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## ORIGINAL ARTICLE

# Condom use during COVID-19: Findings from an Australian sample of heterosexual young adults



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### KEYWORDS

COVID-19;  
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**Summary** Condoms are a valuable tool in combating the continued spread of sexually transmitted infections (STIs). Despite the fact that condoms are effective and easily accessible, young adults report inconsistent condom use and young adults represent a disproportionately large amount of new STI cases annually. The Behavioural Immune System theory suggests that health behaviours, such as condom use, are impacted by cognitive activation of perceived threat of disease. The advent of the COVID-19 pandemic may then have unforeseen impacts on condom use and the spread of STIs. The present study investigated changes in condom use during the pandemic, and any associations these changes may have had with perceived vulnerability to COVID-19. An Australian sample of 269 students completed a survey asking them to recall their condom use prior to COVID-19, and then their current condom use. Final analyses included a sample of 149 sexually active heterosexual participants. Results revealed a general decline in condom use. Single and coupled participants both reported less frequent condom use, but this decrease was more pronounced among single people. Gender did not moderate these effects. Surprisingly, diminished condom use was not significantly related to perceived threat of COVID-19. Findings of the present study have concerning implications for sexual health and sexual messaging during pandemics.

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## Introduction

Condoms are a vital and effective health tool in combating the spread of sexually transmitted infections (STIs). Condoms are widely available and can functionally prevent the spread of STIs when used correctly (Holmes et al., 2004). Despite this, cases of STIs continue to proliferate. Globally, approximately half a billion new STI cases are reported every year (WHO, 2019). In Australia, cases of gonorrhoea

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and syphilis have tripled and doubled, respectively, over the past decade (Kirby Institute, 2018). Chlamydia has also become the most prevalent infectious disease in Australia, due, in part, to asymptomatic spread among young adults (NSW Health, 2019). It seems then that condoms, despite their effectiveness and availability, are not used adequately enough to stem the rise of STI cases.

Motivating factors of condom use and non-use are subjects of much empirical research. Alcohol (Leigh, 2002) and substance use (Poulin and Graham, 2001), sensation seeking (Aicken et al., 2011), increased amounts of casual sex and sexual partners (Parkes et al., 2007), poorer sex education (Milhausen et al., 2013), and perceptions of condoms impeding pleasure (Braun, 2013; Farrington et al., 2016) are recurring risk factors that predict lower condom use. The less studied protective factors predictive of condom use include higher self-esteem (Miller et al., 2000), tertiary education aspirations (Peterson and Huebner, 2003), parental support (Baumer, 2001), and decision-making skills (Tevendale et al., 2009). In line with the cohort that show the largest increases in STI infections, much of this research centres on young adults, whose newly emerging sexual and romantic experiences inform their future condom use.

The age group of young people (15–24-year-olds) accounts for half of total STIs reported annually (Wolfers et al., 2011), yet only 41% of young people report regular condom use (WHO, 2019). Although condoms provide a dual protection against STIs and unwanted pregnancy, young adults report greater concern for unwanted pregnancies than STIs (Milhausen et al., 2013). Accordingly, an overreliance on hormonal contraception is apparent among young people (O’Sullivan et al., 2010). Alarmingly, younger people frequently report low accuracy about STI knowledge (Carrotte et al., 2016; Milhausen et al., 2013), and unfounded optimistic bias, wherein they perceive themselves as relatively invulnerable to STIs (Pollack et al., 2013; Wolfers et al., 2011). Poorer STI knowledge, the presence of optimistic bias, and a preference for hormonal contraception subsequently predicts reduced condom use overall (Pollack et al., 2013), in turn, facilitating the disproportionate spread of STIs in this age group.

The above mentioned literature suggests that young people’s reduced condom use is, at least partially, rooted in discounting the threat of STIs. But perceived threat from diseases in general may have increased with the rapid spread of COVID-19 and its related media focus. The Behavioural Immune System (BIS) theory argues that humans have acquired behavioural defences (e.g. avoiding people who display pathogen-cues, such as sneezing or coughing) against infection through evolutionary processes, and these behaviours are activated when people reflect on perceived illnesses (e.g., Schaller, 2011, 2015). Importantly, these defensive, pathogen-avoidant behaviours have been induced experimentally by priming the concept of disease using cognitive-based instructions (e.g., Murray and Schaller, 2015; Schaller et al., 2015). The research evidence suggests that exposure to the disease concept by itself can lead to cascading defensive behaviours through the activation of the BIS. COVID-19 is currently an omnipresent disease-concept reminder and a clear, natural chronic disease-construct prime. As such, COVID-19 is likely to increase reflections on

disease, in turn increasing the likelihood of BIS activation. But would such activation affect condom use?

