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Article

Students' views towards SARS-CoV-2 mass asymptomatic testing, social distancing and self-isolation in a university setting during the COVID-19 pandemic: a qualitative study

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Abstract: We aimed to explore university students' perceptions and experiences of SARS-CoV-2 mass asymptomatic testing, social distancing and self-isolation during the COVID-19 pandemic. This qualitative study comprised of four rapid online focus groups conducted at a higher education institution in England during high alert (tier 2) national COVID-19 restrictions. Data were analysed thematically. Participants were purposively sampled university students (n = 25) representing a range of gender, age, living circumstances (on/off campus) and SARS-CoV-2 testing/self-isolation experiences. Six themes with 16 sub-themes emerged from the analysis of the qualitative data: 'Term-time Experiences', 'Risk Perception and Worry', 'Engagement in Protective Behaviours', 'Openness to Testing', 'Barriers to Testing' and 'General Wellbeing'. Students described feeling safe on campus, believed most of their peers are adherent to protective behaviours and were positive towards asymptomatic testing in university settings. University communications about COVID-19 testing and social behaviours need to be timely and presented in a more inclusive way to reach groups of students who currently feel marginalised. Barriers to engagement with SARS-CoV-2 testing, social distancing and self-isolation were primarily associated with fear of the mental health impacts of self-isolation, including worry about how they will cope, high anxiety, low mood, guilt relating to impact on others and loneliness. Loneliness in students could be mitigated through increased intra-university communications and a focus on establishment of low COVID-risk social activities to help students build and enhance their social support networks. These findings are particularly

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pertinent in the context of mass asymptomatic testing programmes being implemented in educational settings and high numbers of students being required to self-isolate. Universities need to determine the support needs of students during self-isolation and prepare for the long-term impacts of the pandemic on student mental health and welfare support services.

Keywords: COVID-19, SARS-CoV-2, coronavirus, mass testing, social isolation, social distancing, mental health, students, focus groups, qualitative

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1. Introduction

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization declared the outbreak of coronavirus disease (COVID-19) a pandemic in March 2020. During this time, restrictions on movement were put into place worldwide, to flatten the curve of infection through social distancing. The functioning of colleges and universities during the pandemic has presented a challenge. Globally, strategies to manage the situation have included containment and mitigation, such as access control with contact tracing and quarantine, hygiene, sanitation, ventilation, and social distancing. In the United Kingdom (UK), this has required rapid development of local organisational COVID-19 policies in universities, requiring regular adaptation in line with evolving updates from the UK Higher Education Taskforce, and rapid changes in government policy and guidance as the national situation changes. In the UK, universities rapidly transitioned to online teaching and learning during the first surge of COVID-19 in March 2020, followed by large-scale reopening of campuses for the new academic year in September/October 2020. This mass movement of students from across the UK and overseas aligned with a second surge of COVID-19 across the UK [1] and the establishment of a national tiered system of restrictions to address local outbreaks of COVID-19 (Supplementary file 1).

The proportion of asymptomatic infection among COVID-19 positive persons has been found to be high, with substantial transmission potential [2]. In the absence of a national strategy or policy, some universities developed local capability for frequent and regular mass asymptomatic SARS-CoV-2 testing programmes [3][4] in effort to reduce the risks [5] of viral transmission between asymptomatic students. This approach aimed to maximise the safety of staff, students and local communities and aligned with recommendations made by the UK's Independent SAGE Behavioural Advisory Group [6]. Without national guidance, there was hesitancy around asymptomatic testing as the implications for students' social behaviours and wellbeing were unknown.

The success of mass testing approaches relies on high levels of testing *and* social isolation [7][8]. Although adherence to COVID-19 social regulations has generally been high in the UK population (>90%), 46% of 'resisters' to the lockdown rules are from younger age groups [9], and population adherence to self-isolation is low (18%) [10]. This study was conducted at a university in England, in October 2020 at the beginning of the Autumn term, at the time of a second surge of COVID-19 in the UK. At the start of the term there was wide-scale deployment of local asymptomatic testing with lower uptake than observed in a pilot delivery [4], high numbers of positive cases with confirmed cases rapidly rising to over 1000 in the initial weeks of term, and vast numbers of students being required to self-isolate. The aim of the study was therefore to explore university students' perceptions and experiences of SARS-CoV-2 asymptomatic testing and strategies for mitigation (social distancing) and containment (self-isolation) in a higher education setting. The findings provide insight into students' barriers to testing uptake and adherence to social restrictions and contribute to a wider debate around mass testing approaches in a pandemic [11-14] and the impact of mitigation and containment strategies on young people's social behaviours and wellbeing.

