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Contributor Role	Role Definition	Authors			
		1	2	3	4
Conceptualization	Ideas: formulation or evolution of overarching research goals and aims.	X			
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.	X	X	X	
Formal Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.	X			
Funding Acquisition	Acquisition of the financial support for the project leading to this publication.				
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.	X	X	X	
Methodology	Development or design of methodology; creation of models	X	X	X	X
Project Administration	Management and coordination responsibility for the research activity planning and execution.	X			X
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.		X	X	
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.	X			
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.	X			X
Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.				X
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.	X	X	X	
Writing – Original Draft Preparation	Creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).	X	X	X	
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2

Discussion Points:

1. Internet Gaming Disorder (IGD) is an emerging public health issue among school-going adolescents.
2. The prevalence of IGD among Advanced Level students was 5.06%.
3. Poor parent-child relationship and low extra-curricular involvement are linked to IGD.
4. Escape and Fantasy is associated with higher odds and Competitiveness is associated with lower odds of having IGD.

1 **ABSTRACT.**

2

3 **Background:** Internet Gaming Disorder (IGD) is on the rise in many low and middle-income countries owing

4 to the increasing popularity of electronic gaming and technology availability among adolescents. Despite this,

5 the epidemiology of IGD in South Asia remains largely unknown. Hence, we aimed to determine its

6 prevalence and associations including motivations for gaming, among a Sri Lankan school-going population.

7

8 **Methods:** A cross-sectional study was conducted among Advanced Level students aged 16-18 years,

9 attending four schools in the Colombo Educational Zone. Of the 412 randomly sampled recruits, 395

10 consenting participants filled a pretested questionnaire exploring gaming habits, motivations, and

11 psychosocial factors. English and Sinhala versions of the Internet Gaming Disorder Scale Short-Form

12 (IGDS9-SF) were used and IGD was identified if ≥5 items in the scale were endorsed. The Sinhala IGDS9-SF

13 demonstrated acceptable internal consistency reliability and its factorial validity was affirmed via Confirmatory

14 Factor Analysis.

15

16 **Results:** 81.5% (n=322) of the sample consisted of gamers, a majority of whom preferred mobile gaming

17 (64.0%) and Multiplayer Battle Royale games (27.0%). The prevalence of IGD was 5.06% (95% CI = 2.90–

18 7.22) and was significantly higher (p<0.05) among males who constituted 52.4% of the sample. Daily weekday

19 gaming for ≥6h, low involvement in student societies, poor relationship with parents, Escape motive and

20 Fantasy motive were positively associated, and the Competition motive was negatively associated with IGD in

21 multivariable analyses done using binary logistic regression.

22

23 **Conclusion:** The prevalence of IGD was considerably high in our population and is associated with specific

24 motives, poor parent-child relationship, and low extra-curricular involvement.

25

26 **Key Words**: Internet Gaming Disorder; Addictive Behavior; Motivation; Adolescent Psychiatry; Community

27 Psychiatry

28

29

1 **INTRODUCTION.**

2

3 Electronic gaming is a healthy recreational activity which confers several cognitive, motivational, emotional,

4 and social benefits and is gaining popularity as a source of entertainment among adolescents.[1] Pathological

5 gaming however, is a type of maladaptive behavior and is described as "Internet Gaming Disorder" (IGD)

6 under Section III of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), where it is

7 defined as a pattern of persistent and recurrent participation in electronic gaming leading to significant

8 impairment or distress as indicated by five or more of nine core symptoms exhibited over a year. The

9 specified symptoms include pre-occupation with games, withdrawal, tolerance, lack of control, loss of interest

10 in previous hobbies, continued excessive use despite knowledge of psychosocial problems, deception of

11 family members and/or others, use of games to gain relief from negative emotions and jeopardizing important

12 relationships or opportunities due to gaming behavior. The condition was also recognized by the World Health

13 Organization and described as "Gaming Disorder" in the latest International Classification of Diseases (ICD-

14 11).[2] Despite its name, IGD applies to both online and offline gaming activity.[3] It has to be noted that Internet

15 Addiction Disorder (Problematic Internet Use) and IGD are two distinct entities.[4,5]

16 IGD is a debilitating condition with consequences spanning across physical, mental, and social aspects of a

17 person's wellbeing.[6] Depressive symptoms and lower academic achievement[7] as well as an increase in

18 physical aggression are consequences of pathological gaming.[8] Other associated comorbid

19 psychopathologies include Attention Deficit Hyperactive Disorder, Obsessive Compulsive Disorder and

20 Anxiety.[6,9] Psychosocial issues such as peer problems,[10] poor relationship with parents and teachers[11] and

21 low self-esteem[12,13] are higher among disordered gamers. Poor sleep quality and sleep-related problems,[14]

22 reduced interest in schoolwork[15,16] and other recreational activities are also linked to IGD.[17] Disordered

23 gamers are more likely to prefer Massively Multiplayer Online Role-Playing Games (MMORPGs) and first-

24 person shooter (FPS) games among other genres.[18] Case reports suggest that problematic gaming may be

25 associated with a preference for newer genres such as Battle Royale (BR) games as well.[19] Increased gaming

26 time[15,20,21] and low involvement in sports and exercise[22] adds to the risk of developing IGD. Furthermore, the

27 possession of gaming consoles and a powerful internet connection,[20] as well as an earlier age of first playing

28 games are also implicated.[23] Gaming motives are important predictors[12,24] and mediators of psychopathology

29 in disordered gamers.[25] Seven motives have been identified, namely: Escape, Fantasy, Coping, Skill

30 Development, Recreation, Competition and Social.[26]

31 The global pooled prevalence of IGD is 3.05%[27] and ranges from 0.21-57.5%.[28] IGD is predominantly seen in

32 males and is higher among adults than younger adolescents, although the prevalence decreases with

33 increasing age among adults.[29] The prevalence is lower among European populations compared to South-

34 East Asian populations, with rates as low as 1.6% reported from representative European samples[17] and as

35 high as 10.1% in South-East Asia.[30] The prevalence of IGD was 3.5% in a study done among a sample of 15-

36 19-year-old school-going adolescents[31] and 3.6% among a sample of medical students from India.[32]

37 The literature pertaining to the psychological aspects of electronic gaming is scarce in the South Asian region.

38 Evidence from Sri Lanka has hitherto been limited to case reports such as that done by Chandradasa and

39 Rodrigo in 2017, where IGD was described in four adolescents aged 13-16 years presenting to a Sri Lankan

40 tertiary care hospital.[33] In this light, our aim is to address this regional evidence gap by investigating the

41 prevalence of IGD in a Sri Lankan school-going adolescent population, using a simple validated screening tool

5

1   which can be used in native settings. We also aim to describe the role of interindividual and student-specific

2   factors as well as the role of gaming motivations which have not been adequately explored in the extant

3   literature.

