Exploring young people's preferences for STI screening in the UK

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Main text

1. Introduction

Screening programmes target apparently healthy people to take part in testing for a serious disease or condition [1]. Screening can either be systematic, where all individuals believed to be at risk are invited to take part (e.g. breast cancer screening) or opportunistic where people are invited to take part in particular settings, for example during a routine primary care consultation [2]. In the UK for example, sexually active young people (under 25) are advised to be screened for chlamydia annually or when they have a new sexual partner (opportunistic screening) [3]. By their very nature the main goal of public health programmes such as screening is to increase health at the population level and for most individuals there may be no discernible health gain associated with taking part [4].

Health stigma remains a key issue for many health screening interventions such as screening for sexually transmitted infections (including HIV), bowel cancer screening and mental health screening [5-7]. Stigma can contribute to many problems including: difficulties in achieving target levels of uptake and diagnosis [8]; increasing health inequalities [9]; incomplete disclosure [10]; and treatment non-adherence [11]. There are also wider issues that can affect screening uptake such as information provision, health literacy, practical barriers such as time and accessibility, as well as fear about the screening process and concerns about getting a positive result [12]. There are particular issues for screening programmes for infectious diseases, as the burden of testing and diagnosis is born by a particular population subgroup, but the benefits (i.e. lower likelihood of acquiring the disease) are experienced by the wider population [13].

A wide range of studies have looked at uptake of screening and analysed the potential barriers, in a variety of disease areas [14-16]. However, many of these studies adopt a strictly quantitative or qualitative approach, with very few adopting a mixed methods approach [17].

In this paper we demonstrate that integrating qualitative and quantitative elements gives a richer understanding of what is important to young people and how screening choices are made. A comprehensive understanding of patient views and choices is particularly important in relation to sexual health screening, as a wide body of research has highlighted the complex barriers which exist in accessing sexually transmitted infection (STI) screening services such as stigma, shame and concerns around confidentiality [18].

STIs have important impacts on sexual and reproductive health and can have serious consequences for health beyond the immediate effect of the infection itself [19]. Young people continue to experience the greatest burden of STI infection, with those aged 15-24 accounting for a substantial proportion of those diagnosed with STIs [20-22]. Because STIs such as chlamydia are frequently asymptomatic, screening of asymptomatic sexually active young people is recommended in many countries [23]. The World Health Organisation (WHO) has set out priorities for reducing sexually transmitted infections [24] and one of the key messages is that services need to be more patient-focused.

The delivery of STI screening services has changed fundamentally in recent years with a greater use of family doctors (GPs), community-based pharmacies, and internet provision [25]. The widening of the opportunities to provide screening in different ways has happened alongside severe public health budget constraints in many high-income countries [26]. This means that commissioners and providers need to understand young people's preferences to ensure that optimum policy decisions are taken, and that resources are focussed on screening services that will increase uptake. Only a small number of studies have attempted to measure the strength of preference that people hold for different aspects of screening using appropriate methods, particularly in terms of the newer ways services can be accessed [27-31]. Other previous DCE studies of existing screening provision have not included a representative

sample of young people, particularly in terms of ethnic diversity, with nearly 80% of

participants in related studies being from a 'white' background [28,30,31].

This study explored the preferences of young people (aged 16-24) for the delivery of STI

screening and the degree to which features of delivery affect uptake of screening. The

research addressed the following aims:

1. Identify the characteristics of STI screening provision that are important to young

   people;

2. Establish young people's preferences for different characteristics of STI screening and

   how these vary by subgroup;

3. Understand how young people make trade-offs between different service

   characteristics.

This study addressed the research question using both qualitative and quantitative methods by

utilising focus groups and a survey incorporating a discrete choice experiment. The methods

and results for the qualitative component are described first to allow consideration of the

implications of the findings for the DCE design. The quantitative methods and results are

then outlined, before a synthesis of the two components in the discussion section.

2.Qualitative Component: Methods

The qualitative component of the research explored young people's perceptions of STI

screening, what characteristics of screening were important to them and how they might

make decisions about whether to take part in screening.

2.1 Participants and sampling

A series of focus group discussions and one-to-one interviews were undertaken to explore

young people's preferences for STI screening in different settings, the composition of the

focus groups is given in Table 1. Eight focus groups were undertaken in total, comprising five groups with participants recruited from varied community groups, two groups were recruited from patients attending a specialist sexual health centre and one group with men who have sex with men (MSM) was conducted via a LGBTQ+ (Lesbian, Gay, Bisexual, Transgender and Queer) organisation in Birmingham.

Purposive sampling was undertaken to include young people from a variety of social and economic backgrounds and with varied engagement with existing STI screening services [23]. Participants in the community setting were recruited by contacting a range of community groups working with young people from different parts of the city with information about the study; of those who agreed be involved, groups were selected from different parts of the city in order to ensure a mix of young people from different social backgrounds (with guidance from youth workers in the City). Selected community organisations were then sent participant information leaflets to distribute to young people. All young people who wished to take part in the research were asked to complete a form and return it to the youth worker / community centre staff. Participants were selected by staff to ensure a mix of ethnic groups and ages. Youth worker / community centre staff then informed the young person about the time and date of the group.

