

ORIGINAL RESEARCH

Love during lockdown: findings from an online survey examining the impact of COVID-19 on the sexual health of people living in Australia

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ABSTRACT

Introduction Australia recorded its first case of COVID-19 in late January 2020. On 22P March 2020, amid increasing daily case numbers, the Australian Government implemented lockdown restrictions to help ‘flatten the curve’. Our study aimed to understand the impact of lockdown restrictions on sexual and reproductive health. Here we focus on sexual practices.

Methods An online survey was open from the 23PP April 2020 to 11P May 2020. Participants were recruited online via social media and other networks and were asked to report on their sexual practices in 2019 and during lockdown. Logistic regression was used to calculate the difference (diff) (including 95% CIs) in the proportion of sex practices between time periods.

Results Of the 1187 who commenced the survey, 965 (81.3%) completed it. Overall, 70% were female and 66.3% were aged 18–29 years. Most (53.5%) reported less sex during lockdown than in 2019. Compared with 2019, participants were more likely to report sex with a spouse (35.3% vs 41.7%; diff=6.4%; 95% CI 3.6 to 9.2) and less likely to report sex with a girl/boyfriend (45.1% vs 41.8%; diff=-3.3%; 95% CI -7.0 to -0.4) or with casual hook-up (31.4% vs 7.8%; 95% CI -26.9 to -19.8). Solo sex activities increased; 14.6% (123/840) reported using sex toys more often and 26.0% (218/838) reported masturbating more often. Dating app use decreased during lockdown compared with 2019 (42.1% vs 27.3%; diff=-14.8%; 95% CI -17.6 to -11.9). Using dating apps for chatting/texting (89.8% vs 94.5%; diff=4.7%; 95% CI 1.0 to 8.5) and for setting up virtual dates (2.6% vs 17.2%; diff=14.6%; 95% CI 10.1 to 19.2) increased during lockdown.

Conclusion Although significant declines in sexual activity during lockdown were reported, people did not completely stop engaging in sexual activities, highlighting the importance of ensuring availability of normal sexual and reproductive health services during global emergencies.

INTRODUCTION

In late January 2020, Australia recorded its first case of COVID-19.¹ In response to rapidly increasingly daily case numbers,¹ the Australian Government began to introduce several measures

in an attempt to ‘flatten the curve’. On 22PP March, stage 1 restrictions were announced, including the temporary closure of non-essential businesses and services, limiting the size of non-essential gatherings, promoting social distancing and advising against non-essential travel.² Further lockdown measures were implemented from 29P 29 March, with people asked to remain in their homes and only leave for four activities: shopping for essential goods and services, to exercise, to seek medical care or to attend work or education where these activities could not take place at home.³ In addition to the closure of the international border, most state and territory borders were also closed, effectively preventing interstate travel. These measures continued until 8 May 2020, when the Australian Government announced a plan for the easing of restrictions and a ‘COVID-safe Australia’⁴ as case numbers across the country consistently declined.¹

During this period, most people significantly reduced their activities outside their homes,⁵ and a survey conducted by the Australian Bureau of Statistics found 94% of participants were keeping their distance from those outside their household.⁶ As restrictions were enforced across the country, confusion abounded among those with non-cohabitating intimate partners regarding whether visits were allowed. While some states banned people, including non-cohabitating intimate partners, to meet unless they were exercising together or providing care,⁷ others changed course during lockdown and ultimately made an exception to allow non-cohabitating partners to meet.^{8,9} For those isolating with their partners, some prophesied that Australia is much more likely to experience a declining birth rate than a baby boom¹⁰ as people grapple with the social, economic and health impacts of the pandemic. For those without regular partners, sexual health organisations and state health departments advised against casual sex during lockdown but provided advice on how to still enjoy sexual pleasure in the absence of physically present partner/s.^{11–13} Dating apps like Tinder and Hinge included in-app safety messages about how to connect with new partners while



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maintaining social distancing, suggesting using video platforms to set up virtual dates.¹⁴

Evidently, the COVID-19 pandemic and the lockdown it prompted are likely to have an impact on the sexual practices and sexual health of people living in Australia. We implemented a serial cross-sectional survey that aimed to investigate the impact of COVID-19 on sexual and reproductive health of people living in Australia. In this paper, we report on the results from the first survey and explore the impact of lockdown on people's sexual practices.

