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The Effect of Anxiety on Covid-19 Vaccine Hesitancy in the General Population: A Systematic Review

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Background: In December, reports of a novel Coronavirus-type (SARS-CoV-2) infectious agent was identified as the aetiological cause of widespread cases of pneumonia in Wuhan, China [1]. Its subsequent rapid spread to other regions in the world has led to the global pandemic known as Covid-19. With the emergence of viable vaccines to aid in controlling the spread of the Covid-19 virus, it has become imperative to encourage mass vaccination to attain herd immunity. However, there are many predictors that can lead to vaccine hesitancy; although these factors have been identified, the association between mental health, specifically anxiety, and vaccine hesitancy has not been clearly established. Even before the emergence of the Covid-19 pandemic, the World Health Organization named vaccine hesitancy as one of the top threats to global health [2]. The SAGE definition of vaccine hesitancy is as follows: a delay in acceptance or refusal of a vaccine despite its availability [3]. This uncertainty can significantly hinder efforts to attain herd immunity, thus it becomes necessary to identify the relevant factors that can influence vaccine uptake so that the concerns of the public can be met and diseases like Covid-19 can be controlled and, hopefully, eradicated.

Objective: This review aims to systematically evaluate qualitative evidence from studies examining the link between anxiety and vaccine willingness amongst the general population, as it pertains to the Covid-19 vaccine.

Methods: Literature searching was performed on the MedLine, PsychInfo, PsychArticles, and Pubmed databases from September to November 2021. Studies were selected if they met the inclusion criteria of assessing anxiety and vaccine willingness amongst the general population. Studies were excluded if the population were in the healthcare sector, or the article was not in English. Screening, data extraction, and quality assessment were conducted according to PRISMA guidelines.

Results: A total of 21 studies with a cumulative 97, 539 participants were included in this review. Of these, 10 studies with a total of 50 281 participants reported a significant positive association between anxiety and willingness to vaccinate. 5 of the 21 studies with a total of 30 638 participants showed a negative association between psychological distress and willingness to vaccinate; the remaining studies indicated no significant link between anxiety and vaccine hesitancy.

Conclusions: The data suggests that there is a reasonable link between anxiety and vaccine hesitancy; specifically, anxiety about Covid-19 has been shown to increase willingness to vaccinate whereas psychological distress shows the opposite effect. A greater understanding of the effect of psychological factors on vaccine uptake is needed in order to understand the rationale behind vaccine hesitancy and encourage the general population to vaccinate against Covid-19. The findings illustrated here continue to emphasize the importance of differentiating between different mental states so as to fully understand the complex patterns of thoughts that can influence an individual's health decisions, particularly when it comes to vaccination. Future studies that focus on various psychiatric conditions and their association with vaccine hesitancy will allow for stronger conclusions to be made.

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Social adolescent stress causes increased general anxiety in male rats and reduced social anxiety in both male and female rats

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Background: Due to the COVID-19 pandemic, the prevalence of anxiety and depression disorders increased by approximately 25-30% [1]. Reasons behind this are likely associated with the increased average daily level of stress, especially during social isolation. Since one of the main adolescence hallmarks is formation of meaningful social and love relationships, it represents a particularly vulnerable period for social stress [2]. The aim of this study was to evaluate whether isolation stress during the adolescence causes general and social anxiety in rats.

Methods: Sprague-Dawley rats of both sexes were used for the adolescence social isolation experiment. From the fourth postnatal week, 24 rats were single caged and therefore subjected to the social isolation stress, while 24 non-stressed control rats remained in groups of four per cage and were handled three times a week. All rats were handled daily for one week and weighted before behavioural tests. From eleventh week, rats were subjected to the open field, elevated plus maze, and three-chamber sociability tests, with two-day gap between different tests. In open field test, time spent in the centre was measured, while in the elevated plus maze test, the time spent in open arms, normalized to time spent in all arms was measured; reduction in values of these parameters was interpreted as general anxiety. In the social preference test, social preference ratio was calculated for each animal, according to the previously published protocol [3], and reduction in this ratio was interpreted as social anxiety. 2-way ANOVA, with sex and isolation stress as factors, was used for parametric data analysis, and Fischer's post hoc test was used to detect statistically significant between group differences. Kruskal-Wallis test was used for non-parametric data analysis, and Mann-Whitney post hoc test with multiple comparison correction was used to detect statistically significant between group differences.

Results: Compared to control rats, time spent in the centre of open field (-44% [95%CI: -76%, -12%] p=0,008) and total distance travelled (-17% [95%CI: -32%, -2%], p=0.028) were decreased in isolated males, but not in females (p>0.1). In elevated plus maze test, time spent in the open arms was significantly decreased in male isolated rats (isolated: [median: 0.76, IQR: 0.00 – 2.06] vs control: [median: 4.96, IQR: 2.04 – 17.75], p=0.034); however, this change did not remain significant after multiple comparisons corrections. In sociability tests, both male and female isolated rats exhibited increase in social preference ratio (+32% [95%CI: 12%, 51%], p=0.002) and preference for novel animal over familiar one (+48% [95%CI: 10%, 86%], p=0.015), compared to control rats. Body weight, measured after six weeks of social isolation at week ten, was increased in isolated male compared to control rats (+19% [95%CI: 14%, 24%], p<0.001), while there was no such difference observed in female rats.

Conclusion: Social isolation caused increase in general anxiety in male, but not female rats. In addition, both male and female rats exhibited robust increase in preference for social interaction and novel social stimulus, which is the result opposite from the expected social anxiety as initially hypothesized.

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