For the groups in the specialist sexual health centre, young people were similarly invited to complete an expression of interest form by clinic staff and participants were selected to ensure a mix of age groups, ethnic backgrounds and genders. All of the young people in the focus groups that were conducted in specialist sexual health centres had experience of screening (this was not the case in the other groups). For the focus group with MSM, participant information and a recruitment form were emailed to LGBTQ+ groups within educational organisations and community settings. If a young person wished to take part, they

were asked to complete an expression of interest form and details of the focus group time and location were shared with them by the group organiser.

2.2 Conducting the focus groups and interviews

The focus groups consisted of participants who identified as the same gender in order to allow participants to feel as comfortable as possible about sharing their views. The research was conducted between August 2017 and February 2018. Ethical approval for the qualitative work was granted by North East - Tyne & Wear South Research Ethics Committee (REC reference: 16/NE/0211).

All those invited to take part in the research were given the opportunity to take part in a focus group discussion or a one-to-one interview. The number of participants in the focus group discussions was limited to around six people, to allow participants the opportunity to share their views. Focus group discussions and one-to-one interviews were undertaken until thematic saturation was approached; saturation occurs when additional emerging data is not shedding additional useful light on the development of the ideas and concepts [24]. Decisions about saturation were taken through discussion amongst the research team and analysis of emerging themes.

Focus groups and one-to-one interviews took place in a quiet room within a community centre, sexual health clinic, or other location that was convenient to participants and were recorded with the permission of the participants. Participants provided written consent. The group discussions and one-to-one interviews adopted a semi-structured format using a topic guide [25 26]. LJ was the facilitator for all the groups and interviews. All participants were offered £15 as a thank you for their time, and food and soft drinks were made available during the focus groups.

2.3 Analysis – focus groups and interviews

The qualitative focus groups and interviews were transcribed verbatim and then analysed using thematic analysis [25]. Following full familiarisation with the transcripts, open codes were applied to four transcripts to identify emerging themes of relevance by researchers [27]. This was undertaken digitally using NVivo 10 for Windows. At this stage, codes were grouped together to create and define categories, and this formed a working coding framework which was used with the rest of the data (LJ in consultation with HAJ). The researchers used the framework to code the remaining transcripts, amending the coding framework as necessary. The coding framework was applied to all transcripts to index each code. A Framework Method matrix was used to summarise and manage the data in Excel [28]. The matrix involved cases/ participants (rows), codes or labels (columns) and cells of summarised data. The matrix was used to compare and contrast data across and within cases (by LJ in consultation with the other authors). Connections and differences between codes were analysed to identify the factors that are meaningful and relevant to young people when they are making choices around STI screening.

3. Qualitative Component: Results

Overall, 41 participants took part in the focus groups and two participants took part in the individual interviews. The socio-demographic make-up of the focus groups is summarised in Table 1. Six major themes emerged from the discussions as important when making decisions about whether to participate in screening and access it - stigma and embarrassment; knowledge about STIs and risk; where to get tested; how staff would treat them; what STIs to be tested for; and convenience (waiting times). Some differences relating to demographic background emerged.

Stigma & embarrassment

The stigma associated with STIs and accessing STI screening was emphasised in all of the discussions. This was seen as providing the background to decision-making about screening and was an important barrier for young people being able to access help. Although stigma was seen as affecting decision-making for all groups, it was particularly important for females and those from BAME communities:

> *"For us girls, it's kind of hush, hush." (ID 11, Female, Mixed ethnicity, 18-19)*

> *"The image of going to get checked out.. it's that negative image, for some [BAME] communities anyway. So they avoid that in the first place." (ID21, Male, Asian British, 20-24)*

> *"People know that you can go to the hospital but I think people are either too embarrassed or too frightened to go." (ID 22, Male, Asian British, 20-24)*

Knowledge about STIs & risk

Young people described a situation where they have access to a range of information about STIs due to the availability of the internet on their phones. However, access to meaningful information that was easily understandable and appropriate for this age group was seen as limited. They described a situation where the volume of information was immense but often this was of poor quality, indigestible or just misleading. Rumours and myths about the types of STIs and how they were transmitted were seen as particularly problematic and widespread (through social media). This meant that young people felt that they and their peers were not particularly knowledgeable about STIs, how they were acquired and how to get help.

