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Need for systematic screening for IGD in adolescent psychiatric inpatients.

Nécessité d'un dépistage systématique de l'addiction aux jeux vidéo chez les adolescents hospitalisés en psychiatrie.

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Abstract

Psychiatric comorbidities are frequent in adolescents with internet gaming disorder (IGD). In contrast, the proportion of IGD among adolescents hospitalized for a psychiatric disorder has not been documented yet. In addition, parental ratings of IGD could be useful for diagnosis, but very few data exist on this issue. The objectives of this study were to: (1) assess the prevalence of IGD among adolescent psychiatric inpatients, using the Ten-Item Internet Gaming Disorder Test (IGDT-10), and (2) assess the parental version developed for this study (IGDT-10-P). A total of 102 patients, aged from 12 to 17 years old, were included from four psychiatric units of the French region Auvergne-Rhône-Alpes, during a 6-month inclusion period. Adolescents completed the IGDT-10 while one of their parents completed the IGDT-10-P. The inclusion rate among the eligible population was 57.95%. The prevalence of IGD in the sample, based on the IGDT-10 and IGDT-10-P, was 6.00% and 12.79%, respectively. Psychometric features of the IGDT-10-P indicated excellent internal consistency, a good model fit to the one factor model in confirmatory factor analysis, a strong correlation with gaming time, and a moderate correlation with the IGDT-10. Our results support the need for a systematic screening of IGD among adolescents hospitalized for a psychiatric disorder. Future studies should aim to confirm and explain the prevalence gap between self- and parent-reported criteria.

Key words: internet gaming disorder; prevalence; adolescent; parent; psychiatric comorbidities.

Résumé

En 2013, le DSM-5 intègre l'addiction aux jeux vidéo sous le terme « internet gaming disorder » (IGD) dans sa section dédiée aux pathologies nécessitant des études supplémentaires avant une éventuelle adoption. Le DSM-5 définit l'IGD comme « l'utilisation persistante et répétée d'internet pour pratiquer des jeux, souvent avec d'autres joueurs, conduisant à une altération du fonctionnement ou une détresse cliniquement significative », soulignant l'importance jouée par internet comme facilitateur de ce processus addictif. Cela a mené à une flambée de la recherche dans ce domaine et à l'introduction en 2018 du « trouble du jeu vidéo » dans la CIM-11, avec suppression du terme « internet » qui prêtait à confusion. Les comorbidités psychiatriques sont fréquentes chez les adolescents souffrant d'IGD. Inversement, la proportion de l'IGD dans les unités d'hospitalisation de pédopsychiatrie de l'adolescent n'a pas été encore étudiée. L'évaluation des parents pourrait être intéressante dans l'évaluation diagnostique de ce trouble mais très peu de données sont disponibles sur ce sujet et notamment aucune échelle validée en Français. Les objectifs de cette étude étaient : (1) l'évaluation de la prévalence de l'IGD chez des adolescents hospitalisés en psychiatrie à l'aide du Ten-Item Internet Gaming Disorder Test (IGDT-10) et (2) l'évaluation de la version parentale développée pour cette étude (IGDT-10-P). Un total de 102 patients, âgés de 12 à 17 ans, a été inclus dans quatre unités pédopsychiatriques de la région Auvergne-Rhône-Alpes durant les 6 mois d'inclusion. Les adolescents complétaient l'IGDT-10 pendant qu'un de leurs parents complétait l'IGDT-10-P. Le taux d'inclusion était de 57.95% parmi la population éligible. La prévalence avec l'IGDT-10 était de 6% et de 12.79% avec l'IGDT-10-P. Il n'y avait pas de différence significative de prévalence en fonction du sexe de l'adolescent à l'IGDT-10 mais elle était retrouvée largement supérieure chez les garçons avec l'IGDT-10-P. La prévalence chez les garçons à l'IGDT-10-P était 10 fois supérieure par rapport à l'IGDT-10, il n'a au contraire pas été retrouvé de différence significative entre les deux questionnaires chez les filles. Les analyses psychométriques ont montré pour l'IGDT-10-P une excellente consistance interne, une bonne adéquation au modèle à un facteur en analyse factorielle confirmatoire, une corrélation forte avec le temps passé à jouer, et une corrélation modérée avec l'IGDT-10. Les prévalences élevées d'IGD retrouvées que cela soit avec l'IGDT-10 ou sa version parentale sont en faveur de la nécessité d'un dépistage systématique des adolescents hospitalisés en pédopsychiatrie. Synthétiser les perspectives adolescentes et parentales semble être une approche prometteuse pour discerner ce qui pourrait être rapporté de parents possiblement trop inquiets ou d'adolescents trop peu concernés et ainsi faire le bon diagnostic.