METHODS

Sexual and reproductive health during COVID-19 online survey

The first survey was administered online using Qualtrics survey software¹⁵ between 23P April and 11P May. All Australian states and territories were under lockdown to varying degrees during this period, with restrictions easing from 89P May. The survey comprised questions pertaining to the impact of COVID-19 on sexual practices and sexual and reproductive health. As a repeated cross-sectional survey, participants were asked to provide their month and year of birth and their 'porn star name' (name of their first pet and the name of the first street they lived on) to enable participant tracking over time.¹⁶ Participants were also asked to provide an email address if they wished to be contacted for future surveys. Email addresses were removed from the dataset and not used to link responses. Repeat waves of the survey will be administered every 6–8 weeks across the remainder of 2020, and a cohort analysis will be undertaken on those participants who respond more than once. In this paper, we report on data pertaining to the baseline survey only.

Participants

People were eligible to participate if they were aged 18 years or older and living in Australia at the time of the survey. Participants were recruited via various means, including the research team's existing networks (eg, emailing the recruitment flyer to colleagues and sexual and reproductive health newsletter lists for distribution and posting the recruitment flyer on our research group's Twitter account) and via paid Facebook ads. Participants were asked to pass the link to the survey on to their own networks. Participants clicked on a link that took them to the survey page where they were provided with a plain language statement. If they were interested in participating, they were asked to confirm that they were aged 18 years or over, they understood what the survey was about and they consented to participate.

Data collection

Survey questions included trends and changes in sexual practices, intimate relationships, access to essential goods and services, trends and changes in contraceptive use and pregnancy intentions. Sex was defined as physical contact with other people for sexual pleasure including oral sex and mutual masturbation. For several questions, participants were asked to report on two time periods: their experiences and practices during all of 2019 and during 'lockdown' (the period after 22 March when restrictions commenced). Participants were also asked to report on the frequency of sexual activity by commenting on whether their sexual activity was less, the same or more during lockdown than in 2019. They were also asked to report whether specific sexual practices (such as masturbating alone or oral sex) were being performed the same amount, less often, more or stopped

completely because of COVID-19. We also collected sociodemographic data.

Data analysis

A sample size of 800 would allow us to detect a difference in paired proportions of 6% (55% vs 56%) assuming a correlation of 0.25, power of 80% and alpha of 0.05. Descriptive statistics were used to describe the sociodemographic characteristics of participants. Logistic regression was used to determine the difference in proportion between the two time periods (lockdown minus 2019) for categorical variables adjusting for clustering at the participant level. The difference in the proportion and its corresponding 95% CIs are reported. We fitted interaction terms between the time period (lockdown vs 2019) and the variables of gender, age, sexuality and relationship status in each logistic regression model to examine whether the difference in reported activities between time periods varied across different categories of these variables (eg, did the difference in app use between the two time periods vary between those aged 18 years to 29 years and those aged 30+ years). We also used χ^2 tests and tests for equality of proportions to investigate associations between categorical variables where indicated and t-test or Mann-Whitney test to compare continuous variables between two groups. As not everyone completed all questions, missing data are excluded from all analyses, but denominators are provided to put these missing data into context. To assess response bias, we compared the gender, age and sexuality of those who completed and did not complete the survey. All statistical analyses were performed using Stata SE V.16.0 for Windows.

RESULTS

Demographics

A total of 1187 people consented to participate and commenced the survey; 965 (81.3%) completed it and were included in the analysis. Those who completed the survey were older on average than those who did not complete (28.6 vs 26.2 years, $p < 0.01$), but there was no difference in gender ($p = 0.44$) or sexuality ($p = 0.11$). Overall, 70.0% were female, 66.3% were aged under 30 years (median age = 24; IQR = 20–33; range 18–77), 82.7% reported Australia as their country of birth and 65.7% indicated they were heterosexual. Every Australian state and territory was represented in the survey, with most respondents from Victoria (52.0%), New South Wales (15.5%) and Queensland (12.4%). In 2019, 80.2% reported being employed, but this fell to only 63.4% during lockdown. Overall, 9.1% reported testing for COVID-19, but none had tested positive. Sociodemographic data are reported in [table 1](#).