> *"There's more rumours about them [STIs]. More stereotypes and rumours they've heard about than actual facts" (ID 25, Male, Asian British, 16-17)*

> *"They probably just think because you have sex [intercourse] you can get them, but you can get them through other ways as well". (ID 12, Female, Black British, 18-19)*

There was confusion in almost all groups about the asymptomatic nature of STIs. Although most young people knew that in theory STIs could be asymptomatic, when describing the need to access help for STI screening this was usually framed in terms of having symptoms, the need to access screening in the absence of symptoms was not fully appreciated:

> *"I think most young people would say Ray needs to go [for screening] because he has had more partners and has pain when urinating" (ID22, Male, Asian British 20-24)*

However, the stigma associated with STIs meant that that even symptoms would not induce people to get help, with a down-playing of symptoms:

> *"He'd probably just say 'oh it's just a bit of pain, nothing to worry about'". (ID 25, Male, Asian British, 16-17)*

Setting

Young people did not feel that they were particularly well informed about all of the options in terms of where screening could be accessed. Attitudes towards accessing screening in different settings were dominated by concerns about privacy and confidentiality. Although they were largely aware that screening could be accessed in places such as pharmacies and community locations, there was a lack of understanding about how in practical terms they could access such screening. In particular, they were concerned that people who knew them might see or hear them accessing screening in this way. Similarly, there was a concern about accessing screening in community settings (such as youth centres) because young people felt that their peers would be able to see or find out about them accessing care in this kind of place.

Although a specialist clinic was seen as giving access to specialist staff, there was some concern about the risks of others finding out. There was a concern about accessing STI

screening in a GP setting due to the close relationship between the GP surgery with them and their family.

> *"They avoid going to the GP because a lot of GPs know who they are." (ID21, Male, Asian British, 20-24)*

> *"It's like going to a family member. So like because it's such a taboo anyway, you're not going to want to go to your GP". (ID23, Female, Asian, 16-24)*

Although some young people liked the idea of sending off for a screening kit online, there was also a concern about potential embarrassment when the kit arrived through the post:

> *"If he's living with someone it might be an issue [getting a kit through the post]. He might not want them to know." (ID26, Male, Asian British, 16-17)*

> *"The more discreet the better." (ID13, Female, Black British, 18-19)*

Alongside these concerns there was a perceived need for screening to be as convenient as possible. This was seen as important due to the perceived pressures on young people's time and restrictions in terms of financial resources.

> *"It [screening] needs to be where young people go." (ID11, Female, Mixed Ethnicity, 16-19)*

> *"Online chat, ready to reply to you". (ID13, Female, Black Other, 20-24)*

> *"It's quicker [online testing] and most people have got the internet on their phones anyway." (ID21, Male, Asian British, 20-24)*

Attitude of staff

The participants in the group discussions and interviews felt that the attitude of staff was very important for young people. The perceived stigma surrounding STIs and testing meant that

young people were very sensitive to how they felt they were being treated by staff. This was seen as one of the most important considerations when deciding to take part in screening:

> *"You shouldn't feel that you're coming in here to be judged, you should feel that you are coming to get help." (ID10, Male, White British, 16-19)*

> *"One of my friends said that they hate going in because they feel like they're getting judged." (ID14, Female, Mixed Ethnicity, 16-19)*

Type of test and infection tested for

There was a lack of knowledge about what STI testing would involve and what STIs young people needed to be tested for. There was a concern about whether the test would be painful and for some people there was a concern about having to give blood:

> *"I'm no good with injections." (ID22, Male, Asian British, 20-24)*

> *"You don't know how to get tested, if it requires something, or is it painful." (ID25 Male, Asian British, 16-19)*

Due to the low level of understanding the risks associated with STIs for young people there was an overall lack of awareness of which STIs they should be tested for. Thus many participants stated that they wanted to be tested for 'everything'. They did not really know what was meant by 'everything' and what STIs they would be at risk for. There was an overall concern about HIV and a perceived need to be tested for this for reassurance.

> *"Everything, to be on the safe side." [What tests should receive] (ID3, Female, White British, 16-24)*

Convenience

Young people felt that access to screening needed to be rapid, however there was also a recognition that it might take some time for young people to reach a point where they wanted to access screening:

> *"If they're trying to down-play the situation they might wait until they show the symptoms." (ID25, Male, Asian British, 16-19).*

> *"It depends on how panicked they are. Some would go straight after [unprotected sex] or some would leave it for months, forget about it." (ID31, Male, While British, 20-24, MSM group)*

For results, all young people agreed that speed was essential. This was because they felt that people would be worrying about their results and would want to know that they could access them: *"Straight away"* or the *"Next day"*.

4. Quantitative Component: Methods

Discrete choice experiments (DCEs) are widely used to investigate patient and population preferences for healthcare [32]. They are an attribute-based survey method which involve respondents making choices between hypothetical scenarios (choice sets), comprising two or more alternatives [33]. The hypothetical scenarios are described in terms of different characteristics or attributes and different levels, and the choices people make allow us to analyse the respondents' relative preferences for different attributes and levels [34].

4.1 DCE development

The findings of the qualitative component revealed that due to the perceived stigma which surrounded STIs and being screened, a whole range of aspects such as the location for accessing screening, how they were treated by staff, the type of test and convenience would

all play a part in screening decisions. In addition, limited knowledge about STIs meant that they were unsure about which STIs young people should be tested for, with particular concerns about HIV. The characteristics of testing which were found to be important were refined into attributes and levels as part of the later focus groups [35], with an emphasis on those attributes which were plausible, actionable and capable of being traded. The design process resulted in seven attributes being selected, each with between two and five levels (Table 2). As the qualitative stage of the research had revealed that knowledge about STIs and screening was limited, careful testing of the attributes was undertaken to ensure that they were clear to young people, and specialist terms were avoided where possible.