De futures études devraient chercher à confirmer et expliquer cet écart entre les symptômes rapportés par les adolescents et leurs parents.

Mots clés: Trouble du jeu vidéo; prévalence; adolescent; parent; comorbidité psychiatrique

Introduction

In 2013, the fifth revision of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5) [1] included “internet gaming disorder” (IGD) in its third section listing all disorders that require additional scientific research. The DSM-5 defines IGD as “persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress”. It proposed, as a common basis for further research, a definition of IGD requiring at least five out of nine diagnostic criteria during a 12 months period. The DSM-5 emphasized the key role played by the internet media, but also mentioned that IGD “could involve non-Internet computerized games as well”. This led to an upsurge in research and, finally, to the recognition in 2018 of “gaming disorder” as a behavior addiction by the World Health Organization, with the removal of the confusing term “internet” [2].

IGD has been estimated to affect an overall 2% prevalence among adolescents according to a recent review, considering only Western and East-Asian representative samples, and based on studies using various diagnostic criteria [3]. To the best of our knowledge, up to October 2019, only four studies have reported the prevalence of IGD in adolescents on large representative samples collected using DSM-5 based scales. A prevalence estimate of 1.2% was reported in Germany [4], 2.5% in Slovenia [5], 1.6% in a cross-national European survey [6] and 5.9% in South Korea [7].

Young age, male gender, and increased impulsivity, constitute the main commonly admitted risk factors for IGD [8]. In addition, psychiatric comorbidities are frequent in subjects with IGD [9,10]. The strongest associations with IGD include anxiety, social phobia, depression and attention deficit / hyperactivity disorder (ADHD) [11]. To our knowledge, only one study [12] assessed the prevalence of IGD among psychiatric outpatients (using a non DSM-5 based scale), and none did so among psychiatric inpatients. If IGD is confirmed as a frequent comorbidity among adolescents hospitalized for psychiatric disorders, this would require fostering a systematic screening of IGD among this population.

Several diagnostic instruments have been developed for assessing IGD, but few are specifically based on the DSM-5 criteria. The Ten-Item Internet Gaming Disorder Test (IGDT-10) is a short self-questionnaire adopting a clear wording adequately reflecting the DSM-5 criteria and assessing both online and offline gaming. It has been validated in adults and adolescent populations, in English [13], French [14] and cross-culturally [15]. Its screening accuracy is 86.8%, with a sensitivity of 43.8% and a specificity of 98.3% [16].

Adolescents with mental disorders are subject to many barriers that hinder them from seeking treatment [17]. They may therefore rely on their parents to identify their difficulties and seek help for them. The parents' opinion can thus be crucial for determining a patient's diagnosis. To the best of our knowledge, the parental version of the Gaming Addiction Identification Test (GAIT-P) [18] and of the Internet Gaming Disorder Scale (PIGDS) [19] are the only questionnaires developed to assess IGD using a parental rating. The PIGDS, however, is the only to rely strictly on the DSM-5 criteria, and none of them is in French. Both questionnaires showed encouraging psychometric properties highlighting the need for further evaluations of external ratings of IGD.

Given this, the first objective of the present study was to assess the prevalence of IGD among a sample of adolescent psychiatric inpatients, using both the IGDT-10 and the IGDT-10-P, a parental version of IGDT-10 developed in French for the present study. Secondary objectives were: (1) to explore concordance between adolescent-based and parent-based ratings of IGD symptoms in the study population, using the IGDT-10 and the IGDT-10-P, respectively, and (2) to determinate the first psychometric properties of the IGDT-10-P (reliability and construct validity).