2. Methods

2.1 Study design

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This was a qualitative focus group study involving four online focus groups with a total of 25 participants undertaken in a two-week period during October 2020. The study design adheres to the consolidated criteria for reporting qualitative studies (COREQ) guidelines [15] (Supplementary File 2). The research protocol was approved by the University of Nottingham Faculty of Medicine and Health Sciences Research Ethics Committee (Ref: FMHS 76-0920).

2.2 Study context

During this time, England was subject to national coronavirus restrictions. The participating university was in a region categorised as 'tier 2 high alert' during which government restrictions prevented people from meeting indoors with individuals or groups from outside of their household or support bubble. At this time, people were advised that no households should mix indoors or in groups of more than 6 outdoors with social distancing, remote working (and studying) there were other restrictions on travel, facilities and services (Supplementary file 1). Students had to contend with abrupt changes in the way that education was delivered, the risks of COVID-19 more broadly, significant reductions in social contact and separation from friends and family due to social distancing measures. Large numbers of students had to adapt to confinement strategies in residential education settings, including shared student accommodation and houses in multiple occupation. Due to increasing numbers of positive cases locally and nationally, many students were required to self-isolate during this time, which meant staying in their home or place of residence and not going outside for any reason, including not travelling to a different place of residence. At the time of data collection, a mass asymptomatic SARS-CoV-2 testing programme was underway at the participating university with testing deployments having taken place in a small number of university halls of residence, with plans for a rapid roll out of testing to all university staff and students being developed.

2.3 Participants, sampling and recruitment

Participants were university students recruited from a single higher education institution via an established cohort study of students living on and off campus [16]. Purposive sampling was used to provide a diverse range of ages, genders, living circumstances (on/off campus), SARS-CoV-2 testing and self-isolation experiences (Table 1). Students required to self-isolate were those that tested positive for SARS-CoV-2 (with or without symptoms), lived with someone who had symptoms or had tested positive, or were identified as a contact of someone who had tested positive by the UK National Health Service (NHS) Test and Trace. All participants were currently residing in the UK and gave informed consent online to be approached for interview via Jisc Online Surveys, and additional verbal consent was provided and audio-recorded prior to the start of the focus group. Recruitment continued until achievement of maximum variation sampling in terms of the pre-specified interviewee characteristics. The 2-week data collection period allowed for rapid data analysis so that findings of the study could feed into university COVID-19 strategy around mass testing and student support. Students were not compensated for their participation. Online data collection was necessary due to social isolation policy although online focus groups are commonly used in health research to capitalise on group interaction in diverse and geographically dispersed participants, to collect rich responses to questions posed in a cost saving and convenient way [17].

Table 1. Characteristics of participants

ID (Participant)	Age	Gender	Home/Int†	On/Off campus	Status[a]	Self-isolated[b] /Not
1	22	F	International	Off campus	Not tested	Yes
2	51	F	International	Off campus	Not tested	Yes
3	20	M	Home	Off campus	Not tested	No
4	25	F	Home	Off campus	Not tested	No
5	25	F	Home	On campus	Not tested	No
6	24	F	Home	Off campus	Sympt	Yes
7	32	M	International	Off campus	Sympt	Yes
8	20	M	Home	Off campus	Sympt	Yes
9	20	M	Home	Off campus	Sympt	Yes
10	25	F	International	On campus	Not tested	No

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11	22	F	International	Off campus	Not tested	Yes
12	20	F	Home	Off campus	Not tested	Yes
13	32	F	Home	Off campus	Sympt	Yes
14	18	M	Home	On campus	Sympt	Yes
15	24	F	Home	On campus	Sympt	Yes
16	18	F	Home	On campus	Asympt	Yes
17	20	F	Home	Off campus	Sympt	Yes
18	20	F	Home	Off campus	Sympt	Yes
19	18	M	Home	On campus	Not tested	No
20	18	F	Home	Off campus	Not tested	Yes
21	21	M	International	On campus	Not tested	Yes
22	20	F	Home	On campus	Not tested	No
23	22	M	Home	Off campus	Sympt	No
24	20	F	Home	Off campus	Not tested	Yes
25	20	M	Home	Off campus	Sympt	Yes

Note: [†]International student; [a]Not tested for SARS-CoV-2, Tested Asympt. (University Asymptomatic Testing Service), Tested Sympt. (NHS Symptomatic Community Testing); [b]Self-isolated for any reason.

2.4 Online focus groups

Students took part in one of four focus groups (n= 3-11 in each group) held online using video-conferencing facilities. Focus groups lasted for 58 to 70 minutes (mean = 64 minutes). Two psychologists (HB/HK) generated the question guide, moderated the focus groups and analysed the data. The question guide was reviewed by two student members of a Patient and Public Involvement and Engagement (PPIE) group. Both moderators were trained in qualitative research and interview skills and were not involved in delivery of the asymptomatic SARS-CoV-2 testing programme. Focus groups were conducted according to recommendations from NHS England's focus group guide [18]. All focus groups followed the same questioning route (Supplementary File 3), were audio-recorded and transcribed verbatim. Participants are referred to as new students (first year students beginning their studies in the Autumn term) and returning students (those resuming their studies in the Autumn term following a summer break).