4

5

6

1   **MATERIALS AND METHODS.**

2

3   *Study Design and Setting*

4   A descriptive cross-sectional study with an analytical component was conducted among four conveniently

5   selected national schools located in Colombo, which is the commercial capital of Sri Lanka. Being national

6   schools, the students hail from around the country and therefore the population is diverse and representative

7   of the multi-ethnic demographic of Sri Lanka. Ethics approval was obtained from the Ethics Review

8   Committee of the Faculty of Medicine, University of Colombo prior to recruitment of participants (Reference

9   No. MFC/AL/2016/911).

10

11   *Sample Size*

12   A sample size of 355 was deemed necessary at a confidence level of 95% and 5% margin of error for a finite

13   population of 4500 students. An estimated proportion of 50% was considered in the calculation to arrive at a

14   maximum sample size.[34]

15

16   *Participants*

17   Sri Lankan school education is offered in four stages which are namely: Primary (Grades 1-5), Junior

18   Secondary (Grades 6-9), Senior Secondary (Grades 10-11) and Collegiate or Advanced Level (A/L) (Grades

19   12-13). At the end of Grade 13, students face the General Certificate of Education (A/L) examination in their

20   preferred stream (e.g., Biological Science, Physical Science, Commerce, Arts, etc.) which also serves as the

21   entrance test to state universities. For our study, we recruited a total of 412 students aged 16-18 years

22   studying in the A/L classes of the respective schools. Random cluster sampling was used in order to prevent

23   selection bias, with a class of students constituting a cluster. The exclusion criteria included absence on the

24   day of data collection, failure to provide informed written consent and assent, presence of known cognitive

25   impairment/ co-morbid psychopathology interfering with reliability of responses and filling the questionnaire

26   incompletely/incoherently. Based on these criteria, 17 participants were excluded due to absence (n=4),

27   failure to return the consent and assent forms (n=2) and incompletely/incoherently filled questionnaires

28   (n=11), with 395 students finally included in the study, resulting in a response rate of 95.87%.

29

30   *Study Procedure*

31   Data collection was done throughout September 2020. Permission was initially obtained from the Zonal

32   Education Director and Principals of the selected schools, prior to approaching the selected classes for data

33   collection. The investigators approached the students during the free timeslots in their academic timetables.

34   The study's objectives and procedure were described before distributing the consent forms which were to be

35   signed by the parents. Informed assent was additionally obtained by the students. Students who returned the

36   completed consent and assent forms were given the questionnaire in their preferred language

37   (English/Sinhala). Personal details such as name and residential address were not requested to ensure

38   anonymity. The investigators were present at the time of data collection to answer any queries raised by the

39   participants, although the participants were not allowed to discuss the contents of the questionnaire amongst

40   themselves in order to prevent information bias.

41

7

1 *Measures and Variables*

2 The study employed a self-administered questionnaire, which was pre-tested among 32 A/L students from the

3 Galle district. The questionnaire consisted of three sections.

4 Section A explored sociodemographic and academic characteristics, as well as the average hours of sleep

5 obtained each night in the past week. Extra-curricular involvements including sports, aesthetics and student

6 societies were assessed on a scale of 0-3 with higher values implying greater levels of involvement.

7 Involvement in online learning activities, positive attitude regarding parent-child and teacher-student

8 relationships, lack of satisfaction with one's physical appearance and the presence of few/no friends were

9 assessed by single items graded on a five-point Likert scale, with higher values indicating greater levels of

10 agreement. Self-esteem was assessed with a Single-Item Self-esteem Scale which was graded on a similar

11 five-point scale.[35] Gaming habits and preferences including the preferred genre and device were also

12 explored in this section. The game that was played for the longest duration over the past year was used to

13 identify the preferred gaming genre.

14 Section B consisted of the Internet Gaming Disorder Scale–Short Form (IGDS9-SF) which consists of nine

15 items graded on a five-point Likert scale. Each item corresponds to one of nine DSM-5 diagnostic criteria.[36] A

16 forward-backward translation protocol was used to develop the Sinhala IGDS9-SF and content validity was

17 assessed by a panel of experts from the National Institute of Mental Health, Sri Lanka. Positive cases of IGD

18 were identified based on the endorsement of five or more items in the IGDS9-SF scale, with a score of 4/5 or

19 5/5 considered as an endorsement of an item.

20 Section C incorporated the Motives for Online Gaming Questionnaire (MOGQ). The items are divided into

21 seven subscales which correspond to the seven gaming motives.[26] Each item is graded on a five-point scale

22 and scores of the relevant items were tallied to provide a subscale score with higher scores denoting greater

23 degrees of motivation.

24

25 *Statistical Analysis*

26 The internal consistency reliability of all scales was assessed by the Cronbach's alpha test and $\alpha \geq 0.7$ was

27 considered acceptable. Factorial validity of the Sinhala IGDS9-SF scale was assessed via Factor Analyses.

28 Mean, Standard deviation (SD), Counts and Proportions were used to describe the general characteristics of

29 the sample.

30 Bivariate analyses were conducted using chi-square and fisher's exact tests to identify associations of IGD

31 status. A p value of <0.05 was considered statistically significant at a confidence level of 95%. The Shapiro-

32 Wilk and Kolmogorov-Smirnov tests revealed a non-normal distribution of the IGDS9-SF scores and so,

33 correlational analyses of the IGD score and MOGQ subscale scores were done using Spearman's Rank(r_s)

34 coefficients.