Following extensive discussion with participants, 'setting' was included as one of the attributes and the options were described as Service 'A' or 'B' [36]. This was because young people indicated that setting was an element that they considered alongside other service characteristics and that they would be prepared to trade this characteristic for other aspects of service provision. In addition, staff attitude was included as an attribute, as participants felt that concerns about how they would be treated would influence their decisions, and this is something that could be addressed by services, for example by investments in staff training. Such 'softer' features of service provision have not been widely included in DCE studies previously [37]. An attempt was made to attempt to make the attribute levels similar in number, as this assists in creating an effective design. However, this needed to be balanced against creating levels which were meaningful in this context. The number of choice tasks was influenced by the attributes and their levels and a think aloud exercise was undertaken to ensure that the number of choice tasks was appropriate. An opt-out option was included to reflect the reality that many young people decide not to take part in screening at all [38].

4.2 Experimental design

Data from a pilot survey was used to inform the experimental design. As the total number of potential scenarios was extremely large, a fractional factorial design was generated which selects a subset of choice situations to make the questionnaire practical for participants to complete. The design was created using Ngene which is a specialist design software package. A D-efficient design was selected; this means that the design was as statistically as efficient as possible in terms of the predicted standard errors of the parameter estimates. The pilot survey results were used to create Bayesian priors for the final DCE design and to test the feasibility of completing over 15 choice sets. The final design involved 20 choice sets; the feasibility of completing this number of choice sets was checked during the think aloud interviews (see below) and the pilot survey.

When undertaking the choice task, respondents were asked to make their choices assuming that they were asymptomatic and that they had heard from a previous partner that they had tested positive for chlamydia (the most common STI among young people). They were then asked to make a choice between two hypothetical screening services or they could choose to not take part in screening at all. A full description of the attributes was provided for respondents as well as an example of a DCE choice question from everyday life (shopping for a phone).

4.3 Survey design

A questionnaire was developed for online completion by young people. The questionnaire contained the DCE alongside questions on demographic background, experience of accessing sexual health services, sexuality and perceived level of risk. The findings from the qualitative stage of the research revealed that information about STIs was quite limited; in order to ensure that participants had sufficient knowledge to be able to complete the survey and make informed choices within the DCE, information was provided at the start of the survey about STIs and screening services, and links to additional videos and resources were made available

to respondents who wished to access further information. A question was included to check logical consistency of responses; in this question one of the options was designed to be clearly preferable to the other. We also asked respondents about whether they had considered all of the attributes when making their choices in the DCE element of the questionnaire. Six 'think aloud' interviews were undertaken to test the final questionnaire design and DCE [39]. The interviews were undertaken with six young people aged 16-24 to check that the wording of the DCE was appropriate and the length of the choice task was feasible. The results led to minor amendments being made to the introductory section of the questionnaire and to the layout.

4.4 Recruitment of participants

Members of an internet panel specialising in young people aged 16-24 were contacted via email to invite them to participate in the survey (Youthsight). The target sample size was estimated to allow detailed analysis of population subgroups. Quotas were set with the survey company to ensure that respondents were fully representative of the national UK population aged 16-24 in terms of age, gender and region of residence [40]. Over-sampling of black, Asian and minority ethnic (BAME) groups was undertaken in order to ensure that around 50% of respondents were from BAME groups. Weights were used in the main analysis to ensure that the sample was representative of young people in the UK [40]. Participants were rewarded with points (which can be used towards shopping vouchers) as is usual for online panel surveys. Ethical approval for the survey was granted by the University of Birmingham's Science, Technology, Engineering and Mathematics Ethical Review Committee (Ref ERN_17-0372).

4.5 Piloting and administration of the survey

The questionnaire was initially piloted with young people from the Youthsight Youth Panel with a target of 200 responses [41]. Based on the pilot findings some minor amendments

were made to the wording and format of the questionnaire (the pilot survey results were not included in the final analysis). The main survey was administered to the Youthsight panel between 9/7/18 and 2/8/18.

4.6 Statistical analysis

The results from the DCE experiment allowed us to observe the respondent's choice of one screening scenario from the alternatives presented in each choice set. Responses were analyzed based on random utility theory [42]. It was assumed that the utility that a young person I assigns to screening j, V_{ij}, incorporated a systematic component based on the attributes included in the DCE, and an error component ϵ_{ijt}. In this model V_{ij} is specified as:

$$\beta_0 + (\beta_1 + \eta_{1i})_j + (\beta_2 + \eta_{2i})_j + (\beta_3 + \eta_{3i})_j \ldots \ldots + \epsilon_{ijt}$$

where β_0 is the constant reflecting the preferences for selecting screening over no screening, β_1, β_2…. are the mean attribute utility weights in the population, and η_{1i}, η_{2i}….. are error terms capturing unexplained variation for individuals. Dummy coding was used for all categorical variables. The value of a coefficient gives an indication of the relative importance of the marginal change in the attribute. The fact as to whether the coefficient has a positive or negative sign reflects the effect of the attribute or level on utility compared with the base level.