Sexual activity

Participants reported a median of one sex partner in 2019 (IQR 1–3; range: 0–1000) and a median of one sex partner (IQR 0–1; range: 0–10) during lockdown. Overall, 89.8% (847/943) reported sex in 2019 and 60.3% (555/920) during lockdown (difference (diff) = -29.5%; 95% CI -32.6 to -26.3). Most participants (472/883; 53.5%) reported less sex during lockdown than during 2019 with a small proportion (126/883; 14.3%) reporting that they were having more sex. There was no difference in the frequency of sex by gender, but it varied across age groups ($p < 0.01$), by sexuality ($p < 0.01$) and by relationship status ($p < 0.01$). Across all variables, MSM were the most likely to report less sex than in 2019 (56/80; 70.0%) and those in a cohabitating relationship were the most likely to report the

Table 1 Sociodemographic characteristics of survey participants

Variable	n/N	%
Gender*		
Male	247/962	25.7
Female	673/962	70.0
Gender diverse	42/962	4.4
Age (years)		
18–29	636/959	66.3
30+	323/959	33.7
Relationship status†		
In a relationship and cohabitating	346/960	36.0
In a relationship but not cohabitating	248/960	25.8
Single	329/960	34.3
Other	37/960	3.4
Sexual identity ‡		
Heterosexual/straight	632/962	65.7
Men who have sex with men (MSM)	85/962	8.8
Women who have sex with women (WSW)	197/962	20.5
Other	48/962	5.0
Country of birth		
Australia	783/946	82.7
Other	163/946	17.3
Aboriginal and/or Torres Strait Islander		
Yes	26/951	2.7
Highest level of education		
Primary/secondary school	254/958	26.5
Certificates/diplomas/apprenticeships	144/958	15.0
University	560/958	58.5
Employment in 2019§		
Employed (including full time, part time and casual)	769/959	80.2
Student	326/959	34.0
Unemployed and looking for work**	27/959	2.8
Other¶	48/959	5.0
Employment in lockdown§		
Employed (including full time, part time and casual)	606/956	63.4
Student	287/956	30.0
Stood down due to COVID-19 and/or unemployed looking for work**	135/956	14.1
Other¶	58/956	6.1
State/territory		
Australian Capital Territory/Northern Territory	21/949	2.2
New South Wales	147/949	15.5
Queensland	118/949	12.4
South Australia	62/949	6.5
Tasmania	25/949	2.6
Victoria	493/949	52.0
Western Australia	83/949	8.8
Tested for COVID-19		
Yes, tested negative	78/958	8.1
Yes, waiting on results	10/958	1.0
No	870/958	90.7

n=number who answered the question; denominator is not always 965 because of missing data.

*Gender diverse includes transgender and non-binary.

†'In a relationship' includes those who selected married/de facto/boyfriend/girlfriend/living apart together or long distance relationship; 'cohabitating' defined as living with partner/s; 'single' includes those who selected single/divorced/widowed (and did not select another relationship); 'other' includes people who selected polyamorous or multiple partners (and did not select another relationship option, such as single), and those who indicated in comments that they were casually dating, but not exclusive.

‡MSM includes bisexual and trans men; WSW includes bisexual and trans women; other includes asexual and non-binary respondents and those who selected 'something else'.

§Participants can be in multiple categories.

¶Includes retired, parent/carer, disability support pension and unemployed but not looking for work.

**Excluding students.

same amount of sex (146/321; 45.5%) or more sex than in 2019 (62/321; 19.3%, online supplemental table 1).

Participants were more likely to report having sex with a spouse during lockdown compared with 2019 (41.7% vs 35.3%; diff=6.4%; 95%CI 3.6 to 9.2) and less likely to report sex

with a girl/boyfriend (41.8% vs 45.1%; diff=-3.3%; 95%CI -7.0 to -0.4) or sex with a casual hook-up (7.8% vs 31.4%; diff=-23.4%; 95%CI -26.9 to -19.8, online supplemental table 2). The difference in proportions between time periods for each partner type did not vary by sexuality or age, but males were more likely to have sex with their spouse during lockdown (diff=12.4% for males vs 4.6% for females; p=0.04). Singles had significantly less sex with a girl/boyfriend during lockdown compared with those in cohabitating relationships (diff=-26% vs 0.9%; p<0.01). A small number of participants (10/815, 1.2%) reported participating in group sex, swinging or threesomes since lockdown compared with 2019 (133/815, 16.3%; diff=-15.1%; 95%CI -17.6 to -12.5).

