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COVID-19, PUBLIC HEALTH STRATEGIES AND POST PANDEMIC AAS/ANDROGEN USE: A COMMENTARY/SHORT COMMUNICATION

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Summary: In this commentary/short communication we summarize many recent developments related to public health strategies for COVID-19. At this time, there are a wide range of emerging themes post various lockdown measures that have been reported, such as increased exercise, increased drug use, and various associated declines in mental health and other deleterious effects on eating behaviour patterns. Aligned to this, AAS/Androgen use has increased during and post-lockdowns and we posit, in the context of the aforementioned additional risks that have been reported, that future public health strategies need to demonstrate awareness of increased risk that they (AAS/Androgens) present at this time.

Key words: Mental Health; Body Image; Image and Performance Enhancing Drugs*;* Disordered Eating; Anabolic-Androgenic Steroids (AAS) /Androgens

Introduction

There has been significant success, in terms of vaccine development and the instigation of various other public health measures, at mitigating the scale of transmission, cases, deaths, and areas affected by coronavirus disease 2019 (COVID-19). However, despite a concerted effort from many countries to instigate vaccination programmes and subsequent lowered levels of infection fatality rate (IFR), COVID-19 continues to present a significant risk. In higher-income countries, this is now largely because of the potential surfacing of new variants that present challenges in terms of avoiding existing immunization responses (much developed through vaccination programmes) and thus making it more transmissible. At time of writing, Omicron (first identified as the variant B.1.1.529 and designated a variant of concern by the WHO) is one such variant that led to fast responding changes of government measures. In

England, for instance, travel bans, increased PCR testing, changes in isolation rules, and the reintroduction – in line with the other home nations of the UK that had not relaxed rules previously – of facemasks in shops and public transport were quickly reimplemented. And more substantially, in the UK as a whole, the UK COVID-19 vaccination programme was rapidly accelerated to include booster doses for all adults, and second doses for 12 – 15 year olds (JCVI 2021).

While we recognise the clear and present need to focus on addressing the requirement to ensure an equitable global roll-out of the vaccine initiative continues to be implemented in order to reduce virus circulation, we advocate a prospective focus on groups who are likely to continue to be at higher risk of severe outcomes subsequent to COVID-19 infection. As the virus transitions from pandemic to endemic (Antia & Halloran 2021), public health efforts will need to allocate resources to protect specific groups known to be at added risk. The NHS identifies certain groups likely to be at added medical or societal risk, including the elderly, those with chronic diseases affecting respiratory or cardio-vascular function, individuals with obesity or diabetes, those with mental health issues or intellectual disabilities, and people with compromised immune response (NHS 2021).

We believe that this latter group, including those with HIV/AIDS, Down's Syndrome, splenectomy, or on medication that reduces immune function, should also include those engaged in anabolic-androgenic steroids (AAS) /Androgen use. In this context then, we revisit our prior work detailing one facet of public health strategy, that of minimising AAS/Androgen use for health reasons, and in particular our assertions that AAS use can exacerbate health issues related to COVID-19 infection. Moreover, we extend our argument to include more recent evidence detailing other potential impacts on AAS/Androgen use that is emerging post lockdowns.

Briefly, our previous work on AAS/Androgen use focused centred on the fact that there are numerous, and well documented, health implications associated with their use (Crisp & Sims 2020a), and that there are a range of emerging problems related to how AAS/Androgen use may compromise immune responses in otherwise healthy individuals, a particular worry given the nature of COVID-19 (Crisp & Sims 2020b/2021). Indeed, many of these problems are linked to the manner in which COVID-19 can trigger critical disease responses (Maccio et al. 2021; UK Health Security Agency 2021), oftentimes based on hyperinflammatory responses. Overall, because of the potential for increased morbidity for AAS/Androgen users from COVID-19 infection, we posited that AAS/Androgen use should be mitigated for and understood within public health discourse and mandates (Crisp & Sims 2020a/2020b), and

further outlined how the empirical evidence was starting to clearly demonstrate a number of issues related to AAS/Androgen use and COVID-19 (Crisp & Sims 2020b/2021).

Here then, whilst we will revisit these papers in principle, our objective for this commentary/short communication is to refocus our attention on how any increases in AAS/Androgen and image and performance enhancing drugs (IPEDs) use during lockdowns may have occurred, and then ask whether any increased exercise within and post lockdowns might lead to increases in body dysmorphia, drug taking, and more AAS/Androgen use, and ultimately question what impact on health policy this might have. In other words, we seek to update, and extend, our previous work by investigating the emerging themes from lockdown (increased exercise, increased drug use, decreased mental health) that are becoming evident from the popular and fast-response literature.