A mixed logit model was estimated for the main analysis, to allow for unobserved or random preference variation and to reflect the cross-sectional panel structure of the data [43]. Mixed logit assumes that there is a distribution of preference weights across the sample (reflecting differences in preferences among respondents) and it models the parameters of that distribution for each attribute level. To achieve this, a random parameter is specified and the the mean (β) and standard deviation of the error term (η) are estimated to capture the

parameter's distribution. A fixed parameter was assumed for the waiting time attributes and staff attitude, with the assumption that individuals had the same negative preference for waiting and being judged, all other attributes were specified as random (and were drawn from a normal distribution). The data were analysed in STATA version 16.

A second analysis was undertaken to assess whether preferences for the attributes varied according to a range of demographic variables. The choice of subgroup analyses was informed by the factors that participants in the focus groups highlighted as likely to have an impact on people's choices around screening. An additional analysis by social background was also included to reflect the approach adopted in a related study [30]. To assess the significance of the differences between population groups, a joint model was estimated using interaction terms, following methods employed in a previous study [44].

5. Quantitative Component: Results

Overall, 1946 participants took part in the survey. Information was not available on the total number of panel members who were contacted to take part and hence the overall response rate is not known.

5.1 Respondent characteristics

As the sample was stratified, respondents were generally representative of the national UK population aged 16-24 in terms of age, gender and area of residence, with almost half of the sample from BAME groups (46.6%). Just over one in ten respondents stated that they were from LGBT groups (11%), and the overwhelming majority described themselves as heterosexual (84.9%). The proportion of respondents stating that they were from LGBT groups is slightly higher than has been found in population surveys (e.g. [45]). In total, 20%

of respondents stated that they had previously attended a sexual health centre, which is in line with published data on attendance rates [46].

5.2 Young people's preferences

The results obtained in the survey demonstrate the theoretical validity of the DCE, as the coefficients were generally in line with hypothesised patterns and were logical (Table 4). For example, it was hypothesised that shorter waiting times would be preferred to longer waiting times both for appointments and to receive results, and that a non-judgemental approach would be preferred over a judgemental approach (based on the findings of the focus groups), and this was confirmed by the data. The question to test logical consistency was answered correctly by the vast majority of participants (91%). All of the attributes included in the DCE had statistically significant differences in level coefficients which indicated that the attributes all contributed to individuals' preferences.

The results show that there was an overall preference for being tested, rather than not being tested (this is shown by the positive and significant constant). The value of the attribute is given by the magnitude of the coefficients on the levels; based on this, the most important attributes for young people related to the comprehensiveness of testing and the attitude of staff (Table 3). The marginal change in the attribute which was the most important was a non-judgemental attitude amongst staff (compared to a judgemental attitude). Being tested for all STIs (comprehensive testing), compared to the base case of being tested for the STIs which are the most common amongst young people was also valued highly as young people. There was some preference for a full consultation in comparison to a limited consultation. The results also show that the most preferred locations for screening was a specialist sexual health clinic, with community / youth centres being the least preferred location. The negative coefficients for waiting for more than one week both for an appointment and for results, show

that on average, young people prefer to get an appointment and receive their results the same day or the next day. However, the results suggest that there is no additional value for respondents in reducing waiting times from two days to one day.

Analysis of young people's demographic characteristics and the results revealed that there were some slight variations in preferences by subgroup, but overall preferences were similar (see Table5). For women, comprehensive testing was more important than for men, and for both groups there was a preference for non-judgemental attitude of staff. For those belonging to BAME groups compared to white participants, there was a slightly stronger preference for a full appointment over limited contact and for blood samples to be taken rather than urine only.

6. Discussion

This study involved both qualitative and quantitative components to allow an in-depth understanding of young people's views on STI screening. The overall findings suggest that the most important factors for young people when deciding whether to be screened for infection are that all STIs are tested for, and that staff attitude is non-judgemental.

Bringing together the findings from the qualitative and quantitative components allows us to gain a richer perspective on the results. The stigma associated with STIs and screening is evident from both the quantitative and qualitative elements. Stigma emerged as dominant theme in the focus groups and was seen as framing the choices young people made in relation to screening. The impacts of stigma can also be seen in the results of the DCE, with young people placing particular importance on the attitude of staff. Both qualitative and quantitative components revealed a preference for comprehensive screening. The DCE results revealed that comprehensive testing (including HIV) was preferred over being tested for the STIs for

which young people were most at risk. The focus group discussions revealed that as young people found it challenging to access appropriate information on whether they were at risk, they sought reassurance that the testing would cover 'everything'.

The setting in which screening was accessed was also important to participants. In particular, there was preference for specialist settings over community-based settings. The results of the DCE demonstrated that there were particular concerns about screening in youth centres/ community centres. The results of the qualitative element revealed that there was concern about confidentiality in less specialist settings due to fears that they might encounter family members or peers and that information about their screening could somehow 'leak out'. Both the qualitative and qualitative elements found that although respondents preferred shorter periods of time to wait to participate in screening and to receive their results (the same day or next day), but other 'process' factors were equally important, suggesting that focussing on reducing waiting times alone is not sufficient to encourage young people to engage in screening.