Sexual practices

When asked whether participants had changed their sexual practices because of COVID-19, 14.6% (123/840) reported that they were using sex toys more often on their own and 26.0% (218/838) reported that they were masturbating more. When stratified by frequency of sex during lockdown, those who reported less or no sex during lockdown were more likely to report using sex toys alone (18.3% vs 8.3%, diff=10.0%; 95%CI 5.5 to 14.6) and masturbating alone (35.6% vs 10.3%; diff=25.3%; 95%CI 20.0 to 30.6) compared with those who reported the same amount or more sex since COVID-19 (figure 1). A total of 98 participants (11.5%) reported buying a sex toy during lockdown and of these, 24.0% indicated that this was their first.

Among those who reported sexual contact with another person during lockdown, 12.1% (62/511) reported kissing on the mouth, 13.0% (66/509) having oral sex, 15.1% (77/509) changing sexual positions, 19.8% (101/510) washing hands before and after sex and 2.6% (13/507) using condoms, dams or gloves more frequently than they did before COVID-19. When stratified by frequency of sex during lockdown, those who reported the same or more sex during lockdown were more likely to report kissing (17.2% vs 4.4%; diff=12.8%; 95%CI 7.7 to 17.9), oral sex (17.9% vs 5.4%; diff=12.6%; 95%CI 7.3 to 17.9) and changing sexual positions (20.9% vs 6.4%; diff=14.5%; 95%CI 8.8 to 20.2) during COVID-19 than those who reported less or no sex. However, they were less likely to report washing hands before and after sex (15.8% vs 25.5%; diff=-9.6%; 95%CI -16.9 to -2.4, figure 1).

Dating app use

Overall 42.1% (406/965) participants reported using dating apps in 2019 with a median of two apps each (IQR=1–2; range:1–7). The most popular apps were Tinder (78.7%), Bumble (64.8%), Hinge (15.7%) and Grindr (11.7%). App use in 2019 was reported most among MSM (61/91; 67.0%), women who have sex with women (WSW) (107/201; 53.2%) and among singles (220/329; 66.9%) and least among those in cohabitating relationships (71/346; 20.5%). During lockdown, app use was reported most among MSM (40/89; 44.9%) and singles (198/325; 60.9%) and least among those in cohabitating (23/344; 7.3%) and non-cohabitating (20/245; 8.2%) relationships. Overall, app use decreased significantly during lockdown (42.1% vs 27.3%; diff=-14.8%; 95%CI -17.6 to -11.9, table 2). The decrease in app use was significantly smaller for singles (-5.9% vs -13.3%, p<0.01) and significantly greater for those in a non-cohabitating relationship (-27.3% vs -13.3%, p=<0.01) compared with those in cohabitating relationships. No other differences were found (online supplemental table 3).