We start by revisiting some of the more salient points with our 2021 paper (intended to act as a review of recently published articles on androgen supplementation and COVID-19 disease severity), *Public health concerns and increased risk of severe COVID-19 disease through androgen use* (Crisp & Sims 2021). In the context of a variety of public health campaigns and information relative to AAS/Androgen use, one of the more pressing concerns within lockdown was the increased usage of AAS/Androgens and IPEDs in this timeperiod. A key recent influence here, for example, is the work of Dores et al. (2021), who in an international online questionnaire using 3,161 adult participants, found that during COVID-19 lockdowns anxiety issues underpinned by physical appearance significantly increased the probability of using IPEDs. Similar patterns of depressive thoughts and impacts on training frequency and AAS/Androgen consumption during lockdowns are also evident among male strength athletes who recreationally use AAS/Androgens. This was evident in a very recent study by Zoob et al. (2021), again one we highlighted in our 2021 paper, that also demonstrated how lockdown and the lack of AAS/Androgens had some "consequential effects on mental health" (p.1).

While evidence remains limited, it is reasonable to assume that coping behaviours such as problematic social media use, eating disorders, and recreational drug use, given the restrictions and social distancing within lockdowns, may have changed due to less recreational/social opportunities, but also as coping motives for an unprecedented period of social isolation and associated decline in mental health (Robb et al. 2020; Pieh et al. 2021). Indeed, a study of 6,070 participants during May to October 2020, showed that there were changing patterns of substance use, and certainly increased use in terms of coping mechanisms (Benschop et al. 2021). In simple terms then, what is clear is that drug use habits did seem to

be affected during lockdown (Ornell et al. 2020) and have changed somewhat after and that, whilst not specific to recreational AAS/Androgen use, it is highly likely that more people were doing 'drugs' during the pandemic or just after, and crucially, as Benschop et al. (2021:1) clarify, with the subsequent possibility of "prolonged changes in substance use with lingering "post-corona" consequences".

In a similar fashion, considering some of the motivations behind recreational IPEDs and AAS/Androgen users, it is well worth noting that, in a study of 319 health club users, eating disorder symptomology were significantly higher post lockdown (Trott et al. 2021). Moreover, Shibata et al. (2021) found that of those already active more people did exercise during the pandemic lockdowns, and that for this group more of them were excessively exercising, and surmised - given the higher rates of IPEDs use in this group – that monitoring of this may be necessary. Indeed, in a preprint systematic review on the impact of COVID-19 and restrictions related to the pandemic (e.g., social distancing and lockdown) on body image, disordered eating, and eating disorder outcomes, Schneider et al. (2021) found that despite variations between studies, the consensus of findings were that COVID-19 pandemic and lockdown negatively impacted body image and eating disorders symptomology.

Whilst we have previously mentioned the lack of articles centred on peoples' changing AAS/Androgen and IPEDs use during and post lockdowns, this is not necessarily true in terms of how attitudes towards taking them have changed. Indeed, in a study of 127 gym users, Bejtkovský and Snopek (2021) found that there was piqued interest in researching and taking AAS/Androgens during the pandemic and post lockdown. Admittedly a more nuanced, yet distinct, difference between the separation of actual use and the feeling and perceptions that may motivate people to take AAS/Androgens, nevertheless, in terms of public health initiatives and discourse, this is concerning.

Moreover, once this greater interest in taking AAS/Androgens is taken into consideration, evidence alluding to the possibility of an increase in AAS/Androgen use post lockdown due to users, old and potentially new, of exiting lockdowns and having their training 'reinvigorated' by training with others, alongside the opening up of the informal, illegal face to face AAS/Androgen drugs trade (Gibbs 2021), needs to be taken into account. Indeed, given this we believe it is incumbent upon policy makers to quickly identify these emerging themes from lockdown that demonstrate how increased exercise, drug use (recreational and AAS/Androgens), and increased pressure on mental health through rising body dysmorphia and the like. It is only in the way that quick responses can be made, particularly in light of what we have previously outlined as exacerbated health concerns related to COVID-19 for otherwise

healthy AAS/Androgen users (which, as this commentary/short communication has outlined, has increased during and post-lockdown and shows potential for continuing risk), that public health initiatives can be fully informed.

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