These findings represent a significant contribution to our understanding of young people's preferences for different aspects of screening, particularly given the limited number of studies focussing on this area of screening [27-31]. Two other DCE studies similarly found that comprehensive testing was important to respondents, and that waiting times were less important [28, 30]. This study adds to the evidence base by highlighting the importance of 'softer' or experiential factors relating to staff attitude etc. in decisions about accessing screening, such factors have not been included as a characteristic in previous DCE studies in relation to STIs, and the inclusion of such factors has been highlighted as important in the wider literature [37,47,48]. This study also adds further understanding of the complexity of screening setting, as this has not been previously comprehensively explored [28,31]. The

findings suggest that young people had concerns about screening in community settings and hence provision of screening in such settings will need to provide additional reassurances.

There are also methodological implications from this study's results, around the use of mixed methods. Although some studies have undertaken qualitative research to inform the selection of DCE attributes, the reporting of such research tends to be very limited [49,50,51]. Very few previous studies have attempted to integrate qualitative and quantitative findings (e.g. [52,53]). The current study builds on these attempts and illustrates how qualitative and quantitative aspects can be combined more fully to allow discussion of DCE design and provide insights for the interpretation of DCE results.

The main strength of this study is that it involved a mixed methods approach which allowed a richer exploration of the factors important to young people in relation to STI screening than would have been possible by qualitative or quantitative methods alone [17]. In addition, it focussed on young people's preferences, as the group at highest risk, and the large sample size for the DCE allowed detailed analysis of results by population subgroup. In an environment of increasing pressures on health services, it is important to understand the trade-offs people are willing to make between different service characteristics.

While the use of an internet panel specialising in young people meant that young people who are not engaged with sexual health services could be included, at the same time this is a potential limitation, as there is evidence that members of such panels tend to have higher levels of digital literacy compared to the general population [54]. Although the aim was to include those who are not currently engaged with sexual health services within the survey, at the same time the qualitative work and piloting work revealed that information about STIs needed to be provided to allow respondents to have sufficient knowledge to be able to complete the survey. This was necessary to allow informed choices to be made, but it also

meant that the respondents may have been more informed than the general population. An additional limitation is that a monetary attribute was not included, as this would have allowed monetary valuation of different service options. The young people who took part in the focus groups felt that it was not appropriate to think of cost in this context, and other studies with young people have reported similar issues (e.g. [55]).

The focus group discussions and interviews were conducted in one geographical area only, and although an attempt was made to include young people from a variety of backgrounds, the focus on one geographical area might influence the generalisability of the results. Only one group was conducted with young participants who identified as MSM, this was due to the general focus of the study, but more research specifically focused on defined population groups would be warranted. It should be noted that the qualitative and quantitative components involved different populations, however comparison with the wider literature suggests that the qualitative groups captured key characteristics of relevance to the more general quantitative population. The focus groups and interviews were facilitated by LJ, and although every attempt was made to put participants at ease, the fact that the facilitator was a university researcher might have made some participants reluctant to share their views fully.

There are several policy implications associated with the results. Firstly, the results suggest that young people receive utility from comprehensive testing even if they are at low risk for some of the STIs. Hence, there might need to be consideration of how non-health benefits such as 'peace of mind' could be included in future cost-effectiveness analyses in this area, alongside clinical benefits [56]. Secondly, the results suggest that perceptions of staff attitude are of particular importance to young people, regardless of setting (including for online testing), which highlights the priority of staff training. Thirdly, there were some settings which were less preferred by young people such as youth/ community centres, reflecting a lack of knowledge about how screening would operate in such settings and concerns about

confidentiality. Hence, attempts to introduce screening in such settings would need to address these potential barriers to uptake and provide additional reassurances.

7. Conclusion

In conclusion, this study demonstrates how a mixed methods approach, incorporating a DCE, can be used to provide a richer understanding of preferences in healthcare. The findings show that comprehensive testing, a perceived 'non-judgemental' attitude and setting are particularly important to young people in relation to STI screening, alongside convenience factors. The stigma around STI screening means that such 'experiential' factors need to be fully considered in the design and evaluation of such services.