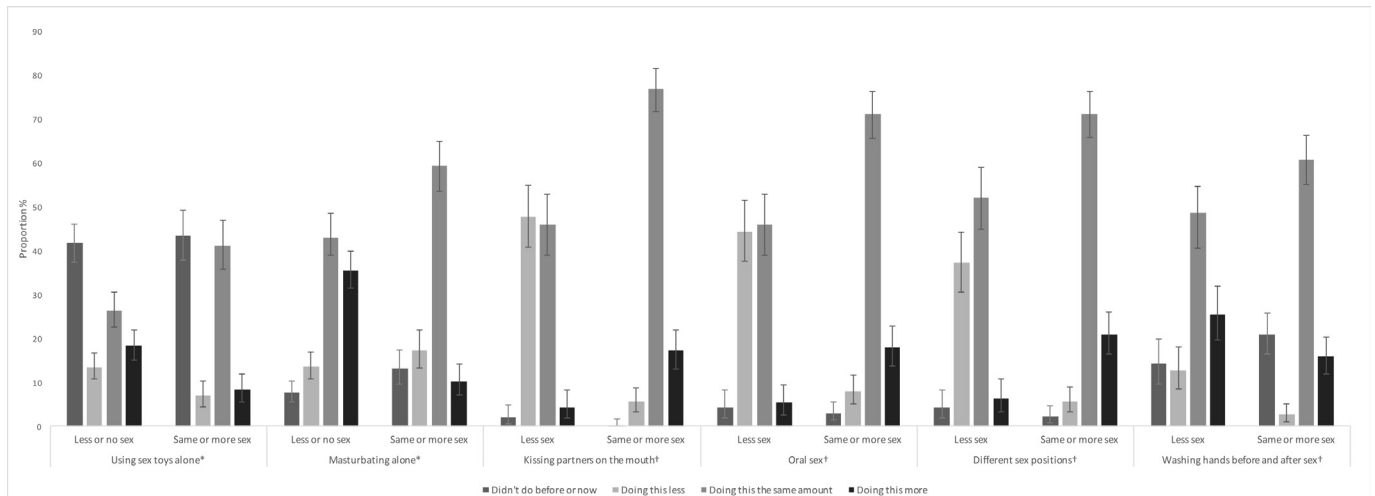


Figure 1 Impact of COVID-19 on frequency of sex practices stratified by those reporting less or no sex versus the same or more sex during lockdown. *Based on all participants; †based on those reporting sex during lockdown.

App use during lockdown increased significantly for chatting/texting (89.8% vs 94.5%; diff=4.7%; 95% CI 1.0 to 8.5) and for virtual dates (2.6% vs 17.2%; diff=14.6%; 95% CI 10.1 to 19.2) and decreased significantly for face-to-face dates (69.1% vs 16.0%; diff=-53.1%; 95% CI -59.5 to -47.2) and hook-ups (46.7% vs 14.8%; diff=-31.8%; 95% CI -37.8 to -25.8, figure 2). The change in app use between time periods did not vary by gender but varied significantly by age for swapping pictures (diff=-9.2% for 18-29 years vs 4.9% for 30+ years; $p=0.02$) and by sexuality for hook-ups (diff=-63.9% MSM vs -22.9% for heterosexuals; $p<0.01$). No other differences were found (online supplemental table 4).

Health service use and STI diagnosis

Overall, 26.5% (211/797) reported a telehealth consultation with a general practitioner (GP) during lockdown, 0.4% (3/797) reported accessing online STI testing and 5.4% (43/797) reported using an online pharmacy during lockdown. Few (1.2%; 10/819) reported being diagnosed with an STI during lockdown.

DISCUSSION

Findings presented here demonstrate clear changes in sexual activity and sexual practices during the peak of the COVID-19 pandemic (to-date) in Australia and the lockdown measures it prompted. Our findings show a decline in sexual activity

Table 2 Use of dating apps and online dating in lockdown compared with 2019

Variable	Used apps in 2019, n/N (%)	Used apps since lockdown, n/N (%)	Difference (95% CI) †
Overall	406/965 (42.1)	260/953 (27.3)	-14.8 (-17.6 to -11.9)
Gender			
Male	117/247 (47.4)	85/241 (35.3)	-12.1 (-17.3 to -6.9)
Female	270/673 (40.1)	162/669 (24.2)	-15.9 (-19.4 to -12.4)
Gender diverse*	18/42 (42.9)	13/41 (31.7)	-11.1 (-24.6 to 2.3)
Age (years)			
18-29	309/635 (48.7)	193/627 (30.8)	-18.0 (-21.8 to -14.1)
30+	96/323 (29.7)	67/320 (20.9)	-8.8 (-5.1 to -12.4)
Sexual identity†			
Heterosexual	221/632 (35.0)	152/624 (24.3)	-10.6 (-13.9 to -7.3)
MSM	61/91 (67.0)	40/89 (44.9)	-22.1 (-31.2 to -13.0)
WSW	107/201 (53.2)	55/201 (27.4)	-25.9 (-33.0 to -18.8)
Other	15/38 (39.5)	12/37 (32.4)	-7.0 (-22.3 to 8.2)
Relationship status‡			
In a relationship and cohabitating	71/346 (20.5)	25/344 (7.3)	-13.3 (-16.8 to -9.7)
In a relationship but not cohabitating	88/248 (35.5)	20/245 (8.2)	-27.3 (-33.5 to -21.1)
Single	220/329 (66.9)	198/325 (60.9)	-5.9 (-11.0 to -0.1)
Other	25/37 (67.6)	17/36 (47.2)	-20.3 (-39.0 to -1.7)

*Gender diverse includes trans and non-binary.

†The difference in proportions lockdown-2019; calculated from logistic regression model.

‡MSM=men who have sex with men (including bisexual men); WSW=women who have sex with women (including bisexual women); other=asexual and non-binary and those who selected 'something else'.