There is very limited research on condom use as a behavioural response to reflections on diseases. A single study found that when presented with a pathogen prime in a laboratory setting, participants self-reported an increased intention to use condoms (Tybur et al., 2011). Based on that study, one may predict that, as COVID-19 has likely been priming pathogen threat to many people, one should find an increase in the use of condoms during the pandemic.

A potential detriment to condom use, in contrast, is the higher frequency of health messaging guidelines broadcast during the pandemic. Emerging research suggests that monotonous and repetitive health messaging can lead to fatigue (So et al., 2017). In turn, recipients’ attitudes towards the target behaviour become increasingly unfavourable and avoidance of the message increases (Dillard and Shen, 2005; Kim and So, 2018; Rains and Turner, 2007). Ultimately, fatigued recipients are at risk of forgoing the advice of these health campaigns. Condom use has already been identified as one health guideline negatively impacted by message fatigue (Frew et al., 2013; So et al., 2017). The introduction of additional health guidelines likely risks accelerating fatigue. Indeed, safe sex campaigns in Australia have incorporated social distancing guidelines (NSW Health, 2020) and existing research has cautioned against multi-message campaigns as they seemingly accelerate fatigue (So et al., 2017). Avoiding or forgoing these health guidelines has a cascade of health risks, facilitating both unprotected sex *and* ignoring social distancing, risking exposure to both STIs and COVID-19. Therefore, on one hand, COVID-19 may pose a significant health threat to individuals, thereby increasing condom use. On the other hand, the bombardment of health guidelines may inadvertently diminish condom use.

As such, the present study sought to uncover any changes in condom use during a COVID-19-related lockdown. To assess support for the competing predictions of the BIS theory versus message fatigue, exploratory analyses were conducted on changes in condom use before and during the outbreak of COVID-19. Gender was included in these exploratory analyses as a potential moderator, given evidence that women are more prone to behavioural responses to pathogens in sex-related domains than men (Al-Shawaf et al., 2018). It was also expected that perceived vulnerability to COVID-19 would be positively associated with any observed changes in condom use – that is, an increase in condom use would be associated with vulnerability to COVID-19, while a decrease would correlate with invulnerability to COVID-19.

## Method

### Participants

Participants were recruited from an Australian university psychology participation pool. In total, 269 participants completed the study, but 97 were removed after reporting no instances of sexual contact over the past 12 months. Due to the diversity of reasons to use condoms across sexual orientation groups (Sarkar, 2008), and

the limited number of responses from LGBT participants (3 homosexual-identifying men, 11 homosexual-identifying women, 1 bisexual-identifying man, and 8 bisexual-identifying women), data from LGBT participants were removed, leaving 149 heterosexual-identifying participants (99 female) for the final analyses. Age ranged from 17 to 34 years ( $M=20.05$ ;  $SD=2.58$ ). In terms of relationship status, 36.9% reported being single, 61.7% in a relationship, and 1.3% married. Of those in a relationship, 11.4% reported living with their partner.

All participants completed the survey in late May to early June, 2020, in New South Wales, Australia. Data collection took place following a couple of months of heavy media focus on COVID-19; at the time, few restrictions had been lifted – cafés, restaurants, and shops were re-opened, and up to 10 people were allowed in one premises at a time, but working from home and social distancing were still strongly encouraged.

## Materials

### Demographics

Participants indicated their age, gender, sexual orientation identity, and relationship status.

### Perceived vulnerability to COVID-19

A single-item capturing perceived threat from COVID-19 was adapted from the Perceived Vulnerability to Disease Scale (Duncan et al., 2009) to be COVID-19-specific (i.e., ‘‘I am more likely than the people around me to catch COVID-19’’). This item was rated on a 7-point Likert scale from 1 (*Disagree strongly*) to 7 (*Agree strongly*).

