

# Association between Problematic Internet Use and Mental Health among Chinese Population under Public Health Events

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## ABSTRACT

This study firstly analyzed the relationship between problematic Internet use (PIU) and mental health, revealing negative correlations between PIU and low self-esteem, anxiety, depression, and suicidal tendencies.

Secondly, explored the relationship between online gaming and PIU, highlighting early studies found no direct link between gaming duration and addiction, recent research suggests excessive gaming can lead to PIU, with heightened online engagement and risks observed during the pandemic. Next, analyzed the relationship between online gaming and mental health, highlighting its dual role: fulfilling social needs, alleviating stress, and enhancing psychological well-being, while excessive use may trigger mental health issues. Finally, described online gaming as a moderator between PIU and mental health, demonstrating that prolonged gaming exacerbates internet gaming disorder. It further highlights gender disparities, with males more prone to depressive risks due to higher smartphone addiction tendencies and excessive gaming.

**Keywords:** problematic Internet use, mental health, online gaming, Chinese population, public health events

## I. INTRODUCTION

Problematic Internet use (PIU) has become a big concern in the last decade (Wang et al., 2019) and aroused public health concern, as it was related to mental health problems including depression and anxiety (Elhai et al., 2019), due to its wide diffusion and behavioral, interpersonal and social consequences (Bersani, 2021). Online gaming is the riskiest online activity in terms of the development of a tendency to PIU and related problems (Blinka et al., 2015). Online gaming refers to the gaming behavior of being able to participate throughout the day, easily ignoring real-world entertainment, communication, leisure,

and emotional experience (Amin et al., 2022), and playing the game over the network using a personal computer, a game console, a PDA, or a smartphone (Ferretti et al., 2008). The digital world is the carrier of online games, which is the world of digital data and information transfer (Ting et al., 2021). There are many diverse digital environments in the digital world that can support interaction with non-digital entities from both the social world and the physical environment. These non-digital entities can be real things such as objects, images, sounds, texts, signals, etc., while the social world and physical environment belong to the non-digital world.

PIU differs from non-PIU in several ways (e.g. excessive time spent online, negative consequences, loss of control, escapism, preoccupation, withdrawal symptoms), which is an umbrella construct that refers to a wide range of online behaviors (shopping, pornography viewing, social networking, cyberbullying, “cyberchondria”) that can become uncontrolled and engender negative consequences (social, occupational, familial, educational), and associated with functional impairment in a subgroup of vulnerable users (Nogueira-López et al., 2023). This stands in contrast to normal and healthy Internet use. People seemed to be more participated in technology use (e.g. smartphone use, Internet use, online gaming), especially under public health events. As a study conducted in Bangladesh indicated, almost 50% of the participants reported PIU during the epidemic (Jahan et al., 2021). Problematic Internet use during public health events is an emerging research topic (Jahan et al., 2021).

## II. LITERATURE REVIEW

PIU and mental health

Previous studies showed an association between PIU and mental health including low self-esteem and anxiety (Elhai et al., 2019; Elhai et al.,

2018; Kim and Koh, 2018; Mamun et al., 2019a; Ranet al., 2022; Zhou et al., 2022), suicide (Peng et al., 2021), depressive disorder (Mamun et al., 2019a) and psychological distress (Lian et al., 2021). Problematic social media users reported lower mental well-being (e.g. life satisfaction), and lower social well-being (e.g. family and friend support) than nonproblematic users, as indicated in a previous study (Boer et al., 2020). Moreover, PIU often occurs when people try to self-medicate their anxiety, stress, or depression through excessive online activity (Mamun et al., 2019b), especially during public health events. People's subjective well-being declined during the COVID-19, and there were individual differences in this change (Zacher and Rudolph, 2021). For Bangladeshi students, depression, smartphone addiction, and anxiety were predicting factors for PIU (Jahan et al., 2021). For secondary school students in Nigeria, parent-child attachment was a potential factor of PIU (Thomaset al., 2022).

#### Online gaming and PIU

Online gaming is an important part of Internet use for many individuals and there was a substantial increase, especially during the COVID-19, which may cause Internet gaming disorder (Zha et al., 2022). A main finding in a previous study showed that high online gaming usage times were not correlated with addiction behaviors (Ng and Wiemer-Hastings, 2005). However, as indicated in recent research, excessive and incorrect network gaming may lead to PIU (Kim and Lee, 2021), as game players show classic signs of addiction such as using gaming as a means of psychological escape (Young, 2009). According to recent findings in Bangladesh, individuals have seen an increase in the frequency of online use, an increase in risk, and a large proportion of PIU during the COVID-19 pandemic (Jahan et al., 2021).

#### Online gaming and mental health

As the epidemic spread and countries worldwide enacted stay-at-home orders and quarantine measures related to the coronavirus, participation in online gaming increased (King et al., 2020). Especially as the pandemic continues and online gaming continues to be one of the main forms of entertainment for people, its impact on mental health during COVID-19 attracts more attention (Formosa et al., 2022). Researchers have found that videogame play can help people meet social needs, relieve psychological stress, and gain psychological well-being (Formosa et al., 2022; López-Cabarcos et al., 2020). However, a study conducted in India showed that excessive online gaming may cause individuals mental health issues during the

COVID-19 epidemic (Amin et al., 2022). Therefore, the influence of online gaming on mental health during the pandemic needs to be further explored.

#### Online gaming as moderator

Both PIU and mental health are crucial for individuals' health, especially for online gamers (OG) during the COVID-19 epidemic (Amin et al., 2022). PIU reduces mental health and leads to depression and other psychological problems (Takahashiet al., 2022). Online gaming addiction has become a serious public health problem (Young, 2009). Boys were more problematic smartphone users than girls (Zhou et al., 2022). Individuals who are mobile phone addicted would spend more time and money on smartphone use (Chen et al., 2016). OG may spend more time on online game playing during the pandemic, which may cause Internet gaming disorder (Zha et al., 2022).

Previous studies indicated that online gaming and mental health had an interaction effect for excessive Internet use and OG with mental health issues was associated with more possibilities of longer Internet usage time (Chen et al., 2016; Kim and Lee, 2021; Mamun et al., 2019b), leading us to suppose that whether OG with lower mental health is more prone to PIU in the same situation. The pandemic is spreading around the world and online gaming engagement has grown considerably (Amin et al., 2022). The relations between mental health (social, emotional, and psychological well-being) and PIU in Chinese OG and non-OG especially during the COVID-19 pandemic need to be further explored.

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**Competing interests.** The authors declare none.

**Ethics statement.** The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation.

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