§'In a relationship' includes those who selected married/de facto/boyfriend/girlfriend/living apart together or long distance relationship; 'cohabiting' defined as living with partner/s; single includes those who selected single/divorced/widowed (and did not select another relationship); other includes people who selected polyamorous or multiple partners (and did not select another relationship option, such as single) and those who indicated in comments that they were casually dating but not exclusive.

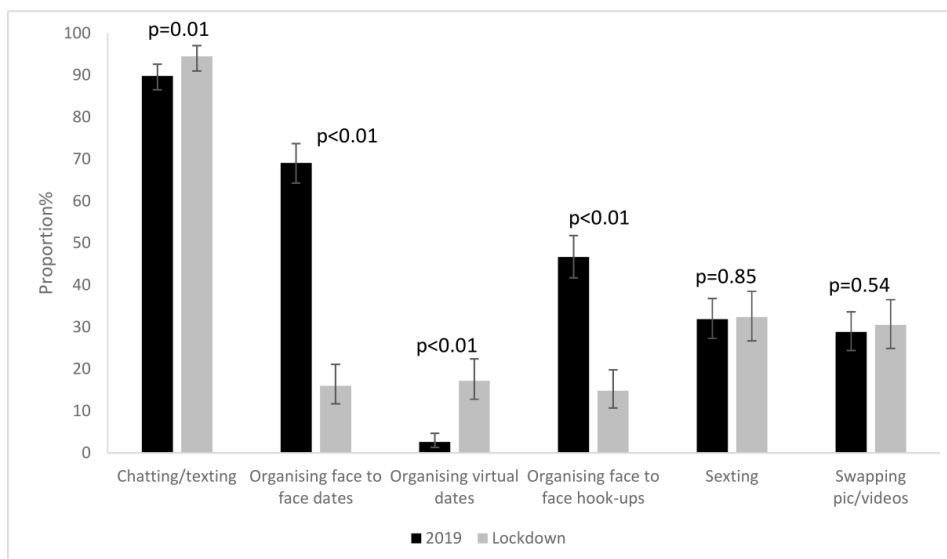


Figure 2 Use of dating/hook-up apps or websites in 2019 and during lockdown.

during the lockdown period with more than half of participants (53.5%) reporting having less sex during lockdown as compared with 2019. These patterns were most stark among those who reported being single, with 69.1% reporting less sex compared with those who reported being in a relationship. Somewhat unsurprisingly, of those reporting sexual activity during lockdown, sexual partners were most often regular partners, with few reporting sexual activity with casual hook-ups (7.8%). While research on the impact of COVID-19 on sexual behaviour is currently limited, data from a cross-sectional study conducted in the UK among those self-isolating reported similar results, with participants who were married or in a domestic relationship more likely to report sexual activity in the past week than their single counterparts.¹⁷

Alongside declines in sexual activity, our findings also demonstrate changes in sexual practices. As could be anticipated given reduced opportunity for meeting partners, our findings show an increase in solo sex activities, including masturbation and using sex toys, particularly among those reporting less or no sex during lockdown. Indeed, adult stores in Australia reported a surge in sales during lockdown.¹⁸ We were also interested in whether participants had changed their normal sexual practices or were engaging in additional hygiene practices, like washing their hands before and after sex, due to COVID-19. Although some participants indicated more frequently washing their hands before and after sex, overall we saw little change in partnered sex practices.

Contrary to our initial assumptions that dating app use would increase during lockdown, overall our findings showed a marked decrease in use. In particular, we saw significant declines in use among people who identified as female, those aged 18–29 years and those in a relationship. Among singles, dating app use declined by only a small amount. These findings contrast with reports of increasing use of dating apps during periods of lockdown worldwide.¹⁴ Dating apps are often used to facilitate in-person sexual and romantic connections¹⁹; for the participants in our study, the physical distancing enforced during lockdown perhaps drove usual users off the platform. However, among those still using apps during lockdown, we saw a significant increase in use for chatting/texting and organising virtual dates, and some continued to use the apps to facilitate

in-person dates/hook-ups. Interestingly, rates of sexting or swapping intimate pictures did not significantly change between 2019 and lockdown. Furthermore, only a small proportion of participants reported being diagnosed with STIs during lockdown and few reported accessing STI testing. However, given that some participants reported arranging in-person dates/hook-ups during lockdown, ready access to STI screening and treatment services during the COVID-19 pandemic is vital.