2.5 Data analysis

Data were analysed thematically [19]. Two researchers familiarised themselves with the data (HK/HB). Due to the rapidity of the study, one researcher developed initial codes and themes (HK) and then both researchers discussed the codes, categories and themes until they reached agreement on themes. Themes were confirmed by two student participants. Given the aim of the study, the sample specificity, the rich dataset, in-depth insights into the phenomena of interest and the analysis approach adopted, the qualitative sample was deemed to have sufficient information power [20].

3. Results

Six themes emerged from the analysis of the qualitative data from the focus groups: 'Term-time Experiences', 'Risk Perception and Worry', 'Engagement in Protective Behaviours', 'Openness to Testing', 'Barriers to Testing' and 'General Wellbeing'. A thematic map illustrating the relationships between the key themes and subthemes is provided in Supplementary File 4 and further detail on the key themes, codes and quotes is provided in Supplementary File 5. Table 2 shows the list of all the key themes and subthemes and representative quotes.

Table 2. Examples of key themes, subthemes and their representative quotes

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Themes	Subthemes	Representative quotes
Term-time experiences	Logistical difficulties	'As an international student we wouldn't have to isolate in a usual time but during this time when we arrived at the UK we needed to isolate for two weeks first from certain countries and that happened with everyone. It's very difficult because when you just move into a new country and you cannot do anything and you're wondering 'how am I going to get groceries?' Participant 1
	Adjustment to online learning	'All our limited lectures can be done online and it's quite nice to be able to relax and get myself into a rhythm. It isn't as predetermined as it used to be' Participant 8 'I thought that I would have really interesting experiences and networking opportunities and potentially job opportunities at the end of my matriculation and I feel very frustrated by the fact that I don't have those opportunities anymore' Participant 2
	Safeguarding	'On campus I actually feel relatively safe because of the social distancing. I don't know about in halls but like in teaching, especially when we have like our labs and in-person teaching, people are actually sat away from each other and we wipe down our area' Participant 22 'I'm primarily lab-based and my lab was shut for 5 months due to Covid, so that's affected my studies quite a lot' Participant 4
	Connectedness through communication	'I was actually really humbled to have an email from [my school] just to check up on me as they heard I was isolating, and that was really nice. It made me feel less forgotten' Participant 18 'Also as a postgrad I also feel a bit forgotten about because like we were here the whole time when our labs were closed and just like a lot of the emphasis – I know we're like a minority obviously and you can't sort out everything at once, but it felt like a lot of the emphasis was on like majority groups that were probably less affected' Participant 4

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Risk perception and worry	Previous experience with COVID-19	'A guy who lives, who I share a bathroom with, tested positive but he didn't have any symptoms, so it's been like something happening but not really anything to do with me' Participant 19 'My mum was super bedbound for the whole ten days, but we were both very lucky, we didn't have to go to hospital or anything. So at the beginning I wasn't very worried about it until I kind of got it' Participant 6
	Perception of health	'I had no real worry for myself because, I mean, I've had it now so hopefully it means I've got some sort of immunity. I'm more worried for my older relatives' Participant 14 'Covid terrifies me - Until recently I was considered vulnerable to the virus because of previous serious illness. So being in a shared house, still going to work in order to pay rent and also having to go onto campus for some lessons has made my anxiety go crazy' Participant 18
Engagement in protective behaviours	Format of communication and guidance	'I know we've been receiving lots of emails about what the rules are, what we need to do – but they are very text heavy – and I wouldn't have thought of this if it weren't for my housemates – but they're all international students and they struggle with the large blocks of text because there are a lot of words in there that are just unfamiliar to them' Participant 15 'We didn't get told that we weren't allowed to use our communal space until after we finished self-isolating so, for us, there was no communication and then they emailed us to say 'oh, even if you've all tested positive, you're not allowed to use your communal space, or you are but one at a time' – we didn't realise this – so that seems like really weird because, to be fair, if you've tested positive it's probably too late and you've probably given it to all your flatmates anyway' Participant 14
	Environmental and structural factors	'There were just like large crowds of them in the corridor over both sides of the system and then we would all get like stuck in crowds of students' Participant 4