References

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Tables

Table 1: Details of focus groups

Group	Setting / population	Age	Ethnicity	Gender	No. of participants
1	Community – North B'ham	18- 24	Mixed	Female	4
2	Community – Central B'ham	16-24	Mixed	Male	7
3	Community – Central B'ham	16-24	Mixed	Female	7
4	Community – South B'ham	16-19	Mixed	Male	4
5	Community – South B'ham	16-20	Mixed	Female	4
6	Specialist	16-24	Mixed	Female	6
7	Specialist	16-19	Mixed	Male	5
8	MSM	16-24	White British	Male	4

Table 2: Attributes and Levels for DCE

Attribute	Level
Where you get tested / get a self-test kit	GP surgery
	Community centre/ youth centre
	Specialist sexual health clinic
	Pharmacy (chemist)
	Online
Attitude of staff	Judgemental
	Non-judgemental
Contact with staff	Full appointment
	Limited contact
Type of test	Urine sample/ genital swab/ saliva sample
	Blood sample **as well as** urine sample/ genital swab/ saliva sample
STIs tested for	The most common STIs for young people
	All STIs (including HIV)
How long you wait for an appointment/ to get checked	Same day
	Next day
	Within a week
	1-2 weeks
How quickly you get your results	Same day
	Next day
	Within a week
	1-2 weeks

Table 3: Survey respondent characteristics (Total 1948)

Characteristic	Count	%
Gender		
Male	916	47.0%
Female	1024	52.6%
Other	8	0.4%
Age group		
16 to 19 yrs	942	48.4%
20 to 24 yrs	1006	51.6%
Ethnicity		
White	1040	53.4%
Non-white	908	46.6%
Sexuality		
Heterosexual	1654	84.9%
LGBT	214	11.0%
Prefer not to say / other	80	4.1%
SHC prior attendance	389	20.0%

(see Online Appendix 1 for details of items)

Table 4: Young people's preferences for STI screening characteristics

		Utility coefficient	Std. Err	P value	SD
Location (Ref.= GP)	Community centre/ youth centre	-0.443 (-0.637 to -0.249)	0.099	0.000	0.577**
	Specialist sexual health clinic	0.293 (0.155 to 0.43)	0.070	0.000	0.32**
	Pharmacy (chemist)	-0.241 (-0.414 to -0.068)	0.088	0.006	0.001
	Online	0.045 (-0.278 to 0.368)	0.165	0.785	1.199**
Contact type (Ref.= Limited contact)	Full appointment	0.311 (0.197 to 0.426)	0.059	0.000	0.357**
Test type (Ref.= Urine only)	Blood and other samples	-0.026 (-0.144 to 0.091)	0.060	0.659	0.759**
STI (Ref= most common STIs)	All STIs	0.88 (0.755 to 1.006)	0.064	0.000	0.856**
Staff attitude	Judgemental	-1.141 (-1.385 to -0.896)	0.125	0.000	
Wait for appointment	Next day	-0.269 (-0.469 to -0.069)	0.102	0.009	
(Ref.= Same day)	A week	-0.557 (-0.81 to -0.304)	0.129	0.000	
	2 weeks	-0.657 (-0.855 to -0.46)	0.101	0.000	
Wait for results	Next day	-0.017 (-0.151 to 0.117)	0.068	0.801	
(Ref.= same day)	A week	-0.446 (-0.589 to -0.303)	0.073	0.000	
	2 weeks	-0.679 (-0.936 to -0.422)	0.131	0.000	

Number of observations 36,176 (1946 respondents × 20 choices, minus 2744 missing values).
Log-likelihood = – - -19781.289 ; Wald chi2(14) = 748.23; Prob > chi2 = 0.0000
SD relates to the random component of the model coefficients (rather than the coefficients themselves).
*$P < 0.05$. **$P < 0.01$. Note: utility coefficients indicate the strength of preference for the marginal change in the attribute (e.g. community centre) relative to the reference level (e.g. GP). Positive values are indicate the attribute level is preferred to the reference level. Negative values indicate the reference level is preferred.