2. Materials and methods

2.1. Study design

This was a single-visit, multicenter; epidemiological study involving the entire clinical population aged 12 to 17 years, from four adolescent psychiatric hospitalization units in the Auvergne-Rhône-Alpes Region of France.

Participants were recruited between March 15, 2018 and September 15, 2018. The inclusion process was conducted by the attending psychiatrist, to enroll patients with at least one of their parents, in the first 21 days following hospital admission.

All patients and their parents received oral and written information and gave their informed consent to participate in the study. Both patients and one of their parents had to complete a short anonymized self-report questionnaire.

Exclusion criteria were as follows: (1) patient already included during a prior hospitalization; (2) participation refusal by the patient or one of its parents; (3) impossible parental consent (orphan, foster child, etc.); (4) patient and/or their parents not fluent in French; (5) intellectual deficit (i.e., intelligence quotient below 70); and (6) severe behavior/delusional/cognitive disturbance making impossible the filling out of the questionnaire in the first 21 days of hospitalization. All excluded patients were registered in an exclusion record along with the main reason for exclusion.

The study was submitted to and approved by an ethics committee (*Comité de Protection des Personnes*, CPP, *Ile-de-France* 7, Le Kremlin Bicêtre, France, N°17-088), and registered with

the National Commission for Data Protection (*Commission Nationale Informatique et Liberté*, CNIL). The study was registered on ClinicalTrials.gov (NCT03366948).

2.2 Sample characteristics

A total of 235 patients aged from 12 to 17 years were hospitalized at least once in one of the 4 psychiatric units, during the 6 months inclusion period.

Most patients (74.89%) had no exclusion criteria (eligible population). Among them the response rate was 57.95%. The study population consisted of 102 patients: 100 with a complete IGDT-10, 86 with a complete IGDT-10-P, and 84 patients with both questionnaires. Figure 1 describes the inclusion and exclusion procedure. Among the adolescents studied, 66.00% were girls, the mean age was 14.90 ($SD = 1.44$). Among the responding parents, 81.40% were mothers. Basic demographic characteristics of the patients and their parents are outlined for each center in Table 1.

Insert Figure 1 about here

2.3 Measures

Assessment of Internet Gaming Disorder

The IGDT-10 was used to assess IGD as a self-report. Response options are “never”, “sometimes”, “often” and are recoded into a dichotomous format, meaning “often” equals 1 point while all other answers equal 0 points. The ninth DSM-5 criterion was divided into two items given its complexity. However, positivity on either item 9, or item 10, or both items, generated only 1 point. Therefore, the IGDT-10 has 10 items based on the 9 criteria from the DSM-5 and diagnostic is made if five or more criteria are fulfilled (Appendix A and B).

IGD in adolescents was also measured from a parental viewpoint, using the French parental version of the IGDT-10 (IGDT-10-P), specially developed for this study from the French version of the IGDT-10 [14]. Appropriate authorization was given by the authors of the original and French versions of the IGDT-10. All 10 items of the IGDT-10 were reworded to gather an external instead of a self-report rating (Appendix C and D). The response format and the scoring method were kept identical between the IGDT-10 and the IGDT-10-P.

The frequency of video gaming was assessed by both patient and parental reports. The number of hours played on average each day was separately assessed for either Monday to Friday, or Saturday and Sunday. It was measured as an ordinal variable with six response options: “never”; “less than 1 hour a day”; “1-2 hours a day”; “2-4 hours a day”; “4-6 hours a day”; “more than 6 hours a day” and it was linearized for analysis (the first and last values were retained with a score of 0 and 6, while intervals were recoded with their mid-points). The responses were then multiplied and summed together to assess how many hours per week each participant spent on gaming.

Assessment of Psychiatric disorders

Psychiatric disorders were systematically screened by the investigator, on the basis of the ICD-10 criteria. Psychiatric diagnoses were grouped into nine categories, i.e., (1) depressive disorders, (2) manic episode, (3) anxiety disorders, (4) psychotic disorders, (5) developmental disorders, (6) conduct disorders and/or attention-deficit hyperactivity disorder (ADHD), (7) attachment disorders of childhood, (8) eating disorders, and (9) personality disorders.

