

RESEARCH SUMMARY

Enhancing Youth Mental Health: Decomposing the Factors Linking Gaming to Adolescent Depression and Anxiety

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Background

Excessive gaming has been widely linked to adolescent depression and anxiety, yet the relative contribution of underlying factors — including physical health, demographics, and socioeconomic conditions — to this relationship remains poorly understood. This study aimed to decompose and quantify each factor's specific contribution to gaming-related mental health disparities among Mongolian adolescents.

Methods

A cross-sectional study enrolled **4,789 students (grades 7–12)** across 13 schools in urban (Ulaanbaatar, Darkhan) and rural (Tuv, Dundgovi, Govisumber provinces) regions of Mongolia. Depression was measured using the **PHQ-9**, anxiety using the **GAD-7**, and gaming disorder using the **IGDS9-SF**, categorized into low (0–8), moderate (9–16), and high (17–32) risk groups. Concentration index (CI) and decomposition analysis were applied in STATA 15 to quantify the contribution of each factor group to the observed mental health inequalities.

Results

High-risk gamers had a mean depression score of **12.67** (SD=7.42) compared to **6.64** (SD=6.46) in the low-risk group ($p<0.001$), with anxiety scores rising correspondingly. The concentration indices confirmed that mental health burdens were disproportionately concentrated among high-gaming adolescents (CI=0.16 for anxiety; CI=0.15 for depression), demonstrating a significant non-linear relationship.

Decomposition analysis identified the **gaming score (IGDS9-SF)** as the dominant contributor (104.67% for anxiety; 101.30% for depression). **Demographic factors** — particularly sex — had a notable mitigating effect (–20.91% for anxiety; –19.93% for depression), with boys showing lower depression likelihood than girls at equivalent gaming levels. **Physical health conditions** contributed 5.57% to anxiety inequality and 6.88% to depression inequality, reflecting the role of sedentary behavior, poor sleep, and chronic illness. Health behaviors (smoking, exercise) accounted for 2.62% and 2.04%, while socioeconomic and family-related factors played a minimal role (<1.25%).

Conclusions

Gaming addiction exerts a disproportionate, non-linear mental health burden on adolescents. Physical health and demographic factors — particularly sex — play meaningful moderating roles. These findings underscore the need for **early, targeted interventions**. Gender-sensitive approaches are recommended: promoting healthy gaming balance for boys, and providing alternative stress-coping mechanisms and mental health resources for girls. Integrating mental health screening into physical health programs can help address the dual burden of gaming-related challenges.

Keywords: adolescent mental health · gaming addiction · decomposition analysis · depression · anxiety · physical health · gender differences · Mongolia