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	Desire for social contact	'I think also people will social distance with strangers or people they don't know, but they feel it's fine with friends, even if they're not in the same household, which can be hard because literally some people, like the only friends they have are not in their household and now it's dark, it's getting cold and it's like sit in your room alone or, like, break the rules, and especially now you're not allowed people in your household even if you're social distancing with them, I reckon lots of people are going to not follow that' Participant 16
Openness to testing	Control of the virus	'There clearly are people who are asymptomatic but carrying the virus and being able to get on top of that is going to play a massive role in being able to control the virus' Participant 13 'My only sort of slight issue with the asymptomatic testing is it does – it kind of puts, like, it makes Nottingham seem a lot worse than potentially it actually is in comparison to other areas of the country and other universities' Participant 5
	Access and experience	'I think it's quite a good thing because otherwise you can't really have a test unless you've got symptoms' Participant 19 'I think it's pretty much impossible to get an NHS test unless you've got really loads of symptoms and even if you do it's still really a long wait and you have to like drive somewhere' Participant 22
	Perceived immunity	'I was so relieved to be negative, but it didn't change my behaviour at all - I was still on high alert - if anything I was more aware as I didn't want to have that scare again' Participant 18 'I'd be quite wary around some of the people that I know. I sort of fear that once they've got it they're going to feel like they're immune and they can do whatever now. I've certainly seen like parties of households as soon as they come out of isolation, they sort of celebrate and go a bit mad' Participant 10

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Barriers to testing	Guilt about impact of test result on others	'I feel people feel guilty if they have it and then that means everyone in the household has to isolate and then, like, the prospect of having to isolate in a pretty small room for like two weeks is quite daunting as well' Participant 16
	Mental health impact of testing	'I think it's that point about lockdown that really got me because, again, over the summer, especially that sort of first half of the summer, my mental health just completely deteriorated and went like really, really badly and I'm in the position now and sort of getting a positive test is I don't want to go back to what that was like, being locked down' Participant 24
General wellbeing	Social impact of the pandemic	'I'd say I feel very strongly about the first years and sort of hearing, like, about, like, where they get like a positive test in a hall, they've got security guards on the door and they're sort of, like, breaking the law because they want to go and see their mates and I remember how difficult it was in first year, like, to meet people, to make friends – and when you don't have those obvious, like, big social weeks to meet people and the university is, like, encouraging them to not go out and meet people – I can't imagine how difficult that is for some people' Participant 25
	Mental health impact of the pandemic	'I'm getting quite down about it, because it's literally your work's on your screen, like, and then all you can do is like looking at your screen, like, if you socialise you have to do it over on your screen and it's just really, just making me a bit down really, because I can't even eat lunch with people' Participant 16 'Nationally if we went into another lockdown I would be scared about how I coped because I coped pretty badly in the last one with my mental health and stuff and I'd just be scared I'd go straight back into that again if that were to happen' Participant 23

4. Discussion

This study explored university students' perceptions and experiences of university life during COVID-19, SARS-CoV-2 mass testing and strategies for mitigation (social distancing) and containment (self-isolation) of the virus during the second surge of the COVID-19 pandemic in the UK, with 6 emerging themes. Theme 1 ('Term-time Experiences') highlights the impacts of COVID-19 on practical issues surrounding students' daily life and academic studies, alongside university approaches to protect and safeguard. Themes 2 and 3 ('Risk Perception and Worry'; 'Engagement in Protective Behaviours') demonstrate the individual and structural drivers of students' engagement with social behaviours that protect against virus transmission. Themes 4 and 5 ('Openness to Testing', 'Barriers to Testing') highlight students' openness to mass asymptomatic testing alongside the barriers and enablers of testing and its consequences. Theme 6 ('General Wellbeing') emphasises the broader impacts of the pandemic on social and mental wellbeing, recognised as core concepts that have interwoven themes 1-6.

4.1 Impacts on university life during a pandemic

We found that COVID-19 had impacted significantly on student experience of university life. It is clear that students in university-managed accommodation experienced some practical complications in accessing basic supplies at the start of the term, and although these issues likely contributed to student anxiety, they were temporary and quickly resolved at a local level. Nevertheless, there will be students for whom access to food and basic supplies was likely to have been more challenging during this time (e.g. students living off-campus in privately owned accommodation, particularly international students arriving to the UK for the first time). These groups may be at particular risk since food insecurity (worry about how, and where, to access food) has been identified in 35% of students during COVID-19 lockdown, and students' living arrangements during the pandemic have been found to be the strongest predictor of food insecurity [21].