2.4 Statistical analysis

Descriptive statistics were computed to obtain the proportion of IGD-positive subjects, criteria endorsement in both the IGDT-10 and the IGDT-10-P and participants' characteristics (age, genre, gaming time, additional questions). Since this is the first study on the prevalence of IGD in this population and no preliminary data were available to estimate hypothesis results, no sample size calculations were performed.

The hypothesis of normal distribution of quantitative variables was analyzed using the Kolmogorov-Smirnov test and graphically confirmed with a histogram. Categorical variables were compared using the Chi-squared test or Fisher's exact test when the conditions of application of Chi-squared test were not met. Quantitative variables were compared between groups using the nonparametric test of Wilcoxon or the Kruskal-Wallis (when more than two categories) as the hypothesis of normality of distribution was not verified. Correlation between continuous variables was estimated using Spearman test as the hypothesis of normality of distribution was not verified. Matched data were compared using signed ranked test for continuous variables as the hypothesis of normality of distribution was not verified and using Cohen's Kappa coefficient for qualitative variables.

Reliability through internal consistency was measured using Cronbach's coefficient. Internal consistency coefficients may be considered fair between 0.70 and 0.79, good between 0.80 and 0.89, and excellent from 0.90 upwards [20]. To test construct validity of the IGDT-10-P, confirmatory factor analysis (CFA) was used with generalized least squares (GLS) to maximum likelihood (ML) estimation method. Several fit indices and the following thresholds were used to determine the quality of the model estimate in CFA: relative χ^2 (χ^2/df) < 3, RMSEA < 0.06 and SRMR < 0.08 as recommended by Schreiber et al. [21] (2006), CFI > 0.90 as recommended by Bentler and Bonett [22]. Factor loadings had to be above the conventional level of 0.40 [23].

To further verify the construct validity of the IGDT-10-P, we examined it through concurrent validity (relationship between the scale and other validated measures of IGD) with the IGDT-10 and convergent validity (relationship between the scale and frequently related variables) with gaming time assessed by parents.

Internal consistency, CFA and correlation with gaming time assessed by patients were also performed for the IGDT-10. Concordance between the IGDT-10 and the IGDT-10-P was also evaluated at item level using Spearman's rho. Statistical tests were bilateral and the level of significance was set to 5% ($p < 0.05$). All statistical analyses were conducted using SAS version 9.4 (SAS Institute Inc, NC) except for CFA where Statistica 11.0 was used.

3. Results

3.1 IGD prevalence, criteria endorsement, and associated psychiatric disorders.

Prevalence of IGD, computed from the IGDT-10, was 6% ($n = 6$). The prevalence revealed by the IGDT-10-P was 12.79% ($n = 11$). The difference between both prevalence rates was not significant ($p = 0.13$). IGD prevalence is detailed for each psychiatric unit in Table 1.

IGDT-10 mean (SD) score was 0.93 (1.49), while IGDT-10-P mean (SD) score was 1.19 (2.11). There was no significant difference between scores from both questionnaires ($p = 0.09$). Among the population studied, 60% (based on the IGDT-10) and 65% (based on the IGDT-10-P) endorsed zero criterion. Item 8 “escape” was the most frequently endorsed criterion in both questionnaires (Table 2). IGD prevalence was significantly higher in boys (33.34%) than girls (3.39%; $p = 0.0004$) according to the IGDT-10-P but no such difference was observed using the IGDT-10 (boys: 2.94%; girls 7.58%; $p = 0.66$). IGD prevalence in boys was significantly higher with the IGDT-10-P than with the IGDT-10 ($p = 0.01$) but not such difference was observed concerning IGD prevalence in girls ($p = 0.45$). Criteria endorsement was significantly higher for boys than for girls with both the IGDT-10 ($p = 0.03$) and the IGDT-10-P ($p = 0.0003$). For IGDT-10-P, no significant difference in criteria endorsement was found between father and mother assessments ($p = 0.58$).