35 Multivariable analyses were then conducted using binary logistic regression with the IGD status as the

36 dependent variable. All significant bivariate associations were initially entered into the initial model and a

37 forward method of entry was used to obtain the final model which retained only significant variables. The

38 continuous variables were tested via the Box-Tidwell test a priori to verify the linearity assumption.

39 Multicollinearity was excluded by assessing the Variance Inflation Factors which were <2.5. Exponentiated

40 beta co-efficients were presented as odds ratios with the 95% confidence interval (CI) for each variable.

1 Statistical analyses were conducted using Version 26.0 of the Statistical Package for the Social Sciences and

2 Version 1.2.27.0 of jamovi.

3

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1 **RESULTS.**

2

3 *Validity and Reliability of Scales*

4 The English and Sinhala questionnaires were filled by 183 and 139 gamers respectively. The internal

5 consistency reliability of the Sinhala IGDS9-SF was good (α=0.854) and acceptable *(α=0.77)* in the English

6 IGDS9-SF. The alpha estimates were not significantly increased by excluding any of the items and inter-item

7 correlations were acceptable (0.15-0.5). The Cronbach's Alpha values of the MOGQ subscales were

8 acceptable (0.763-0.818 for the Sinhala version and 0.663–0.803 for the English version).

9 The Factorial Validity of the Sinhala IGDS9-SF scale was assessed using factor analyses. The adequacy of

10 the sample size was initially verified with the Keiser-Meyer-Olkin measurement which was acceptable at

11 0.886. The Bartlett's Test of Sphericity was significant (x^2=412, df=36, p<0.001). The Exploratory Factor

12 Analysis done with a Varimax rotation on the nine items revealed a one-factor solution with an Eigenvalue

13 threshold of one. This was further affirmed by examination of the Scree plot. The unidimensional structure

14 was further assessed by Confirmatory Factor Analysis. The test for exact fit was significant (x^2=44.9, df=27,

15 p<0.05) and other fit indices were acceptable (Comparative Fit Index = 0.954, Tucker-Lewis Index = 0.939

16 and Root Mean Square Error of Approximation = 0.069). All factor loadings were statistically significant

17 (p<0.001) and ranged from 0.455-0.733. These results affirm that the Sinhala IGDS9-SF scale measures a

18 unidimensional construct, like its validated English counterpart.

19

20 *Descriptive Analysis of Sample Characteristics*

21 The general and gaming-related characteristics of the sample are described in **Table 1**. The mean age was

22 17.22 years (SD=0.54) and 52.4% of the participants were male. Most participants reported a monthly income

23 of LKR 100,000–199,999 (31.6%, n=125) and had one sibling in the family (53.4%, n=211). Most of the

24 students studied in English medium (51.6%, n=204) and followed Commerce subjects (32.9%, n=130). A

25 majority reported high involvement in online learning activities (60.0%, n=237) and slept for 6-7 hours every

26 night (57.0%, n=225).

27 Of the 395 participants, 322 identified themselves as "gamers" (81.5%). A gamer was defined as an individual

28 who had intentionally played electronic games for any duration of time, offline/online, using any device during

29 the past 12 months. A majority played games for ≤1h every day during the weekdays (53.4%, n=172) and

30 weekends (40.7%, n=131). Most of the students started to play games when they were 8-10 years old (24.8%,

31 n=80), and preferred online multiplayer games (50.9%, n=164), and gaming on mobile phones (64.0%,

32 n=206). The favorite genre was Multiplayer Battle Royale (27.0%, n=87) among 11 identified gaming genres

33 (**Figure 1**).

34

35 *Prevalence of IGD and Bivariate Analyses*

36 The prevalence of IGD was 5.06% (95% CI = 2.90–7.22) among the total study population and 6.21% (95% CI

37 = 3.58–8.85) among the gamers. **Table 2** presents the cross-tabulated characteristics associated with IGD.

38 IGD was significantly higher (x^2=7.04, p<0.05) among males. The proportion of Sinhala medium students with

39 IGD (9.2%, n=14) was significantly higher (x^2=4.45, p<0.05) than that among English medium students (3.5%,

40 n=6). The only extra-curricular activity associated with IGD was involvement in student societies. Students

41 reporting no/minor involvement in such activities (8.8%, n=17) were significantly more likely to have IGD

10

1 (x^2=5.46, p<0.05) than those reporting moderate/major involvements (2.3%, n=3). Poor quality of relationships

2 with parents and teachers was also significantly linked to IGD (p<0.001). Furthermore, the proportion of IGD

3 gamers who were dissatisfied with their physical appearances (14.9%, n=10) was found to be significantly

4 higher (x^2=12.66, p<0.05) than those who were satisfied/neutral. Playing games for ≥6h during the weekdays

5 and weekends was significantly associated with IGD (p<0.001). Furthermore, gamers who preferred BR

6 games (13.8%, n=12) were more likely to have IGD (x^2=11.76, p<0.05) than those who preferred other genres

7 (3.4%, n=8). Associations pertaining to the preferred type of games, gaming device, and starting age were not

8 significant.

9 All correlations between the IGDS9-SF score and the MOGQ subscales were significant (p<0.001). The

10 Escape motive correlated strongly with the IGD score ($r_s = 0.616$). There were moderate positive correlations

11 between IGD score and the Social ($r_s = 0.514$), Coping ($r_s = 0.513$) and Fantasy ($r_s = 0.451$) motives, while the

12 correlations with the Skill development ($r_s = 0.398$), Recreation ($r_s = 0.389$) and Competition motives ($r_s = 0.367$), were positive but weak.

13 0.367), were positive but weak.

14

15 *Multivariable analysis*

16 The factors retained in the final binary logistic regression model are shown in **Table 3**. The Hosmer and

17 Lemeshow test revealed an acceptable fit of the data (x^2=4.24; df=8; p=0.835). The model was found to be

18 significant (x^2=63.64; df=7; p<.001) and explained 48.4% (Nagelkerke R^2) of the variance in IGD status.