Impacts on studies were particularly notable at the start of the Autumn term alongside efforts to shift to online teaching and learning, and to mobilise mitigation and containment strategies in a short time period. The crisis-response migration of universities to online education early in the pandemic was essential and enabled the continuation of education in universities [22] but the transition was not without its impacts. The IAU Global Survey on the impact of COVID-19 on higher education around the world [23] provided data gathered from 424 universities across 109 countries, in March/April 2020. This demonstrated the impact of COVID-19 on teaching and learning with the shift from classroom teaching to distance teaching and learning approaches. The immediate challenges for higher education institutions were apparent, with regards access to technical infrastructure, pedagogies for distance learning, competences (of students and staff) and managing the requirements of specific fields of study (e.g. hands-on learning requirements, field work, assessments) [23]. This rapid transition to online teaching and learning may precipitate enhanced teaching and learning opportunities in the future [24] by increasing opportunities for flexible learning approaches [23]. However, the requirement to adapt at speed to unfamiliar online e-learning and video-conferencing environments approaches in the context of the pandemic has been exceptionally challenging for students and staff alike. Whilst students have generally adapted well to the transition, remote learning relies heavily on students' personal motivation and time management skills and impacts on students' socialisation through the absence (or significant reduction) of personal face-to-face interactions between peers, and between learners and instructors [25]. For students in our study, the early hitches of the switch to online teaching and learning, together with the drastic reduction in personal interactions normally gained through classroom teaching has been particularly difficult through the pandemic and contributes to experiences of remoteness and loneliness. Students who seemed to fare better were those who had received more regular contacts from university staff during the pandemic, and particularly through periods of self-isolation.

Overall, the University approach to safeguarding students while managing the continuation of studies was well received, although the pandemic had dramatically impacted the social aspects of learning and university life. Regular

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communications from university staff are likely to influence students experience of university life, enhance students' feelings of connectedness during an outbreak and reduce the loneliness associated with social isolation. Universities should act on generating opportunities for social support and networking which could be delivered through academic departments, sports, wellbeing facilities, clubs and societies.

4.2 Risk perceptions, adherence, and social behaviours

With regards COVID-19 mitigation, students in our study were highly conscious of the risks of COVID-19 although they were more concerned with the asymptomatic spread of COVID-19 to others, particularly those in vulnerable groups (e.g. those with existing health conditions), than the risk of contracting the virus themselves. Their concerns about passing on COVID-19 to vulnerable loved ones indicates that adherence of university students to COVID-19 protective behaviours may be associated with a sense of social responsibility, which has also been identified in other populations of young people [26] [27]. Although adherence to social distancing and protective behaviours has been found to be lower in younger adults than other age groups [28], students in our study reported adhering to protective behaviours and observing compliance across the university more broadly. Nonetheless, they reported seeing or hearing that a minority of students were non-compliant with social distancing behaviours or self-isolation.

In the first national lockdown in the UK, population adherence to stringent behavioural regulations was high (over 90%) [29] [9]. At the time of the study and after the UK government announced the introduction of local COVID alert levels in England on 12 October 2020, data from the Office for National Statistics (ONS) showed that this trend had remained broadly consistent and the majority (84%) of respondents said they always or often maintained social distancing [30]. The ONS Student Covid Insights Survey (SCIS) [31] found that that 9 out of 10 university students reported complying with social distancing around the time of the study and more likely to avoid leaving their accommodation completely than the general public, although the non-adherent minority are more likely to be from younger age groups [9].

Some studies have indicated that non-compliance with public health advice during COVID-19 is associated with weaker feelings of moral obligation, low trust in authorities and individual characteristics related to antisocial potential [32]. Alternatively, it may be that non-compliant students simply perceive being around their peers, particularly in a campus environment and shared living accommodation, to be low risk due to their familiarity with each other, and so the concept of social responsibility may feel less relevant to some individuals in this context. This could partially explain the high prevalence of COVID-19 outbreaks on university campuses across the UK.

In our sample, there were two factors that were perceived to reduce compliance with social distancing in a minority of students and this did not seem to be related to risk perception, but more to environment and desire for social contact. First, some of the residences and educational buildings had narrow corridors and 'bottlenecks' preventing the 2m distancing between people required by UK government restrictions which was seen to present an environmental constraint. Second, some students had an overwhelming desire to socialise that meant they were non-compliant with peers despite adhering to social distancing in other contexts (with strangers).

Adherence to self-isolation in those who are infected or else are contacts of those who test positive for the virus seems to be low in the UK (18%)[10]. Our participants suggested that adherence to self-isolation may be more likely in students who have experienced COVID-19 symptoms than in those who are self-isolating for other reasons. This may be due to greater perceptions of risk and disease severity in those who have personal experience of COVID-19 (e.g. [16], and people with high risk perception around infectious disease tend to take preventive behaviour [33]. However, risk perceptions can only partially explain this, since adherence to self-isolation in young people is strongly related to structural vulnerabilities and availability of resources (e.g. social support with food access and caregiving responsibilities, financial hardship, space in living accommodation)[34].