Psychiatric disorders are presented in Table 3. More than half (54.90%) of the patients suffered from a depressive disorder.

3.2 Gaming time

According to both patient-based and parent-based reports, most of the patients played less than 1 hour a day from Monday to Friday (MtF) and less than 2 hours a day during the weekend. According to patient-based reports, 10.71% of patients played more than 4 hours a day from MtF (versus 5.95% according to parents) and 16.46% the weekend (versus 23.52% according to parents). The distribution of gaming time by self-report and assessed by parents is outlined in Table 4. Concordance between patients and parents' reports were respectively 0.43 (0.30 - 0.56; $p < 0.0001$) for MtF and 0.37 (0.24 - 0.50; $p < 0.0001$) for weekend. Positive patients for IGDT-10 and IGDT-10-P had significantly higher gaming time than negative ones for MtF ($p = 0.05$ and $p < 0.0001$) as for weekend ($p = 0.004$ and $p < 0.0001$) assessments. Gaming time significantly increased with the number of endorsed criteria in the IGDT-10 and the IGDT-10-P (Table 4).

3.4 Reliability and validity of the IGDT-10-P

Cronbach's coefficient was 0.92 for the IGDT-10-P. Based on a previous finding (i.e. the 9 items loading on one single IGD factor [13,14], a one-factor solution of the nine IGDT-10-P items was tested with CFA. The model provided a good fit to the data ($\chi^2/df = 2.23$; CFI = 0.937;

RMSEA = 0.049, SRMR = 0.047 $n = 86$). Factor loadings of all nine items of the IGDT-10-P are presented in Table 2 and were all above the conventional threshold of 0.40 except from item 4 (0.344) and 7 (0.356). Correlation between the IGDT-10 and the IGDT-10-P with Spearman's rho was 0.50 ($p < 0.0001$). The correlation was 0.68 ($p = 0.0002$) for boys and 0.41 ($p = 0.002$) for girls. Correlations at item level were all significant (from $p < 0.01$ to $p < 0.0001$) and ranked from 0.27 to 0.55 (Appendix E). Correlation between the IGDT-10-P and linearized gaming time (assessed by parents) was 0.82 with Spearman's rho.

3.5 Reliability and validity of the IGDT-10

Cronbach's coefficient was 0.83 for IGDT-10. A one-factor solution of the nine IGDT-10 items was tested with CFA. The model provided a good fit to the data ($\chi^2/df = 1.79$; CFI = 0.920; RMSEA = 0.052, SRMR = 0.068 $n = 100$) but item 4 had a remarkably low loading (0.188) and 3 other items had loadings below 0.40 (Table 2). Correlation between the IGDT-10 and linearized gaming time (assessed by patients) was 0.61.

4. Discussion

4.1. Descriptive analysis and comparisons

The present study assessed the prevalence of IGD in a sample of adolescent psychiatric inpatients, using a patient and a parent version of the IGDT-10. Prevalence with the patient version was 6% versus 10% in a study performed among adolescent outpatients with psychiatric disorders [12]. However, these figures should be compared with caution given major differences in the types of questionnaires used. Considering the low sensitivity of the IGDT-10 [16], 6% prevalence might be an underestimation. The prevalence estimated using the IGDT-10-P was twice as high as that assessed using the IGDT-10, a comparable result to that observed between adolescent and parental assessments in the GAIT and GAIT-P study [18]. The Item 8, i.e., "escape", was the most commonly endorsed criterion in both questionnaires, which is consistent with previous research. Escapism as a gaming motive has indeed been found to be one of the strongest mediator of the association between psychiatric distress and IGD [24]. This suggests that psychiatric patients use video gaming to cope with their psychiatric distress, supporting a self-medication hypothesis [25].