19 Gaming daily for six hours or more during the weekdays was associated with almost seven-fold higher odds of

20 having IGD (95% CI = 1.735 – 27.569). Furthermore, no/minor involvement in student-based societies and

21 poor parent-child relationship were positively predictive of IGD status. While the Escape and Fantasy motives

22 were positively predictive, every unit increase of the Competition motive score was associated with 17.6%

23 lesser odds of having IGD (95% CI = 0.703–0.967).

24

25

1   **DISCUSSION.**

2

3   To our knowledge, this is the first study which describes the prevalence of IGD in a Sri Lankan adolescent

4   population and is one of few conducted in the South Asian region. In addition to the disease burden, we have

5   discussed IGD from the perspective of school-going students by focusing on interindividual factors such as

6   the parent-child, teacher-child relationships, as well as the role of academic and extra-curricular activities

7   which are unique to this population and hitherto overlooked by researchers. Understanding the interplay

8   between motivation and addiction enables early identification of at-risk gamers at a community-level.

9   However, previous studies have described these motivations in relation to adult populations, and so, our study

10   furthers the field by describing the specific motivations that drive gaming addiction among an adolescent

11   population. Furthermore, the Sinhala IGDS9-SF which was translated from the original English version, was

12   found to be a potentially valid and reliable tool which can be used among native speakers in future studies.

13   The prevalence of IGD in our study was 5.06%, which is greater than the global pooled prevalence of

14   3.05%,[27] but is lower than the pooled South-East Asian prevalence of 10.1%.[30] It is also higher than the

15   prevalence reported from India, i.e., 3.5-3.6%,[31,32] although this may be explained by the strict diagnostic

16   criteria adopted in these studies. Our prevalence resembles that among Thai high-school students which is

17   5.4%.[37]

18   Male gamers were significantly more likely to have IGD than females which is consistent with the extant

19   research.[29] This is partly explained by the fact that males spend more time gaming and prefer high risk

20   genres, whereas most female gamers favor low-risk casual games. Maladaptive cognitions such as the

21   overvaluation of virtual rewards may also explain the higher prevalence of IGD among males.[38] Of the

22   academic characteristics explored, the only significant association was the language of study, with Sinhala

23   medium students being more likely to have IGD. Poor sleep is a known association of IGD.[20] In our study

24   however, reduced sleep hours was not linked to IGD. In fact, some studies report higher sleep hours among

25   IGD gamers in high-school student populations.[37] This could be explained by the regular sleep schedules

26   students are compelled to adhere to, owing to early school commencement hours. Although low exercise is

27   cited as a risk factor,[22] a low involvement in sports was not associated with IGD in our study, which may be

28   explained by the lack of opportunities for sports activities owing to lockdowns amid the COVID-19 pandemic.

29   A lack of interest in recreational activities is a known correlate[17] and our findings reflect this as IGD gamers

30   were more likely to report low involvement in student societies. Disordered gamers also had poor inter-

31   personal relationships with their parents and teachers. These interindividual factors which are associated with

32   Internet Addiction,[11] appear to be linked to IGD as well. We did not find the number of friends to be a

33   significant association which supports the notion that despite real-life social exclusion, online gaming can in

34   fact facilitate social interactions,[39] with IGD gamers reporting more friends than non-IGD counterparts in some

35   studies.[16] We also found that IGD gamers were significantly more likely to be dissatisfied with their self-

36   appearance which may explain the tendency to idolize in-game avatars with idealized physical forms.[40]

37   Although low self-esteem is commonly described among IGD gamers,[12,13] this was not a significant

38   association in our study, and so, it is conceivable that the feeling of virtual achievement may have a positive

39   influence on a gamer's self-esteem.

40   Daily weekday gaming for ≥6h daily was retained as a significant association in multivariable analyses,

41   highlighting the role of excessive gameplay in disordered gaming. Excessive gaming, however, is not

12

1   tantamount to disordered gaming, with certain studies failing to show increased gameplay as a significant

2   association.[12] Although, MMORPG and FPS games are traditionally implicated with disordered gaming,[18] in

3   our study, most of the gamers (27.0%) preferred Multiplayer Battle Royale games such as "PUBG" and

4   "Fortnite" which was also linked to IGD. Most gamers in our study (64.0%) preferred mobile phones among

5   traditional gaming devices such as personal computers and consoles.[20] The mobile phone is indeed an

6   emerging gaming device in middle-income countries like Sri Lanka with the number of mobile connections

7   increasing by 2.2 million from January 2019 to January 2020,[41] although a preference for mobile gaming per

8   se was not associated with disordered gaming.

9   Escape and Fantasy were positively predictive of IGD, which echoes extant work on gaming motivations.[12]

10 However, Competitiveness had a negative effect in our model, which is in fact described as a positive

11 predictor among women in the cited study. Escape refers to "escaping from problems in the real world" and

12 Fantasy entails "stepping out of one's usual identity, trying new identities in a different fantasy world", while

13 Competition represents the motive of "competing with and defeating others to feel a sense of achievement".[26]

14

15 *Limitations*

16 Our findings should be interpreted with caution in light of certain limitations. First, we acknowledge the limited

17 generalizability of our results which may be applicable to the four selected national schools. The cross-

18 sectional design of the study does not allow temporal interpretation of associations as true predictors or

19 consequences of disordered gaming. IGD was diagnosed using the IGDS9-SF scale, which is a validated

20 psychometric tool. This is less accurate than the structured clinical interview which is the gold standard of

21 diagnosis. We also admit the possibility of recall bias and reduced answering accuracy as participants were

22 expected to report gaming practices over a period of 12 months. Furthermore, the study was conducted amid

23 the COVID-19 pandemic and so the data presented here may not reflect the "pre-COVID normal" where

24 students were not compelled to follow online lessons owing to countrywide lockdowns. Despite these

25 limitations, our study has set an important precedent for future studies both nationally and regionally.