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Overall, social interaction is an integral part of students' lives. Universities and colleges should consider the social impact of protective behaviours and offer social outlets for students when appropriate (e.g. providing opportunity for monitored socialising outdoors when it is safe to do so). Given the highlighted structural difficulties some students have experienced with their accommodation providers, the university should set out clear guidance for both students and providers on practical, social and emotional supports for students on return to campus following national lockdown and during periods of self-isolation. These strategies may improve adherence to self-isolation and reduce fear of self-isolation which may equally enhance uptake of testing.

4.2.1 Communications and social behaviours

Our study suggests that students on the whole are predominantly adherent to protective behaviours, but reduced compliance with social distancing and self-isolation guidance was also associated with perceived inadequacies in university communications at the time of the study, which were not always seen to be timely. We propose that institutional communications around COVID-19 may need to be more accessible and inclusive, since messaging at the time of the study was not universally understood amongst students, and the needs of certain groups (e.g. postgraduate students, international students, off-campus students) were not being met. The importance of communications (e.g. clarity, inclusion and timeliness) in maximising adherence to protective behaviours should not be underestimated.

However, students in this study recognised the challenges associated with communicating with large numbers of people in frequently changing national and global circumstances. Also, previous research conducted at the same institution found that most student participants were largely satisfied with university communications, with dissatisfaction expressed by a minority that was related specifically to an early approach to communicating negative test results at this institution, that was subsequently changed in response to student preference [4].

Nevertheless, continuing efforts should be made to ensure the style and format of communications meets the needs of all students. It is important to consider these findings in the context of a fast moving and uncertain crisis situation during which institutional COVID-19 strategies had to be developed and operationalised at speed. This required high responsivity to changes in local and national guidelines and procedures, with rapid communication of changes to university staff and students. It has been advocated that organisational communications during the COVID-19 crisis should be succint to be read and understood [35]. Our findings may highlight a tension between the need for simplicity and readability of communications by the target audience, particularly students for whom English was not their first language, and the finer detail required of ethical and legal regulations around COVID-19 test and trace approaches. For some end users, excessively detailed emails ('blocks of text') related to COVID-19 mitigation and containment may serve to reduce the likelihood of engagement with the key messages being delivered.

4.2.2 Communication approaches

Overall, COVID-19 information provided to young people should be clear, delivered by a trusted source, should avoid giving visibility to non-adherence and promote positive behaviours to enact rather than avoidance of negative behaviours [34]. Ideally, messages for students would be co-created with students [36], since it is well established that young people are often more heavily influenced by their peers than by other age groups and more likely to heed advice from those in similar age groups. Thus, 'using the young person's voice' to deliver messaging will be helpful to reach higher education students in younger age groups. As 'social influence agents' who support and/or undermine health-related behaviours [37], peers both model, and influence, healthful and unhealthful behaviours [38]. Therefore, communications could emphasise social norms related to adherence to protective behaviours (e.g. what peers think, what peers do)[34]. Since young people in particular are generally more oriented towards short-term rewards rather than long-term consequences [39], messaging could emphasise the immediate impacts of COVID-19 such as the

risks to loved ones, and young people should be thanked for their contribution to reduction of virus transmission. Communications should not just instruct young people on *what* to do but should include clear guidelines on *how* to enact protective behaviours (e.g. how to socialise in a COVID-safe way, how to socially distance in specific situations, and how to engage with peers who are non-adherent)[34]. Messaging needs to emphasise the desirability of adhering to public health protocols, and signpost activities that minimise the boredom of self-isolation and maximise opportunities for social contact and activity engagement (e.g. virtual social interactions, exercise classes)[40].

4.3 Students and COVID testing

Our study suggests that students at this institution remained positive towards the availability of local asymptomatic testing for SARS-CoV-2 and generally felt safe on the university campus at the time of the study (high alert, UK second surge) with mass testing in place and during a time when the national situation had dramatically changed, and cases were rising [1]. With regards the practicalities of testing, no particular problems were raised relating to any of the testing processes or procedures (NHS symptomatic community test: throat swab; University asymptomatic test: saliva). Some students reported that the throat swab test was uncomfortable, yet prior work suggests that students do not raise this as a barrier to the uptake of testing [4]. Studies in other populations suggest that discomfort is relatively low in both throat and nasal swabs, although nasal swabs were less likely to induce nausea or vomiting [41]. There is little published evidence in this area, although unpublished work suggests that saliva tests are a less intrusive approach with university students compared with nasal swabs [42]. Testing uptake and self-isolation adherence can be low in education settings (e.g. [27]). Greater student adherence to SARS-CoV-2 asymptomatic testing has been associated with their level of satisfaction with university communications [4]. Intrusiveness and convenience of testing procedures should also be considered and balanced alongside test sensitivity to maximise testing uptake. Overall, our study shows that the availability of testing was seen by students to be an important approach to 'getting control' of the virus, although engagement with testing is more likely to be related to the emotional impacts of self-isolation and its consequences. To maximise uptake of asymptomatic testing, there needs to be significant support in place to manage the impacts of self-isolation on students' social relationships and mental wellbeing. Further, the risk of unintended behavioural consequences of mass testing cannot be dismissed, since our findings suggest for a minority, a negative test result may instil a sense of false security and perceived immunity to COVID-19.