Our findings should be interpreted within their limitations. Namely, we used convenience sampling to recruit participants, and our resultant sample was largely homogenous, with most participants identifying as female, aged <30 years and well educated. We also had an over-representation of WSW. It is likely that our findings do not adequately capture the experiences of diverse population groups who have been significantly impacted by the pandemic, including, for example, culturally and linguistically diverse groups and those living in areas of low socioeconomic advantage.^{20 21} Furthermore, although all Australian states and territories were represented, participants living in the state of Victoria were over-represented. Due to our recruitment methods, namely via our own networks and via Facebook advertising, we are unable to estimate our response rate. Further limitations include recall bias, particularly for data on activity during 2019, and missing data for several variables (although this was usually $\leq 13\%$). Several participants also initiated the survey but did not complete it. Those who completed the survey were more likely to be older than those who did not. However, our study is novel in providing unique insight into changes in sexual activity during the peak of COVID-19 lockdown restrictions (to-date) among a cohort of people living in Australia, and its strengths will be realised in subsequent cohort analyses of future waves of data.

The COVID-19 pandemic and the lockdown measures it prompted clearly impacted the sexual activity of people living in Australia. Although restrictions are beginning to ease across most of the country, recent spikes in cases in Melbourne,²² the second largest city in Australia, serve as a reminder that the pandemic is still with us and probably will be for some time. Whether or not the changes in sexual behaviour we report here will continue is unclear. As the pandemic continues, it is important to continue to monitor changes in sexual activity and associated implications

for sexual and reproductive health. In the short term, as restrictions lift and people increasingly engage in casual sex, sexual health organisations have produced guidelines for reducing risk of COVID-19 transmission during these encounters and are encouraging regular HIV and STI screening.¹² Others warn of the continued impact of the pandemic on sexual and reproductive health, including reduced access to abortion services and an increase in intimate partner violence.²³ Whether or not Australia will experience an increase in fertility, as has been observed after high-mortality disasters like the 2004 Indonesian tsunami²⁴ or a long-term fertility reduction as seen in Sweden after the 1918 pandemic²⁵ is yet to be seen.

Key messages

- ▶ Sexual activity declined among our participants during the COVID-19 lockdown restrictions in Australia, with more than half reporting having less sex than in 2019.
- ▶ Sexual practices also changed during lockdown, with more people reporting solo sex activities like masturbating alone or using a sex toy.
- ▶ Use of dating apps also declined among our participants. Of those still using apps, we saw increased use for chatting/texting and setting up virtual dates.