26

27 *Conclusions*

28 Gaming addiction is an emerging public health challenge in our student population. The Sinhala IGDS9-SF

29 was found to be a potentially valid and reliable tool. IGD was significantly higher among male gamers and was

30 associated with a poor parent-child relationship, low extra-curricular involvement, increased daily weekday

31 gaming and specific gaming motives. These associations should be considered when planning preventive

32 interventions and awareness programs targeting high-risk groups. The inclusion of gaming motivations in the

33 psychological assessment of at-risk gamers will facilitate screening efforts, as gaming time alone is insufficient

34 in distinguishing disordered gaming from non-pathological high involvement. IGD should be considered as a

35 serious public health problem that is emergent in school-going adolescent populations and we recommend

36 further studies that explore this condition in nationally/ regionally representative samples.

37

1 **SUMMARY – KNOWLEDGE TRANSLATION**
2
3 නව යොවුන් විගේ දරුවන් අතර ඉලෙක්ට්‍රොනික/ විද්‍යුත් ක්‍රීඩා ජනප්‍රිය වීම සහ තාක්ෂණික මෙවලම් වැඩියෙන් සතුව
4 තිබීම හේතුවෙන් බොහෝ අඩු සහ මධ්‍යම ආදායම් ලබන රටවල විද්‍යුත් ක්‍රීඩා ආබාධය (Internet Gaming
5 Disorder/IGD) වැඩිවෙමින් පවතී. IGD යනු ඇමරිකානු මනෝවිකිත්සක සංගමයේ (American Psychiatric
6 Association) DSM-5 වර්ගීකරණයේ සහ ලෝක සෞඛ්‍ය සංවිධානයේ ICD-11 වර්ගීකරණයේ (Gaming Disorder
7 ලෙස) සඳහන් වී ඇති මානසික ආබාධයකි. මෙම තත්වය හේතුවෙන් බොහෝ දරුවෝ මානසික අවපීඩනය, කාංසාව හා
8 නින්ද ආශ්‍රිත ගැටලු වලින් පෙළෙති. තවද ඔවුන්ගේ අධ්‍යාපනික කටයුතු මෙම තත්වය නිසා අඩාල විය හැකියි. දකුණු
9 ආසියාවේ IGD හි ව්‍යාප්තිය නොදන්නා තරම් ය. එබැවින්, ශ්‍රී ලංකාවේ පාසල් යන සිසුන් අතර IGD හි ව්‍යාප්තිය සහ ඒ
10 හා ආශ්‍රිත පෙළඹවීම් (Motivations) ඇතුළු සාධක කිහිපයක් අපගේ පර්යේෂණය තුළින් නිර්ණය කිරීම අපගේ අරමුණයි.
11
12 කොළඹ අධ්‍යාපන කලාපයේ ජාතික පාසල් හතරක ඉගෙනුම ලබන, වයස අවුරුදු 16-18 අතර උසස් පෙළ සිසුන් මෙම
13 පර්යේෂණය සිදු කිරීම සඳහා තෝරාගන්නා ලදි. අහඹු ලෙස බඳවා ගත් සිසුන් 412 දෙනෙකුගෙන්, සිසුන් 395ක්
14 පර්යේෂණයට සහභාගි වීමට කැමැත්ත පල කළේ ය. එසේ කැමැත්ත පල කළ සිසුන් විසින් විද්‍යුත් ක්‍රීඩා ක්‍රියාකාරකම් හා
15 සබැඳි පුරුදු (ක්‍රීඩාවන්හි යෙදෙන කාලය, කැමති ක්‍රීඩා වර්ග, ආදිය), පෙළඹවීම් සහ මනෝ සාධක රැගහා ගවේෂණය
16 වන ප්‍රශ්නාවලි පුරවන ලදි. විද්‍යුත් ක්‍රීඩා ආබාධය හඳුනා ගැනීම සඳහා Internet Gaming Disorder Scale – Short Form
17 (IGDS9-SF) නැමැති ප්‍රශ්නාවලිය අප යොදා ගත් අතර එම ප්‍රශ්නාවලියේ වගන්ති 9න් වගන්ති 5කට 4/5 හෝ 5/5 ලෙස
18 ප්‍රතිවාර දැක්වුවහොත් එම සිසුවාට විද්‍යුත් ක්‍රීඩා ආබාධය තිබෙනු යැයි අප විසින් තීරණය කරන ලදි.
19
20 සහභාගි වූ සිසුන්ගෙන් 81.5% ක් විද්‍යුත් ක්‍රීඩා වල යෙදී තිබුනේය. ඉන් බහුතරයක් ජංගම දුරකථනයෙන් (64.0%) ක්‍රීඩා
21 කළ අතර, PUBG® වැනි "Battle Royale" වර්ගයේ ක්‍රීඩාවන්ට (27.0%) වැඩිපුර කැමැත්තක් පල කරන ලදි. සහභාගි
22 වූ වන්දෙන් සිසුන්ගෙන් 5.06% කට අන්තර්ජාල ක්‍රීඩා ආබාධය (IGD) තිබෙනු යැයි අප විසින් සොයාගන්නා ලදි. විද්‍යුත් ක්‍රීඩාවන්හි
23 යෙදෙන සිසුන් අතර එහි ව්‍යාප්තිය 6.21% කි. මෙම තත්වය පිරිමි සිසුන් අතර වැඩියෙන් දැකගැනීමට හැකිවීම
24 විශේෂත්වයකි. තවද දිනකට පැය 6කට වඩා ක්‍රීඩා කිරීම, දෙමව්පියන් හා සමග දුර්වල සම්බන්ධතාවයක් තිබීම, ශිෂ්‍ය
25 සංගම් ආශ්‍රිත කටයුතු වල අඩුවෙන් නියැලීම යනාදිය IGD හා සබැඳි සාධක ලෙස අප විසින් සොයාගන්නා ලදි.
26 ජීවිතයේ ගැටලු සහගත තත්වයන්ගෙන් මිදීමට හෝ ෆැන්ටසි ලෝකයකට පලායෑමේ චේතනාවන්ගෙන් ක්‍රීඩා කරන
27 සිසුන් අතර මෙම තත්වය වැඩියෙන් දැකගැනීමට හැකි වූ අතර තරගකාරී මනෝභාවයකින් ක්‍රීඩා කරන සිසුන් අතර
28 මෙම තත්වය අඩුවෙන් දැකගැනීමට අපට හැකි විය.
29
30 IGD යනු සමාජයේ අලුතින් පැන නැගී ඇති මනෝසෞඛ්‍ය ගැටලුවකි. විද්‍යුත් ක්‍රීඩාවන්හි නියැලෙන සුලුතරයකට
31 පමණක් IGD ඇති විය හැකි වුවද, ශිෂුයෙන් වැඩිවෙන විද්‍යුත් ක්‍රීඩක ප්‍රජාව හමුවේ මෙය සැලකිය යුතු කාරණාවකි.
32 එබැවින්, මෙම පර්යේෂණය තුළින් සොයාගෙන ඇති සාධක ඉලක්ක වන ලෙස ප්‍රජා සෞඛ්‍ය වැඩපිළිවෙත් නිර්මාණය
33 විය යුතු යැයි අපේ නිර්දේශය යි.
34