4.4 General wellbeing and mental health

Overall, the long-lasting pandemic situation and associated restrictions have had psychological consequences in the general population [43], with young adults being particularly at risk for mental ill-health [16][44]. In university students specifically, mental health concerns have been identified globally during the pandemic, with high rates of stress, anxiety, depression and evidence of clinically relevant post-traumatic stress disorder [4][16][45-47].

Confinement strategies associated with COVID-19 were unavoidable during the COVID-19 pandemic, but have shown to impact mental health and exacerbate social inequalities in university students [48]. There are undoubtedly individual differences in people's behavioural responses to COVID-19 in that most will voluntarily or habitually engage in protective behaviours (e.g. self-isolating if advised to do so), but others will seek out high levels of social engagement as soon as possible [42]. Our study suggests that mental health plays a key role in this, not least as a negative impact of self-isolating, but also as a factor in behavioural decision-making (e.g. avoidance of self-isolation to avoid emotional impact).

For example, we found that students worried about how they would cope if they had to self-isolate, and experience high anxiety, low mood and loneliness when self-isolating, coupled with a fear of re-experiencing these negative emotions if they we asked to self-isolate again. They also exhibited a strong sense of guilt if household members

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had to self-isolate because of them and fear the interpersonal conflict this situation may bring. Participants in our study believed that this may be a factor for young adults in decision-making related to COVID-19 testing, particularly for those who are asymptomatic. Students' emotions seem to over-ride their willingness to engage in COVID-19 testing when they are asymptomatic due to the risk of self-isolation for themselves and others, despite viewing onsite testing as convenient, and seeing testing as an important national and local strategy for controlling the virus. The same pattern occurs with other protective behaviours since people socialise to avoid feeling lonely, and loneliness is a barrier to social distancing adherence in adult populations [49]. Further, young adults are more likely to report loneliness during COVID-19 restrictive measures than other age groups [50].

Overall, our findings are consistent with others suggesting that mental health is a key driver in both testing behaviour [4], and adherence to COVID-19 protective behaviours [34]. Further exploration of students' mental health impacts and support needs is warranted.

4.5. Diversity and inclusion

Our participants proposed that the mental health impacts of social distancing and self-isolation differed between student groups and were most notable for newly arriving students who registered at the university in October 2020 during the second surge of COVID-19 in the UK and were living in University accommodation. This is likely to be associated with a lack of social networks; these young people had not yet established local support networks, yet social support predicts mental health and quality of life in university students [51].

The disproportionate impact of COVID-19 on young people [10][44] not only highlights a need for targeted communications to younger populations more broadly but demonstrates the significance of structural barriers in adherence to public health messages, and the potential value of segmenting audiences for messaging to avoid making generalisations about behaviours and circumstances of particular groups [34] (such as university students). For communications in a higher education context, 'one-size-does-not-fit-all' and as we observed, some groups of students may feel forgotten. For example, working students (e.g. often international students, self-funded students, students with caregiving responsibilities) may have experienced a loss of income as a result of the COVID-19 related lockdown restrictions, leading to further worry, spiralling debt, uncertainty about the future, and risk of 'falling through the cracks in the system', all impacting on mental health [52].

4.4 Study Strengths

Whilst vaccination levels at the time of the study were still insufficient to control population-level transmission, mass asymptomatic testing remained a prominent candidate for controlling transmission in educational settings against the background of significant community prevalence of SARS-CoV-2 infection. Given the discovery of new variants that may be more transmissible [53], and therefore require more efficient control measures (including B.1.1.7), understanding experiences of testing and protective social behaviours in young people in schools, colleges and universities is particularly relevant. This study sits in the context of a national debate around the implementation of mass asymptomatic testing programmes in schools and universities which has been divisive [12][13] [54-58]. England's Department for Education has advocated weekly testing in educational settings from January 2021 [59], and despite the potential for transmission from students to other members of the community there is little evidence of how students interpret and respond to these approaches, and the impacts of mass testing on social behaviour and wellbeing. This study therefore contributes [60] to the wider debate around mass testing and informs mitigation and containment strategies for COVID-19 in educational settings.