### Condom use

A single item assessing the use of condoms ‘before COVID-19’ and ‘during COVID-19’ was included. In both instances, the item read ‘‘How frequently do you engage in the following behaviours: Using a condom during penetrative sex’’, rated on a 7-point Likert scale from 1 (*Never*) to 7 (*Very frequently/Almost always*).

### Sexual frequency

Two items were used to ask about the frequency of penetrative intercourse, both ‘before COVID-19’ and ‘during COVID-19’. The items read ‘‘How often did you and your partner engage in the following behaviours: Sexual intercourse with vaginal penetration’’ and ‘‘Sexual intercourse with anal penetration’’. Both items were rated on a 7-point Likert scale, specifically 1 (*Not at all*), 2 (*Once or twice*), 3 (*Once a week*), 4 (*2–3 times a week*), 5 (*4–5 times a week*), 6 (*Once a day*), 7 (*More than once a day*).

## Procedure

Participants signed up to the study online and were given the link to the online survey. Condom use questions were part of a larger survey assessing changes in sex, dating, and relationship behaviours during COVID-19-related lockdown conditions. The condom use question was asked twice on the same page. Participants were informed that the first instance of the question was about their condom use before

COVID-19, and the second was during COVID-19 (i.e., at the time of completing the survey). They were asked to respond identically across both questions if the behaviour had not changed. The survey took approximately 30 minutes to complete. Participants were awarded course credit upon completion.

## Analysis strategy

An analysis of covariance (ANCOVA) was used to test the main hypotheses relating to potential changes in condom use after the onset of COVID-19. The assumptions of the ANCOVA were met, and there were no outliers. A Pearson correlation was used to test the hypothesis of pathogen threat being related to changes in condom use.

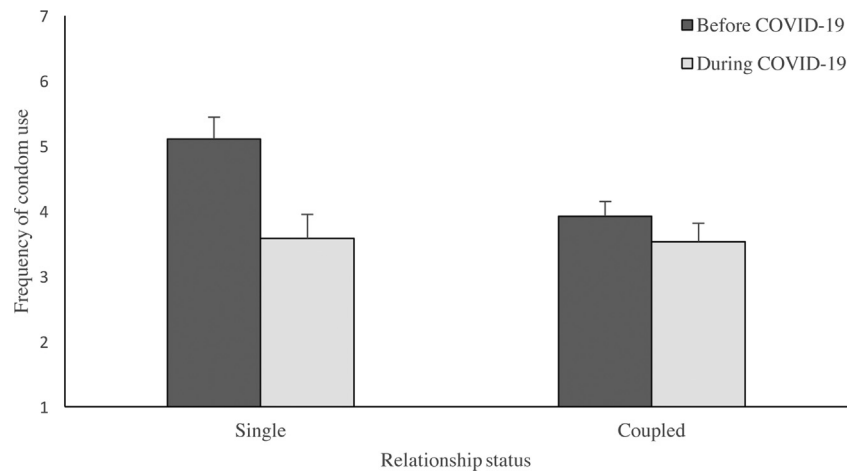
## Results

### Changes in condom use

A mixed method 2 (relationship status – between participants: single vs. coupled)  $\times$  2 (condom use – within-participants: before COVID-19 vs. during COVID-19) ANCOVA was used to assess changes in condom use. To account for frequency of penetrative intercourse, vaginal and anal intercourse items were added together to create a composite variable for penetrative intercourse both ‘before COVID-19’ and ‘during COVID-19.’ A difference score of sexual frequency was then calculated from these new composite variables, such that negative scores indicated an increase in sexual frequency and positive scores indicated a decrease. Participants reported a general decline in the frequency of penetrative sex,  $t(147)=5.405$ ,  $P<.001$ . This change in sexual frequency score was included as a covariate.

This analysis revealed a general decline in condom use,  $F(1, 143)=30.838$ ,  $P<.001$ ,  $\eta_p^2=.177$ . Prior to COVID-19, single ( $M=5.11$ ;  $SD=2.24$ ) and coupled ( $M=3.92$ ;  $SD=2.56$ ) participants already displayed middling condom use. During COVID-19, both single ( $M=3.58$ ;  $SD=2.75$ ) and coupled ( $M=3.53$ ;  $SD=2.69$ ) individuals reported reduced condom use. Between-subjects analyses revealed no significant differences between single and coupled participants’ condom use,  $F(1, 143)=2.252$ ,  $P=.136$ ,  $\eta_p^2=.016$ , nor did men and women differ on their reported condom use,  $F(1, 143)=0.260$ ,  $P=.611$ ,  $\eta_p^2=.002$ . Gender did not significantly moderate changes in condom use,  $F(1, 143)=1.435$ ,  $P=.309$ ,  $\eta_p^2=.010$ .