1 **SUPPLEMENTARY MATERIAL -** The English Internet Gaming Disorder Scale – Short Form (IGDS9-SF)
2
3 These questions will ask you about your gaming activity during the **past year** (i.e., **last 12 months**). By gaming
4 activity, we understand any gaming-related activity that has been played either from a computer/laptop or from
5 a gaming console or any other kind of device (e.g., mobile phone, tablet, etc.) both online and/or offline. There
6 are no right or wrong answers.
7
8 Read each of the given statements and put an "X" on the appropriate number.
9
10 **1 = Never**
11 **2 = Rarely**
12 **3 = Sometimes**
13 **4 = Often**
14 **5 = Very Often**
15

		1	2	3	4	5
1.	Do you feel preoccupied with your gaming behavior? (Some examples: Do you think about previous gaming activity or anticipate the next gaming session? Do you think gaming has become the dominant activity in your daily life?)	1	2	3	4	5
2.	Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?	1	2	3	4	5
3.	Do you feel the need to spend increasing amounts of time engaged gaming in order to achieve satisfaction or pleasure?	1	2	3	4	5
4.	Do you systematically fail when trying to control or stop your gaming activity?	1	2	3	4	5
5.	Have you lost interests in previous hobbies and other entertainment activities as a result of your engagement with the game?	1	2	3	4	5
6.	Have you continued your gaming activity despite knowing it was causing problems between you and other people?	1	2	3	4	5
7.	Have you deceived any of your family members or others because of the amount of your gaming activity?	1	2	3	4	5
8.	Do you play in order to temporarily escape or relieve a negative mood (e.g., helplessness, guilt, anxiety)?	1	2	3	4	5
9.	Have you jeopardized or lost an important relationship, job or an educational opportunity because of your gaming activity?	1	2	3	4	5

16
17

1   **SUPPLEMENTARY MATERIAL** – The Sinhala Internet Gaming Disorder Scale – Short Form (IGDS9-SF)
2

පසුගිය වසර තුළ (එනම් පසුගිය මාස 12 තුළ) ඔබගේ විද්‍යුත් ක්‍රීඩා ක්‍රියාකාරකම් (Electronic Gaming Habits) පිළිබඳව මෙම ප්‍රශ්න මාලාවෙන් අසනු ලැබේ. මෙහිදී විද්‍යුත් ක්‍රීඩා ක්‍රියාකාරකම් ලෙස පරිගණක/ ලැප්ටොප් හෝ PlayStation®, X-box® වැනි කොන්සෝලයකින් හෝ ඕනෑම උපකරණයකින් (උදා: ජංගම දුරකථන, ටැබ්ලට් ආදිය මගින්) සිදු කරන ක්‍රීඩා සැලකිල්ලට ගනිමු. මෙහිදී අන්තර්ජාලයට සම්බන්ධ වී හෝ නොවී සිදු කරන ක්‍රීඩා දෙවර්ගයම සැලකිල්ලට ගනිමු. මෙම ප්‍රශ්න වලට නිවැරදි හෝ වැරදි පිළිතුරු නොමැත.

ලබා දී ඇති සෑම ප්‍රකාශයක්ම කියවා සුදුසු අංකයට "X" ලකුණ යොදන්න

1 = කිසිවිටක නැත
2 = කලාතුරකින්
3 = සමහර අවස්ථා වලදී
4 = බොහෝ අවස්ථා වලදී
5 = සැමවිටම පාහේ