Remotely conducted focus group interviews were a suitable approach for exploring commonality and differences in attitudes and experiences of university students in the context of rapidly changing national policy. Due to the crisis

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situation, this rapid approach allowed for early sharing of qualitative findings which has been identified as important during complex health emergencies (e.g. Ebola [61]). Early study findings have been provided to the Department for Education in England and used in real-time to support institutional efforts to engage students, public health and behavioural experts in COVID-19 messaging content and approaches to communication with students and staff. Finally, the sample included students who lived in university residences, and those who had tested for SARS-CoV-2 either at the university or via local government public health services.

4.5 Study Limitations

Due to the timescale, we were unable to triangulate findings with all of the participants, although we confirmed themes with two participants. Students who had taken a test as part of the participating university deployment of asymptomatic testing in university residences were under-represented. While students were willing to express concerns in this focus group setting and talk about other students' behaviour or compliance to COVID-19 restrictions, there may have been some reservations about openly discussing any personal breaches of COVID-19 guidelines, especially given that the focus group moderators were University employees.

4.6 Summary and future recommendations

Key Points and Policy Recommendations
Practical impacts during Autumn return to campus • Last minute changes to accommodation, travel plans and academic timetabling • Challenges of accessing basic supplies and help with everyday living • Shift to online learning modality • Pandemic impacts on studies (e.g. halted laboratory work and research) • Greater impacts for those without social supports and networks
Emotional impacts during Autumn return to campus • Fear, worry, anxiety, guilt, low mood are widespread • Some reports of food insecurity • But, students do not feel unsafe at university
Risk perception • Those with prior experience of COVID-19 (virus/self-isolation) feel more at risk • Vulnerable groups (pre-existing conditions) feel more at risk • Most students worry more about risks to others than themselves
Engagement in protective behaviours (social distancing, self-isolation) • Timeliness of communications will influence behaviour • Presentation is important - one-size-does-not-fit-all, not all students' needs are being met • Environmental and structural factors play a role in social distancing on campus • Desire for social contact is strong and can override perceived risk and regulations • Primary reason for seeking social contact / breaking self-isolation is to avoid or mitigate emotional impacts of social isolation
Mass asymptomatic testing on campus • Students are receptive to mass asymptomatic testing • Testing is seen as a mechanism for getting control over the virus • Availability of testing on campus enhances students' perceptions of safety

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• Reports of convenience, accessibility and positive experience • Most students would adhere to social behaviour guidelines whether test result is +ve or -ve • Risk of 'perceived immunity' and breaking self-isolation rules in a minority • Barriers to testing are primarily emotional factors associated with self-isolation (e.g. guilt about the impact of self-isolation on others, and fear of the mental health impact of self-isolation)
Broader and longer-term impacts of COVID-19 • Pandemic will have long-term impacts on student experience and satisfaction • Coping with social isolation is harder for students without established social networks • Social contact is intrinsically tied to emotional wellbeing • Some students fear for the future, and many have sustained mental health concerns that will need to be addressed.
Recommendations • Practical and emotional impacts of a pandemic are significant and need to be accounted for when assessing student engagement in studies and academic progress • Action plans are needed to ensure equitable mobilisation of basic supplies for students living on and off campus, in the face of another pandemic • Guidance on pandemic-related social behaviour and testing needs to be timely and inclusive – 'one size does not fit all' for messaging • Implementation of mass testing programmes requires significant support in place for students who may be required to self-isolate to minimise risk of virus transmission • Practical, social and emotional support needs of self-isolating students should therefore be identified • Supportive services should seek to enhance social connectedness, inclusion and positive mental wellbeing • Universities need to prepare for the longer-term impact of pandemic-related mental ill-health on support and welfare services.

5. Conclusions

Mental health of students has been significantly impacted by the COVID-19 pandemic, and social isolation is a key factor in this. Fear of self-isolation is likely to influence uptake of asymptomatic testing and adherence to social restrictions, due to anxiety, guilt and low mood experienced during self-isolation. The adequacy of practical, social and emotional support for students will be paramount to encourage adherence to self-isolation and ultimately reduce virus transmission. Loneliness in students could be mitigated through increased intra-university communications and a focus on establishment of low COVID-risk social activities to help students build and enhance their social support networks. University communications around outbreaks and mental health support needs to be timely and inclusive to reach groups of students that currently feel marginalised and are at risk of 'falling through the cracks' in the system. The practical and emotional support needs of students who have to self-isolate during a pandemic need to be determined, and this has relevance for other educational settings, particularly those in which mass testing may be implemented. Universities need to prepare for the long-term impacts of the pandemic on student mental health and support services.

Supplementary Materials: The following are available online at https://www.mdpi.com/xxx, File S1: Tier 2 High Risk Alert National Restrictions; File S2: Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist, File S3: Focus Group Question Guide; File S4: Thematic map illustrating the relationships between the key themes and subthemes; File S5: Key themes, codes and quotes.

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