Surprisingly, no significant difference in prevalence was found between both sex for the IGDT-10, criteria endorsement being yet higher in boys. Although this was already reported in previous studies [26], this may be due to the specificities of our sample, which was small, with a minority of boy lowering even more the power of the test. Conversely, parental assessment of IGD found an overwhelming majority of boys, which is in line with previous studies [18,27]. The IGDT-10-P reported a 10 fold higher IGD prevalence for boys compared to the IGDT-10. Inversely, prevalence for girls was twice according to the IGDT-10 compared to the IGDT-10-P, the difference being not significant. This indicates that parents may overestimate gaming issues in boys and might underestimate these issues in girls. This could be due to the assumed

common view that boys play more video games than girls. In this respect, IGD seems to deviate from other psychiatric disorders such as depression, where parents tend to underreport symptoms of both boys and girls [28]. Estimating sensitivity and specificity for the IGDT-10-P, using sex-specific analyses, would be precious to properly address this issue.

4.2 Psychometric properties of the IGDT-10-P and the IGDT-10

In the present study, we developed a DSM-5 based scale for parental assessment of IGD and explored its psychometric properties. Excellent reliability was found using the Cronbach's alpha. Publications on the IGDT-10 indicate a one factor structure [13,14], and results from the CFA of the IGDT-10-P indicated a correct model fit, supporting these findings and suggesting that all criteria load on a single construct of IGD. Factor loadings of criteria 4 and 7 were slightly lower than the acceptable threshold. This has not been observed in previous studies [13,15,19] and could be related to the small size of our sample. We therefore do not recommend their deletion and propose that CFA should be replicated for the IGDT-10-P on other samples. Concerning convergent validity, a strong correlation was found with gaming time. As for concurrent validity, a moderate correlation was found with the IGDT-10, which was much stronger in boys, confirming the difference in parents' and patients' rating of this problematic. These were the first indications of the construct validity of the instrument. Concerning the IGDT-10, internal consistency was high but not as excellent as for the IGDT-10-P. This can be related to the characteristics and size of each sample. Validity was correct (with linearized gaming time) and results of the CFA revealed a good model fit, better than for the IGDT-10-P. As for the IGDT-10-P, the individual factor loadings revealed a poor fit of some items. Item 4 ("loss of control") was particularly low, even considering the small size of the sample. The screening made among adolescents, at an early stage of the addiction process, could explain this result. They are less aware of their pathologic gaming and may not have even tried to reduce it. Further research should therefore focus on item 4.

4.3 Limitations

Some limitations should be pointed out. First, no clinician-based assessment of IGD was performed. A structured interview would be required to complete the assessment of the IGDT-10-P. Second, it is conceivable that some IGDT-10-P items regarding thoughts and feelings are harder to rate for parents than other more visible behaviors of the adolescent, such as neglecting school. However, a change of wording of these items did not seem adequate to ensure the comparability of IGDT-10 and IGDT-10-P items. Third, the IGDT-10 and the IGDT-10-P examine DSM-5 criteria in patients, but not the existence of a clinically significant impairment or distress, which is needed for diagnosis. These questionnaires shall be only seen as screening instruments, insufficient for diagnosis. A fourth limitation was that the patients with the most impairing psychiatric symptoms were excluded. A similar concern pertains to patients without an accessible parent for parental authorization. The inclusion rate was only 43.40% (57,95% among the eligible population), and it is uncertain, to which point the

population is representative of adolescent psychiatric inpatients of these departments. All these contributed to lower our sample size, which was small, limiting its power and therefore limiting the conclusions, particularly on estimated prevalence of IGD in this population.

4.5 Conclusion

The prevalence of IGD was high, when using either the IGDT-10 or the IGDT-10-P, supporting the need for a systematic screening of IGD in this population. Development of a parental version of the IGDT-10 showed promising psychometric properties with excellent reliability, unidimensional structure and reasonable correlations, indicating its construct validity. Taking into account both adolescent and parental perspectives in the assessment seems a promising approach to discern between over-concerned parents, under-worried adolescents and make accurate diagnostic easier. Future studies should aim to confirm and explain the prevalence gap between self- and parent-reported criteria.

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Conflicts of Interest

The authors declare no conflict of interest.