1	ඔබ විද්‍යුත් ක්‍රීඩා (පරිගණක/ ලැප්ටොප් හෝ කොන්සෝලයකින් හෝ ජංගම දුරකථන, ටැබ්ලට් ආදිය මගින් සිදු කරන ක්‍රීඩා) වලට වුවමනාවට වඩා අවධානය යොමු කරන්නේද? (උදාහරණ කිහිපයක්: ඔබ පෙර යොමු වුනු ක්‍රීඩා වාර ගැන සිතන්නේද? නැතහොත් ඊළඟ ක්‍රීඩා වාරය අපේක්ෂාවෙන් සිටින්නේද? ඔබේ දෛනික ජීවිතයේ ඉලෙක්ට්‍රොනික ක්‍රීඩා වල යෙදීම ප්‍රමුඛතම ක්‍රියාකාරකම බවට පත්ව ඇතැයි ඔබ සිතනවාද?)	1	2	3	4	5
2	ඔබගේ විද්‍යුත් ක්‍රීඩා ක්‍රියාකාරකම් අඩු කිරීමට හෝ නැවත්වීමට උත්සාහ කරන විට වැඩි කෝපයක්, කාංසාවක් හෝ දුකක් දැනෙනවාද?	1	2	3	4	5
3	තෘප්තියක් හෝ සතුටක් ලබා ගැනීම සඳහා විද්‍යුත් ක්‍රීඩාවන්හි වැඩි වැඩියෙන් කාලය ගත කිරීමේ අවශ්‍යතාවය ඔබට දැනෙනවාද?	1	2	3	4	5
4	ඔබගේ විද්‍යුත් ක්‍රීඩා ක්‍රියාකාරකම් පාලනය කිරීමට හෝ නැවැත්වීමට උත්සාහ කිරීමේදී ඔබ අසමත් වෙනවාද?	1	2	3	4	5
5	විද්‍යුත් ක්‍රීඩාවන්හි යෙදීමේ ප්‍රතිඵලයක් ලෙස පෙර විනෝදාංශ සහ වෙනත් විනෝදාත්මක ක්‍රියාකාරකම් කෙරෙහි ඇති උනන්දුව ඔබට අහිමි වී තිබේද?	1	2	3	4	5
6	ඔබ විද්‍යුත් ක්‍රීඩාවන්හි යෙදෙන නිසා ඔබ සහා අනෙක් පුද්ගලයින් අතර ගැටලු ඇති වන බව ඔබ දැන සිටියද ඔබ විද්‍යුත් ක්‍රීඩාවන්හි දිගටම නියැලී සිටියේද?	1	2	3	4	5
7	ඔබ විද්‍යුත් ක්‍රීඩාවන්හි යෙදෙන කාලය පිළිබඳව ඔබගේ පවුලේ සාමාජිකයන් හෝ වෙනත් අය ඔබ රවටා තිබේද?	1	2	3	4	5
8	ඔබ විද්‍යුත් ක්‍රීඩාවන්හි යෙදෙන්නේ සෘණාත්මක මනෝභාවයකින් (උදා: අසරණභාවය, වරදකාරී හැඟීම්, කාංසාව ආදියෙන්) තාවකාලිව පැන යාමට හෝ සහනයක් ලබා ගැනීමටද?	1	2	3	4	5
9	ඔබ විද්‍යුත් ක්‍රීඩා හේතුවෙන් වැදගත් පුද්ගල සම්බන්ධතාවයන් හෝ අධ්‍යාපනික අවස්ථා හෝ රැකියා අවස්ථා අහිමි කරගෙන හෝ අවදානමට ලක් කරගෙන තිබේද?	1	2	3	4	5

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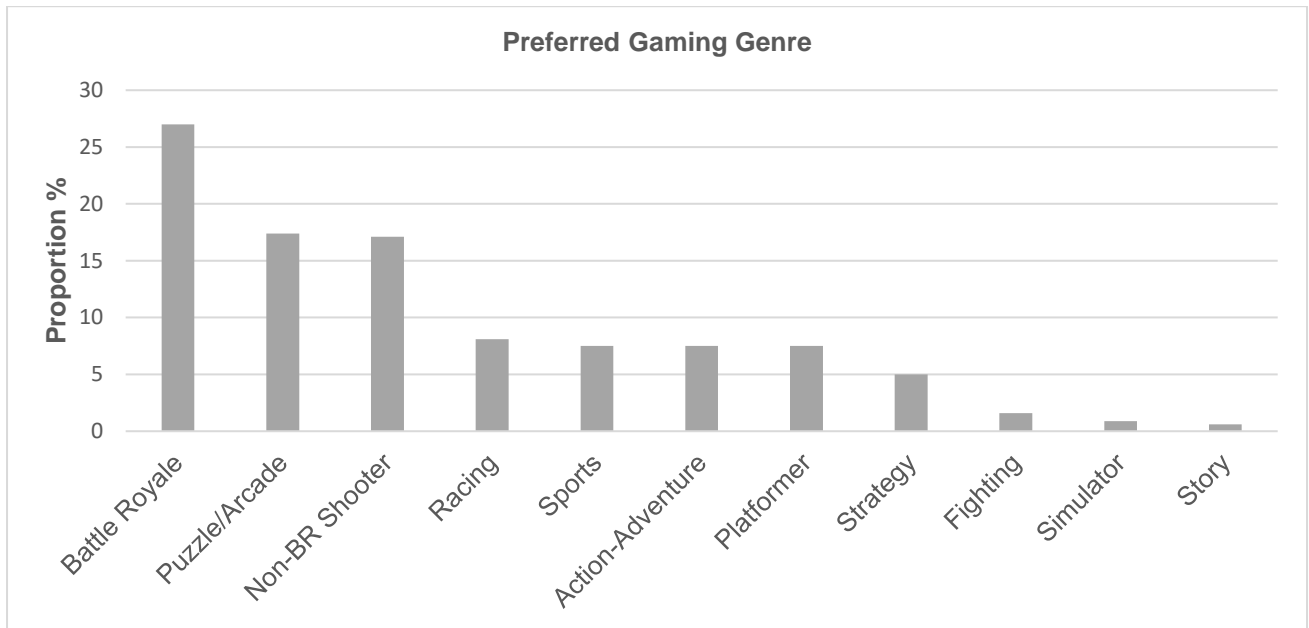3   September 1, 2021.
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19

1   **FIGURES AND TABLES.**

2

3   *Figure 1 -* Distribution of gamers in the sample according to the preferred game genre (n=322).

4

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6

1   *Table 1* - Frequency Distribution of Sample Characteristics.

2

	Count	Percentage
Ethnicity (n=395)		
Sinhala	306	77.5
Tamil	46	11.6
Muslim	37	9.4
Burgher	6	1.5
Monthly Income in LKR (n=395)		
<20,000	8	2.0
20,000 – 49,999	41	10.4
50,000 – 99,999	111	28.1
100,000 – 199,999	125	31.6
200,000 or more	110	27.8
Number of siblings (n=395)		
None	49	12.4
One	211	53.4
Two	104	26.3
Three or more	31	7.8
Stream of study (n=395)		
Biological Science	88	22.3
Physical Science	97	24.6
Commerce	130	32.9
Arts	70	17.7
Other (Miscellaneous)	10	2.5
Hours of sleep per day (n=395)		
Less than four	14	3.5
Four to five	118	29.9
Six to seven	225	57.0
Eight or more	38	9.6
Weekday gaming hours (n=322)		
One or less	172	53.4
Two to three	91	28.3
Four to five	39	12.1
Six to seven	18	5.6
Eight to ten	2	0.6
Weekend gaming hours (n=322)		
One or less	131	40.7
Two to three	101	31.4
Four to five	55	17.1
Six to seven	23	7.1
Eight to ten	9	2.8
Eleven or more	3	0.9
Starting age of gaming (n=322)		
Less than five years old	26	8.1
Five to seven years old	35	10.9
Eight to ten years old	80	24.8
11 to 13 years old	76	23.6
14 to 16 years old	69	21.4
Started recently	36	11.2
Preferred Device (n=322)		
Personal Computer	63	19.5
Mobile Phone	206	64.0
Tablet	24	7.5
Gaming Console	29	9.0
Type of Games (n=322)		
Online Multiplayer	164	50.9
Online Single Player	49	15.2
Offline Single Player	109	33.9

3

1 **Table 2** - Bivariate Analysis of Factors Associated with Internet Gaming Disorder.