There was a significant interaction between relationship status and changes in condom use,  $F(1, 143)=15.321$ ,  $P<.001$ ,  $\eta_p^2=.097$ . As Fig. 1 shows, simple effect analyses used to probe the interaction found that, although both single and coupled participants reported a decline in condom use, the strength of this effect was greater among single people,  $F(1, 53)=42.836$ ,  $P<.001$ ,  $\eta_p^2=.231$ , than coupled people,  $F(1, 90)=5.919$ ,  $P=.016$ ,  $\eta_p^2=.040$ .



**Figure 1** Mean condom use 'before COVID-19', and 'during COVID-19', for both single and coupled participants.

**Table 1** Correlations and descriptive of key variables.

	M (SD)	1.	2.	3.	4.	5.
1. Perceived invulnerability to COVID-19 <sup>a</sup>	2.48 (1.38)	—				
2. Condom use before COVID-19 <sup>b</sup>	4.38 (2.50)	−0.16*	—			
3. Condom use during COVID-19 <sup>b</sup>	3.55 (2.68)	−0.12	0.76**	—		
4. Penetrative intercourse before COVID-19 <sup>c</sup>	4.77 (1.94)	−0.09	−0.26**	−0.07	—	
5. Penetrative intercourse during COVID-19 <sup>c</sup>	4.09 (2.19)	−0.09	−0.30**	−0.06	0.72**	—

\*  $P < .05$ .

\*\*  $P < .001$ .

<sup>a</sup> 1: disagree strongly; 7: agree strongly.

<sup>b</sup> 1: never; 7: very frequently/almost always.

<sup>c</sup> Means are representative of the composite score with vaginal and anal intercourse items added together, with possible scores ranging from 2 to 14. Original item anchors were 1: not at all; 2: once or twice; 3: once a week; 4: 2–3 times a week; 5: 4–5 times a week; 6: once a day; 7: more than once a day.

## Perceived vulnerability to COVID-19 and condom use

For the correlational analysis, a difference score was calculated between condom use before and during COVID-19 for each participant, such that negative scores indicated an increase in condom use and positive scores indicated a decrease. Intercorrelations between variables and descriptive statistics are reported in Table 1. Contrary to expectations, changes in condom use were not significantly related to perceived vulnerability to COVID-19 ( $r = -.05$ ,  $P = .561$ ).

## Discussion

The main objective of the present study was to investigate potential changes in heterosexual people's condom use during the COVID-19 pandemic. Analyses revealed that condom use declined after the outbreak of COVID-19 when controlling for changes in frequency of penetrative sex, and that this decline was more pronounced among single people than coupled people. Men and women did not differ in their use of condoms – logically, this is to be expected when heterosexual men and women are each other's sexual and romantic

partners. A secondary aim was to examine whether such changes in condom use were related to perceived threat from COVID-19. Unexpectedly, there was no indication that the decline in condom use was associated with perceived vulnerability to contracting COVID-19.

The burden of additional health guidelines was speculated to impede condom use, and the observed results are in line with this notion. Fatigue had been negatively associated with safe sex campaigns previously (Frew et al., 2013; So et al., 2017). Emerging research has identified similar quarantine-related fatigue that diminishes the stringency of following distancing guidelines (Zhao et al., 2020). Young adults, who were already using condoms irregularly, may have been overloaded by new sources of health-messaging fatigue and subsequently reduced their condom use even further. Indeed, quarantine-related fatigue is a distinct concern as the disregard of health advice that precedes fatigue would be necessary for any sexual contact for much of the present sample (who were largely either single or in a relationship with a non-cohabiting partner). Such sexual contact necessitates tolerance of risk, and this tolerance may then extend to unprotected sex. When combining this line of reasoning with previous knowledge of inconsistent condom use in young adults (Milhausen et al., 2013), and condom use messaging being at risk of producing counterproduc-

tive effects (Frew et al., 2013), it offers an explanation for the current findings of condom use reduction during the pandemic. Further inquiries into quarantine-related fatigue and its associated risks may strengthen this explanation. It may also potentially reveal other at-risk behaviours that have worsened – or emerged – during lockdown conditions.