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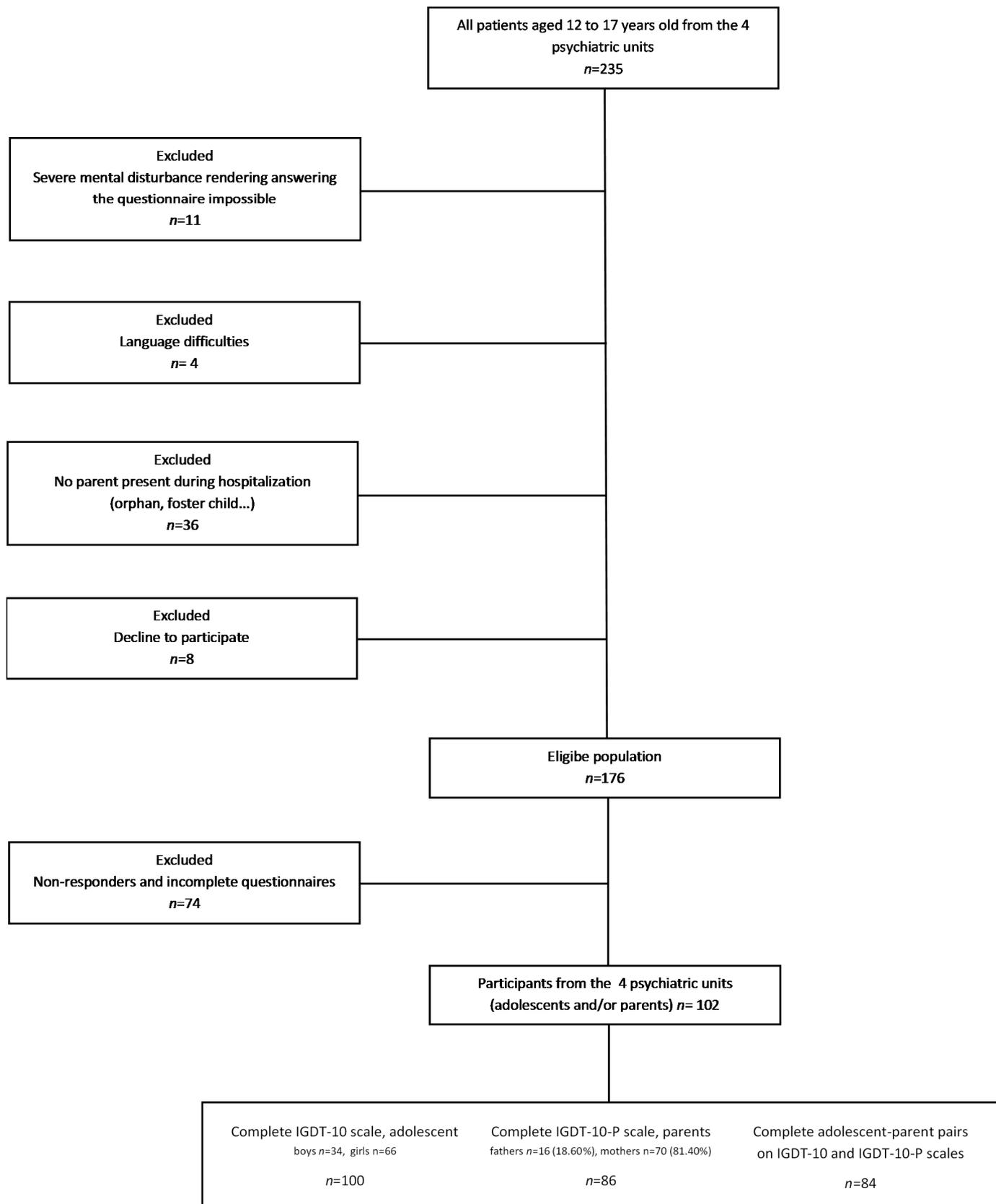


Fig. 1. Flowchart of the study population.

Table 1. Basic demographic data and IGD proportions.