2

	No IGD		IGD		Total	Significance
	n=302	**%**	**n=20**	**%**	**n=322**	
Age						χ^2 = 0.768
16 - 17	214	93.0	16	7.0	230	p = 0.381
18	88	95.7	4	4.3	92	
Sex						$\boldsymbol{\chi^2}$ **= 7.037**
Male	165	90.7	17	9.3	182	**p = 0.008**
Female	137	97.9	3	2.1	140	
Ethnicity						
Sinhala	232	93.2	17	6.8	249	p = 0.582*
Other	70	95.9	3	4.1	73	
Income (LKR)						χ^2 = 0.20
<100,000	116	93.5	8	6.5	124	p = 0.888
≥100,000	186	93.9	12	6.1	198	
No. of Siblings						χ^2 = 1.721
One or less	195	95.1	10	4.9	205	p = 0.19
Two or more	107	91.5	10	8.5	117	
Medium						$\boldsymbol{\chi^2}$ **= 4.446**
Sinhala	138	89.8	14	9.2	152	**p = 0.035**
English	164	96.4	6	3.5	170	
Stream						χ^2 = 0.084
Science	146	94.2	9	5.8	155	p = 0.772
Non-science	156	93.4	11	6.6	167	
Hours of sleep						χ^2 = 0.439
Five or less	97	95.1	5	4.9	102	p = 0.507
More than five	205	93.2	15	6.8	220	
Sports						χ^2 = 0.02
None/Minor	186	93.9	12	6.1	198	p = 0.888
Moderate/Major	116	93.5	8	6.5	124	
Unions						$\boldsymbol{\chi^2}$ **= 5.455**
None/Minor	177	91.2	17	8.8	194	**p = 0.02**
Moderate/Major	125	97.7	3	2.3	128	
Aesthetics						χ^2 = 1.689
None/Minor	151	92.1	13	7.9	164	p = 0.194
Moderate/Major	151	95.6	7	4.4	158	
Online Learning						χ^2 = 0.956
Low	42	95.5	2	4.5	44	p = 0.620
Moderate	77	91.7	7	8.3	84	
High	183	94.3	11	5.7	194	
Parent-Child						
Poor relationship	8	61.5	5	38.5	13	**p = 0.001***
Neutral	36	97.3	1	2.7	37	
Good relationship	258	94.9	14	5.1	272	
Teacher-Student						
Poor relationship	12	75.0	6	33.3	18	**p = 0.001***
Neutral	67	97.0	2	2.9	69	
Good relationship	223	94.1	12	5.1	235	
Self-appearance						$\boldsymbol{\chi^2}$ **= 12.66**
Satisfied	136	97.8	3	2.2	121	**p = 0.002**
Neutral	109	94.0	7	6.0	105	
Not satisfied	57	85.1	10	14.9	61	
Number of friends						χ^2 = 1.341
Many	225	94.5	13	5.5	238	p = 0.512
Moderate	42	93.3	3	6.7	45	
None/Few	35	89.7	4	10.3	39	
Self-esteem						χ^2 = 3.501
Low	27	100	0	0	27	df = 2

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Moderate	88	90.7	9	9.3	97	p = 0.174
High	187	94.4	11	5.6	198	
Weekday gaming hours						
Less than 6h per day	290	96.0	12	4.0	302	**p < 0.001***
6h or more per day	12	60.0	8	40.0	20	
Weekend gaming hours						
Less than 6h per day	276	96.2	11	3.8	287	**p < 0.001***
6h or more per day	26	74.3	9	25.7	35	
Preferred type						χ^2 = 0.819
Online Multiplayer	152	93.1	12	7.3	164	p = 0.664
Online Single Player	47	95.6	2	4.1	49	
Offline Single Player	103	93.8	6	5.5	109	
Preferred genre						χ^2 **= 11.76**
Battle Royale	75	86.2	12	13.8	87	**p = 0.001**
Other	227	96.6	8	3.4	235	
Preferred device						χ^2 = 0.745
Mobile Phone	195	94.7	11	5.3	206	p = 0.388
Other	107	92.2	9	7.8	116	
Starting age of gaming						χ^2 = 0.013
10 years or less	132	93.6	9	6.4	141	p = 0.91
Older than 10 years	170	93.9	11	6.1	181	

1 *Fisher's exact test was conducted. Significant associations (p<0.05) are given in bold.*
2

1   **Table 3 -** Multivariable Logistic Regression Model Retaining Significant Associations of Internet Gaming
2   Disorder (n=322).
3

Variable	*B*	Odds Ratio (95% CI)	p value
Involvement in student societies [a]			
• None/Minor	1.985	7.277 (1.420 – 37.288) *	0.017
Parent-Child Relationship [b]			0.003
• Poor	2.625	13.81 (2.571 – 74.174) **	0.002
• Neutral	-2.058	0.128 (0.009 – 1.85)	0.131
Escape	0.283	1.327 (1.108 – 1.588) **	0.002
Competition	-0.183	0.833 (0.713 – 0.973) *	0.021
Fantasy	0.190	1.209 (1.058 – 1.382) **	0.005
Daily Weekday Gaming Hours [c]			
• 6 hours or more	1.934	6.917 (1.735 – 27.569) **	0.006
Constant	-7.788		

4   ** Significant at p<0.05*

5   *** Significant at p<0.01*

6   *[a] Reference category is Moderate/Major involvement.*

7   *[b] Reference category is Good Relationship.*

8   *[c] Reference category is Less than 6 hours.*

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