A second analysis tested the prediction that an increase in condom use is positively associated with perceived vulnerability to COVID-19; this was not supported. Instead, changes in condom use had no significant relationship with perceived vulnerability to COVID-19. Young adults tend to underestimate threats from disease generally (Lapsley and Hill, 2010), and STIs specifically, even with unfamiliar sexual partners (Pollack et al., 2013; Wolfers et al., 2011). Combined with young adults reporting more concern about unwanted pregnancy than STIs (O'Sullivan et al., 2010), it appears that the threat of COVID-19 is not much of a factor in the decision to use a condom for young adults. Indeed, this may widely apply to young people's behaviour during the pandemic. The WHO (2020) has attributed new clusters of the virus in many countries to young adults who are undisturbed by the threat of COVID-19 and continue to behave as normal. As such, COVID-19 may not pose an adequate threat to young people, due, in part, to their general sense of invulnerability or the nature of the virus itself. Future research involving vulnerable populations, for whom infections are more of a threat, may uncover different associations.

Analyses also revealed that single people, compared to those in a relationship, reported a sharper decline in condom use, even when controlling for a decline in sexual frequency. Such a result is concerning when single people are likely having sexual contact with less well-known partners and might subsequently continue the trend of increasing STI rates (WHO, 2019), even during the pandemic. Indeed, much of the invulnerability literature notes that optimistic bias in young adults facilitates risk-taking behaviours (Lapsley and Hill, 2010; Ravert et al., 2009). Thus, for single people in this sample, a general sense of invulnerability is an important facilitator, as they are risking contact with an unfamiliar partner who may not be aware of (or accurately disclose) their COVID-19 status. If they can tolerate this higher degree of risk, it is then plausible they would be tolerant of the increased risk of STIs that arise from unprotected sex. Coupled people, in comparison, can safely discuss condom and other contraception use with their partner, with far less involved risk. Those in a relationship may have weighed the consequences with their partner and made an informed decision to use condoms less – indeed, this is a common trajectory for young adults in newer relationships (El Bcheraoui et al., 2013). In that case, social isolation guidelines may have facilitated an acceleration of that process as the individuals in the relationship may have been driven closer by reduced social contacts with other individuals in line with medical messaging. Future studies are needed to probe those potential explanations.

### Limitations & implications

One limitation of the present study was its use of self-reported recall of condom use prior to the outbreak of

COVID-19; however, there is evidence that one can accurately recall their condom use for up to three months (as in the current situation; Noar et al., 2006). Despite this, pre- and post-COVID-19 data collection of condom use is the most reliable measure of any changes; research that had collected such data prior to the outbreak would be highly valuable. Second, while informative as a starting point, the present study used a single-item measure of perceived vulnerability to COVID-19. Future research should focus on developing a psychometrically-valid measure of perceived vulnerability to COVID-19.

The results of the present study also indicate a potential dual spread of infections – COVID-19 and STIs. STIs were already proliferating before the outbreak, and the present findings of diminished condom use, despite continued sexual contact, imply that their risk of spread has not changed during the pandemic (Lindberg et al., 2020). However, STI testing clinics in Australia have reported a substantial decline in STI tests, attributed to COVID-19-related lockdown (Tregenza, 2020). Indeed, as STIs were previously increasing annually and condom use may have declined among young adults during the lockdown, it is possible that there may be an undetected spike in STI cases due to reduced testing – particularly when many people with STIs report no symptoms (Farley et al., 2003). These speculations may all be addressed with epidemiological data collected in the near future.

Sexual and romantic relationships, already tumultuous for young adults in non-pandemic conditions, have become even more complex to navigate during a pandemic that emphasises social distancing. Young adults are still forming connections with one another during the pandemic, but their sexual health may have been silently and negatively impacted. Results of the present study suggest that sexual health awareness may have taken a hit during the pandemic. Neglecting condom use among young adults has potential implications that extend beyond COVID-19, ranging from long-term health effects to unplanned pregnancies. Novel and engaging safe sex campaigns, which take message fatigue into account, are therefore clearly needed during the pandemic to protect young adults' sexual health.

### Disclosure of interest

The authors declare that they have no competing interest.

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