lack of evidence for the effectiveness of anal self-examination and the optimal frequency of anal self-examination were important limitations in our study. This will be evaluated in an ongoing trial of anal self-examination for anal syphilis.

There was heterogeneity in preferences for anal self-examination. For example, we uncovered those men living with HIV disliked weekly examinations, and those taking PrEP disliked yearly examinations. This may be influenced by the differing frequencies of health care

consultations for men living with HIV (six month to yearly monitoring) and men taking PrEP (three monthly monitoring). Therefore, we might require different strategies in promoting anal self-examination in these two groups of MSM, such as educating men living with HIV to increase the frequency of regular STI screening, raising awareness of syphilis and the benefits of anal self-examination not just for syphilis detection but also for anal cancer screening. Future studies addressing anal self-examination might need to consider evaluating the different frequencies of anal self-examination in examining its effectiveness with a view for the less frequent option than weekly examination.

There were several other limitations in our study. First, a digital anorectal examination whether clinician performed or self-performed was very unlikely to be 100% accurate in detecting anal syphilis lesions as detection might be dependent on the accessibility of the fingers to feel or palpate the anal syphilis lesion. However, our study indicates that a substantial proportion of MSM may still perform anal self-examination even if it wasn't 100% accurate. A study on anal cancer using anal self-examination in men found that 3 mm lesions could be detected with a sensitivity of 71% to 80% and specificity of 92% to 100%.²¹ It is possible for men to detect similar size anal syphilis lesions with appropriate training, and further studies are required to assess the accuracy. Second, our surveys were mainly distributed to MSM who attended a single sexual health clinic and the number of participants recruited through the community-based organisations and social media was low (13%), therefore, our findings might not be generalisable to the whole MSM population. Moreover, our study had a low response rate (20%) among MSM who were sent the SMS about the study. Our findings may reflect the preferences of those who were more interested in participating in health research, perhaps more health conscience and may not reflect the general MSM population. Third, our study was exploratory, and not all salient attributes relevant to the choice of conducting anal self-examination were included in the DCE, such as costs associated with return for medical review if an abnormality was found or anxiety associated with performing anal self-examination. Fourth, it is possible for social desirability bias by the survey participants, especially the sexual health clinic attendees in the study, but the survey was completely anonymous and taken in their free time outside the clinic. Therefore, anonymity and confidentiality were likely to reduce this bias.

Despite the limitations, our study identified important attributes of anal self-examination that men prefer—the frequency and accuracy of anal self-examination. We also predicted reasonably high uptake (72%) in the scenario where “once a week” anal self-examination frequency was used, although this frequency was not the most preferred. Similarly, the predicted uptake value remained high in the scenario where accuracy was

halved from 100% to 50%, as achieving 100% accuracy to detect anal syphilis is unrealistic. The findings imply that anal self-examination was likely to be acceptable as a screening test among MSM. The findings from our study will help us design future studies related to anal self-examination and inform guidelines that recommend anal self-examination as a means for anorectal syphilis detection. Overall, we conclude that future studies evaluating the efficacy, cost-effectiveness, and ideal frequency of anal self-examination to detect anal syphilis are warranted.

Contributors

CKF, EPFC, TRP, JJO, and ETA designed and coordinated the study. JJO and ETA designed and developed the DCE component. ETA, KM and ERR distributed the survey. JJO and ETA performed the analysis of the data and revised the manuscript. ETA drafted the 1st manuscript. All authors reviewed and edited the manuscript. All authors read and approved the final manuscript.

Declaration of interests

Financial interests: All authors have no financial conflicts of interest to declare.

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Data sharing statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request beginning 9 months and ending 36 months following article publication, with the permission of the Alfred Hospital Ethics Committee. The datasets can be requested by a researcher who provide a methodologically proposal.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.lanwpc.2022.100401.

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