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REFERENCES

- 1 Australian Government Department of Health. Coronavirus (COVID-19) current situation and case numbers, 2020. Available: <https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/coronavirus-covid-19-current-situation-and-case-numbers> [Accessed 22 May 2020].
- 2 Prime Minister of Australia. Media statement 22 Mar 2020. Available: <https://www.pm.gov.au/media/update-coronavirus-measures-220320> [Accessed 30 Jun 2020].
- 3 Prime Minister of Australia. Media statement 24 Mar 2020. Available: <https://www.pm.gov.au/media/update-coronavirus-measures-24-March-2020> [Accessed 22 May 2020].
- 4 Prime Minister of Australia. Media statement 08 May 2020. Available: <https://www.pm.gov.au/media/update-coronavirus-measures-08may20> [Accessed 22 May 2020].
- 5 Australian Broadcasting Company (ABC) News. Charting recovery after the coronavirus crisis. Available: <https://www.abc.net.au/news/2020-05-21/road-to-recovery-from-the-covid-19-coronavirus-pandemic/12229514?nw=0> [Accessed 22 May 2020].
- 6 Australian Bureau of Statistics (ABS). 4940.0 - Household Impacts of COVID-19 Survey, 29 April - 4 May 2020. Available: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/D90A6BA872BC19D7CA25854F008214D1?opendocument> [Accessed 22 May 2020].
- 7 Wahlquist C. Australia's coronavirus lockdown - the first 50 days. The Guardian (online), 2020. Available: <https://www.theguardian.com/world/2020/may/02/australias-coronavirus-lockdown-the-first-50-days>
- 8 Chief Health Officer Victoria, @VictorianCHO. Tweet: 'Regarding 'Stay at Home' rules: We have no desire to penalise individuals who are staying with or meeting their partners if they don't usually reside together. We'll be making an exemption. Hope that helps. Tweeted on: Apr 1 2020, 4:57PM. Available: <https://twitter.com/VictorianCHO/status/1245228717351170048>
- 9 Eddie R. 'Obvious in retrospect': rules for Victorian couples who live apart flipped. the age, 2020. Available: <https://www.theage.com.au/eu1.proxy.openathens.net/politics/victoria/obvious-in-retrospect-rules-for-victorian-couples-who-live-apart-flipped-20200401-p54g7n.html>
- 10 Winter C. Demographer warns of coronavirus 'ripple effects', predicts drop in birthrate and taxpayers. Australian Broadcasting Company (ABC) News (online), 2020. Available: <https://www.abc.net.au/news/2020-04-27/demographer-warns-of-the-missing-children-of-covid-19/12187262>
- 11 ACON. Sex in an era of COVID-19, 2020. Available: <https://www.acon.org.au/what-we-are-here-for/covid19/#sex-in-the-era-of-covid-19> [Accessed 22 May 2020].
- 12 ASHM. COVID-19 Taskforce on HIV viral hepatitis and sexual health. harm reduction approaches to casual sex during the COVID-19 pandemic, 2020. Available: <https://ashm.org.au/covid-19/clinical-care/harm-minimisation-approaches-to-casual-sex/> [Accessed 15 Jun 2020].
- 13 Play Safe (NSW Government). Everything you need to know about sex and COVID-19, 2020. Available: <https://playsafe.health.nsw.gov.au/2020/06/01/everything-you-need-to-know-about-sex-and-covid-19/> [Accessed 25 Jun 2020].
- 14 Portolan L. The safest sex you'll never have: how coronavirus is changing online dating. The conversation, 2020. Available: <https://theconversation.com/the-safest-sex-youll-never-have-how-coronavirus-is-changing-online-dating-134382>
- 15 Qualtrics. *Qualtrics survey software*. Provo, Utah, USA: Qualtrics, 2020.
- 16 Lim MSC, Bowring A, Gold J, et al. What's your "porn star" name? A novel method of identifying research participants. *Sex Transm Dis* 2011;38:150-1.
- 17 Jacob L, Smith L, Butler L, et al. COVID-19 social distancing and sexual activity in a sample of the British public. *J Sex Med* 2020.
- 18 Bell SJ. Adult stores stay open during coronavirus as sales surge. ABC news, 2020. Available: <https://www.abc.net.au/news/2020-04-28/sex-shops-help-mental-wellbeing-during-coronavirus/12189202>
- 19 Hobbs M, Owen S, Gerber L. Liquid love? dating apps, sex, relationships and the digital transformation of intimacy. *J Sociol* 2017;53:271-84.
- 20 Evershed N. Disadvantaged areas of Melbourne hardest hit in Victoria's coronavirus outbreak. The Guardian (Online), 2020. Available: <https://www.theguardian.com/news/datablog/2020/aug/25/disadvantaged-areas-of-melbourne-hardest-hit-in-victorias-coronavirus-outbreak>
- 21 Grey A. Multilingual Australia is missing out on vital COVID-19 information. No wonder local councils and businesses are stepping in. The conversation, 2020. Available: <https://theconversation.com/multilingual-australia-is-missing-out-on-vital-covid-19-information-no-wonder-local-councils-and-businesses-are-stepping-in-141362>

- 22 Department of Health and Human Services. Coronavirus update for Victoria - 29 June 2020. Available: <https://www.dhhs.vic.gov.au/coronavirus-update-victoria-29-june-2020> [Accessed 30 Jun 2020].
- 23 Marie Stopes Australia. Pandemic impacts on nation's sexual and reproductive health: media statement, 2020. Available: <https://www.mariestopes.org.au/your-choices/pandemic-sexual-health/> [Accessed 16 Jun 2020].
- 24 Nobles J, Frankenberg E, Thomas D. The effects of mortality on fertility: population dynamics after a natural disaster. *Demography* 2015;52:15–38.
- 25 Boberg-Fazlić N, Iivets M, Karlsson M, *et al.* Disease and fertility: evidence from the 1918 influenza pandemic in Sweden, 2017. Available: <https://www.iza.org/publications/dp/10834/disease-and-fertility-evidence-from-the-1918-influenza-pandemic-in-sweden> [Accessed 16 Jun 2020].