Table 5: Subgroup preferences for STI screening characteristics

		Gender		^P value	Age group (95% CI)		^P value	Ethnic group (95% CI_		^P value
		Male	Female		16-19	20-24		White	BAME	
		Utility coefficient (95% CI)	*Utility coefficient (95% CI)*		*Utility coefficient (95% CI)*	*Utility coefficient (95% CI)*		*Utility coefficient (95% CI)*	*Utility coefficient (95% CI)*	
Log-likelihood		-10139.027	-10448.779		-10133.46	-10576.788		-10980.426	-9713.7291	
Location (Ref. = GP)	Community centre/ youth centre	-0.5 (-0.641 to -0.359) SE=0.072**	-0.366 (-0.504 to -0.227) SE=0.071**	0.172	-0.422 (-0.563 to -0.282) SE=0.072**	-0.44 (-0.578 to -0.302) SE=0.07**	0.957	-0.504 (-0.642 to -0.367) SE=0.07**	-0.356 (-0.497 to -0.215) SE=0.072**	0.362
	Specialist sexual health clinic	0.288 (0.198 to 0.378) SE=0.046**	0.288 (0.198 to 0.378) SE=0.046**	0.984	0.304 (0.214 to 0.394) SE=0.046**	0.273 (0.184 to 0.362) SE= 0.045**	0.581	0.273 (0.185 to 0.362) SE=0.045**	0.302 (0.211 to 0.393) SE=0.046**	0.501
	Pharmacy (chemist)	-0.331 (-0.47 to -0.191) SE=0.071**	-0.123 (-0.263 to 0.016) SE= 0.071	0.04	-0.182 (-0.322 to -0.042) SE=0.071*	-0.262 (-0.4 to -0.124) SE=0.071**	0.518	-0.319 (-0.458 to -0.181) SE=0.071**	-0.125 (-0.265 to 0.014) SE=0.071	0.13
	Online	-0.195 (-0.438 to 0.047) SE=0.124	0.127 (-0.115 to 0.368) SE=0.123	0.059	-0.099 (-0.341 to 0.144) SE=0.124	0.038 (-0.202 to 0.278) SE=0.122	0.45	-0.18 (-0.418 to 0.058) SE=0.121	0.128 (-0.116 to 0.372) SE=0.125	0.136
Contact type (Ref. = Limited contact)	Full appointment	0.202 (0.117 to 0.287) SE=0.043**	0.268 (0.181 to 0.354) SE=0.044**	0.259	0.244 (0.158 to 0.33) SE=0.044	0.226 (0.142 to 0.311) SE=0.043**	0.682	0.154 (0.07 to 0.238) SE=0.043**	0.32 (0.233 to 0.406) SE=0.044**	0.003
Test type (Ref. = Urine only)	Blood and other samples	-0.058 (-0.134 to 0.018) SE=0.039	0.009 (-0.068 to 0.086) SE=0.039	0.225	-0.018 (-0.094 to 0.057) SE=0.038	-0.029 (-0.106 to 0.048) SE=0.039	0.759	-0.126 (-0.205 to -0.047) SE=0.04*	*0.081 (0.008 to 0.154) SE=0.037*	0
STI (Ref= most common STIs)	All STIs	0.647 (0.567 to 0.728) SE=0.041**	0.784 (0.704 to 0.864) SE=0.041**	0.009	0.711 (0.631 to 0.79) SE=0.041**	0.722 (0.642 to 0.803) SE=0.041**	0.912	0.762 (0.681 to 0.843) SE=0.041**	0.668 (0.589 to 0.746) SE=0.04**	0.492
Staff attitude	Judgemental	-0.878 (-1.051 to -0.706) SE=0.088**	-1.078 (-1.249 to -0.907) SE=0.087**	0.181	-0.894 (-1.066 to -0.721) SE=0.088**	-1.06 (-1.23 to -0.891) SE=0.087**	0.302	-1.131 (-1.299 to -0.962)	-0.815 (-0.989 to -0.642)	0.099

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									SE=0.086**	SE=0.089**	
Wait for appointment (Ref. = Same day)	Next day	-0.203 (-0.347 to -0.059) SE=0.073**	-0.133 (-0.279 to 0.014) SE=0.075	0.607	-0.144 (-0.29 to 0.001) SE=0.074	-0.184 (-0.328 to -0.04) SE= 0.073	0.753	-0.091 (-0.233 to 0.051) SE=0.072	-0.242 (-0.39 to -0.095) SE=0.075**	0.157
	A week	-0.44 (-0.617 to -0.262) SE=0.091**	-0.421 (-0.606 to -0.236) SE=0.094**	0.953	-0.365 (-0.546 to -0.185) SE=0.092**	-0.49 (-0.67 to -0.31) SE=0.092**	0.449	-0.357 (-0.536 to -0.178) SE=0.091**	-0.497 (-0.679 to -0.315) SE=0.093**	0.202
	2 weeks	-0.518 (-0.651 to -0.385) SE=0.068**	-0.562 (-0.695 to -0.429) SE=0.068**	0.511	-0.489 (-0.621 to -0.356) SE=0.068**	-0.588 (-0.721 to -0.456) SE=0.068**	0.333	-0.506 (-0.637 to -0.375) SE=0.067**	-0.579 (-0.713 to -0.445) SE=0.068**	0.373
Wait for results (Ref. = same day)	Next day	-0.001 (-0.137 to 0.134) SE=0.069	-0.02 (-0.158 to 0.118) SE=0.07	0.834	-0.036 (-0.174 to 0.101) SE=0.07	0.013 (-0.122 to 0.148) SE=0.069	0.619	-0.038 (-0.172 to 0.096) SE=0.068	0.017 (-0.122 to 0.156) SE=0.071	0.587
	A week	-0.312 (-0.444 to -0.18) SE=0.068**	-0.441 (-0.572 to -0.31) SE=0.067**	0.178	-0.393 (-0.524 to -0.261) SE=0.067**	-0.361 (-0.492 to -0.231) SE=0.067**	0.685	-0.412 (-0.542 to -0.281) SE=0.066**	-0.345 (-0.477 to -0.213) SE=0.067**	0.733
	2 weeks	-0.413 (-0.588 to -0.239) SE=0.089**	-0.571 (-0.745 to -0.398) SE=0.089**	0.168	-0.487 (-0.661 to -0.312) SE=0.089**	-0.497 (-0.67 to -0.324) SE=0.088**	0.923	-0.437 (-0.608 to -0.266) SE=0.087**	-0.551 (-0.727 to -0.376) SE=0.09**	0.368

Data are unweighted and presented as estimate (95% confidence interval). SE = standard error; ^P value was estimated in a joint model with interaction terms. *$P<0.05$. **$P<0.01$.