QUALITY ASSESSMENTS FOR TYPES OF STUDIES IN LAY LANGUAGE

17. Cross-sectional or prevalence study

What's this?

A 'cross-sectional study' or 'prevalence study' is simply a snapshot of a group or 'sample' of people (e.g., brain scans) or their experience (e.g., mood), or other types of non-human data measured at one point in time. This allows researchers to look at rates of things (e.g., unemployment rates in the UK) and/or relationships between different measures of interest to answer particular questions such as, "Does being unemployed relate to low mood?" However, because it is a snapshot in time, we CANNOT say that one thing (unemployment) causes another (low mood) or vice-versa.

Quality Guide:

✓ YES ✗ NO ? UNSURE **n/a** NOT APPLICABLE *delete as appropriate*

The below quality guide is based on the following established quality assessment checklist: **OSQE: "Development of a Methodological Quality Criteria List for Observational Studies: The Observational Study Quality Evaluation" by Drikker et al. (2021) is licensed under a CC-BY 4.0** **https://www.frontiersin.org/articles/10.3389/frma.2021.675071/full**	
1. Did the study try to answer a clear and focused question or issue?	✓
Comments: Study was cross-sectional and therefore couldn't fully answer the question relating to association of Internet Gaming Disorder (IGD) with aggression due to inability to determine causation but this was acknowledged.	
2.1 Did the authors publicly share a detailed plan or 'protocol' of how they would go about doing the study before they completed it?	✗
Comments: The paper does not report a published protocol or pre-registration, and no protocol link or registration number is provided. Therefore, there is no evidence in the paper that the study plan was made public before the research was carried out.	
2.2 If they did, did they stick closely to the plan in the final study publication?	**N/A**
Comments:	
3. Were the group of people included in this study (or other types of non-human sampled data) selected carefully and appropriately?	✗
Comments:	

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There are important concerns about how representative the sample was. Participants were recruited through social media rather than using random or population-based sampling. Also, 76% of participants were female, 92.2% were aged 16–18, and 85.5% attended government schools. This means the sample does not closely represent all Saudi adolescents aged 10–18.

4. Did the authors describe the group of people included in this study (or other types of non-human sampled data) well enough? ✓

Comments:
Study group described well (including some limitations) but did not discuss selection bias fully where related to the initial selection using social media.

5. Was the group of people (or other types of non-human sampled data) included in this study large enough? ✓

Comments:
The researchers calculated that at least 264 adolescents were required, based on an expected IGD prevalence of 22%, 95% confidence and a ±5% margin of error. The final sample contained 5,016 participants, so the study was much larger than required and had good statistical power.

6. Did the authors describe people in study (or other types of non-human sampled data) and the setting well enough to easily repeat the study in future, if necessary? ✓

Comments:

7. Were the calculations used to 'crunch the data' well described by the authors and appropriate? ?

Comments:
Most of the analyses were clearly described. The authors used descriptive statistics, chi-square tests, Mann-Whitney tests and regression models, and checked issues such as data distribution and multicollinearity. However, there are concerns about the use and interpretation of Poisson regression for IGD and aggression questionnaire scores, and variables were selected using backward stepwise methods. Some results are described as changes in "risk" even though the model appears to predict the IGD score rather than simply whether a person had IGD. Therefore, the analysis is reasonably sophisticated but not completely convincing.

8.1 Were the measures used (e.g., to look at rates of depression, or find people with depression to include in the study) actually measuring what they claim to measure? ?

Comments:
The questionnaires used in the study are widely recognised for assessing IGD and aggression but there are limitations in terms of self-

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reporting and cultural contexts. Additionally, they are not specifically designed to capture the association between IGD and aggression.

8.2 And did they measure the thing of interest well enough over time **N/A**

Comments:
This was a cross-sectional study, so participants were measured at only one point in time. The study was not designed to examine how IGD or aggression changed over time. This also means it cannot establish whether IGD came before aggression or aggression came before IGD.

9. Of all the people invited to take part in the study, did a large enough number participate? ?

Comments:
The final sample was very large, with 5,016 participants, and the authors report a 96.8% response rate. However, this response rate is difficult to interpret because the researchers did not know how many parents saw the survey and simply ignored or skipped it. They acknowledge that they had no way of measuring the number of parents who did not respond. Therefore, the number taking part was excellent, but the true participation rate is uncertain.

10. Did the results match-up with the planned statistical analyses at the start of the study? ?

Comments:
The results generally correspond with the analyses described in the Methods section. However, because there was no publicly available protocol or pre-registration, we cannot know whether these analyses were planned before the researchers saw the data or whether some decisions were made afterwards.

11. Did conclusions drawn from the study or 'final thoughts' match-up with the results, and were comments made justified? ?

Comments:
Largely results aligned but it is unclear whether the cultural aspects of Saudi Arabia - highlighted as a reason for the study – brought to bear results substantially different from existing international studies.

12. Were the limitations of the study openly discussed? ?

Comments:
Some limitations covered, including the limits of using a cross-sectional design but biases in data collection not fully addressed, e.g. greater inclusion of non-gamers to determine whether aggression is still prevalent without gaming. Also, more socio-economic information on participants would be useful to examine other potentially confounding factors. Incorporating clinical assessments, and information on types of games would strengthen results.

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13. Was there any conflict of interest with the study and the study authors?	X
Comments: None disclosed but implicit confirmation bias by the authors may exist.	
14. Were there any other issues or problems with the study in terms of bias we should know about? (please state below)	✓
Comments: There are several possible sources of bias. Recruitment through social media could create selection bias, because adolescents and families who use these platforms or are interested in gaming may be more likely to participate. The sample was heavily weighted towards older adolescents and females. All measures were self-reported, which may introduce recall or socially desirable responding. Mental-health problems were excluded mainly through parental report rather than clinical assessment, even though mental-health difficulties could be related to both gaming and aggression. There is also a risk of measurement bias, because scoring above the IGDS9-SF cut-off is not the same as receiving a clinical diagnosis of IGD. Finally, the statistical modelling and stepwise variable selection introduce some uncertainty, and the very large sample means even very small differences can become statistically significant without necessarily being important in everyday life.	

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