	Total	Centre 1	Centre 2	Centre 3	Centre 4
Adolescent questionnaires					
Total (<i>n</i>)	100	37	22	30	11
Males (<i>n</i>)	34	9	11	10	4
Males (%)	34.00%	24.32%	50.00%	33.34%	36.36%
Age, years; <i>M (SD)</i>	14.90 (1.44)	13.92 (1.07)	15.36 (1.33)	15.70 (1.19)	15.09 (1.44)
Positive IGDT-10 (<i>n</i>)	6	3	0	2	1
Positive IGDT-10 (%)	6.00%	8.10%	0.00%	6.67%	9.09%
Parent questionnaires					
Total (<i>n</i>)	86	36	18	22	10
Males (<i>n</i>)	27	7	9	8	3
Males (%)	31.40%	19.44%	50.00%	36.36%	30.00%
Fathers (<i>n</i>)	16	6	3	5	2
Fathers (%)	18.60%	16.67%	16.67%	22.73%	20.00%
Positive IGDT-10-P (<i>n</i>)	11	4	2	3	2
Positive IGDT-10-P (%)	12.79%	11.11%	11.11%	13.64%	20.00%

Table 2. Endorsement of the nine IGD criteria and factor loadings.

Criterion	IGDT-10			IGDT-10-P		
	Criteria endorsement		Factor loadings <i>n</i> = 100	Criteria endorsement		Factor loadings <i>n</i> =84
	<i>n</i>	%		<i>n</i>	%	
1. Preoccupation	7	7.00	0.428	9	10.47	0.439
2. Withdrawal	6	6.00	0.418	11	12.79	0.644
3. Tolerance	10	10.00	0.375	11	12.79	0.657
4. Loss of control	10	10.00	0.188	4	4.65	0.344
5. Giving up other activities	16	16.00	0.522	12	13.95	0.544
6. Continuation	13	13.00	0.554	16	18.60	0.694
7. Deception	7	7.00	0.334	6	6.98	0.356
8. Escape	19	19.00	0.428	16	18.82	0.571
9. Negative consequences	5	5.00	0.333	13	15.12	0.648

Table 3. Psychiatric disorders in total sample and among positive IGDT-10 and IGDT-10-P.

Psychiatric diagnosis (<i>n</i>)	Total sample <i>n</i> = 102	Positive IGDT-10 <i>n</i> = 6	Positive IGDT-10- P <i>n</i> = 11
Depressive disorder	56	3	2
Manic episode	2	0	0
Anxiety disorder	28	2	4
Psychotic disorder	11	0	1
Developmental disorder	4	1	0
Conduct disorder	16	1	2
ADHD*	1	0	1
Attachment disorder of childhood	19	1	2
Eating disorder	9	0	1
Personality disorder	8	0	0
Total	154	8	13

* attention-deficit hyperactivity disorder

Table 4. Gaming time according to adolescents and parents, and comparison with IGDT-10 and IGDT-10-P scores.

	Gaming time per day	Never	<1h/d	1h/d-2h/d	2h/-4h/d	4h-6h/d	>6h/d	<i>p</i>
From Monday to Friday								
Adolescents (n = 100)	<i>n</i> =	32	20	18	19	7	4	
	IGDT-10 criteria, median (Q1-Q3)*	0 (0-0)	0 (0-1)	0.5 (0-1)	1 (0-2)	3 (2-5)		< 0.0001
Parents (n = 86)	<i>n</i> =	24	25	15	19	2	3	
	IGDT-10-P criteria, median (Q1-Q3)*	0 (0-0)	0 (0-0)	1 (0-1)	3 (1-5)	5 (2-7)		< 0.0001
Saturday and Sunday								
Adolescents (n = 100)	<i>n</i> =	26	14	15	25	12	8	
	IGDT-10 criteria, median (Q1-Q3)*	0 (0-0)	0 (0-1)	0.0 (0-1)	1 (0-2)	2 (1-4.5)		< 0.0001
Parents (n = 86)	<i>n</i> =	25	17	12	12	15	5	
	IGDT-10-P criteria, median (Q1-Q3)*	0 (0-0)	0 (0-0)	0.0 (0-1)	1.5 (1-2.5)	3.5 (2-5.5)		< 0.0001

*due to low sample size, groups 4h-6h and >6h/d were combined for Kruskal-Wallis test