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## PREDISPOSING ADDICTION FACTOR TO GAME ONLINE : A SYSTEMATIC REVIEW

**Boby Nurmagandi<sup>1\*</sup> Achir Yani S. Hamid<sup>1</sup>**

<sup>1</sup>Fakultas Keperawatan, Universitas Indonesia, Indonesia

\*Correspondence email : nurmagandi.bob@gmail.com

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### ABSTRACT

Playing a complete online game can cause health problems such as decreased sleep quality, insomnia, cardiovascular problems, vision and coping with hands when psychosocial problems are caused such as stress, anxiety, recovery and increased levels of life satisfaction. A systematic review to determine the predisposing factors of online addiction games to be used as a reference in disputing efforts. ProQuest, ScienceDirect, Scopus, SAGE Publications and EBSCO host databases for 2015-2020 are based on established inclusion and exclusion criteria. Article identification using PRISMA guidelines obtained 14 articles that meet the requirements. The results of the 14 articles review obtained by biological online game predisposing factors, namely dysfunctional impulsive, male sex, appetite. Psychological aspects that describe physical and verbal abuse and intimidation, lack of attention, stress, anxiety, depression, low self-defence, self-esteem problems, low self-control, low self-efficacy, low life expectancy, motivation, emotional motivation and attention from the environment. While the sociocultural aspects are social support and control, the length of time and devices used to play online games, types of online games, social relations that are vulnerable, hyperactivity, dissociation, looking for fun, suitable daily activities, and active in the online gaming community. Predisposing factors can be protective and the risk of individuals using online game addiction based on the coping protection used.

**Keywords:** Predisposing Factors; Online Gaming; Addiction

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### INTRODUCTION

Online gaming is an electronic game that needs an internet connection when played to connect with other players.<sup>1</sup> Online gaming causes players to collaborate with others to play and finish the mission according to the aim of the game.<sup>2</sup> Players can also compare their scores they get to other players and challenge each other or collaborate to play the game.<sup>3</sup> Online gaming was first presented in Indonesia on 2001 and develops quickly nowadays.<sup>4</sup>

On 2017, there are 54,68% of Indonesians who use internet, of which 54,13% play online games.<sup>5</sup> Indonesia is one of the biggest online gaming market globally and the biggest in Southeast Asia.<sup>6</sup> The income from gaming industry in Indonesia on

2017 is US\$ 879,7 million, it is greater than Singapore, US\$ 317,6 million, and Malaysia, US\$ 586,6 million.<sup>6</sup>

Playing online games frequently can cause health problems particularly addiction.<sup>7</sup> Clinical distress can also appear in teenagers who often play online games.<sup>8</sup> Bullying often occurs among game players because of their inability to play as good as others which can make it harder for other players and leads to insults, intimidation, getting kicked out from the game,<sup>9</sup> or having bad quality of sleep caused by decreased mental health status.<sup>10</sup> Physical problems that often occur are insomnia, cardiovascular problems, vision problems, pain on the wrist, and hyperactive.<sup>11</sup> Psychosocial problems such as stress, anxiety, indication of

depression, and low life satisfaction can also be experienced.<sup>12</sup> Anxiety and depression increase the risk of suicide.<sup>13</sup>

Online gaming already raises concerns about the impact or the outcomes, several cases about gaming addiction have been reported that violence and death can happen from banning the kids off the game.<sup>14</sup> Harassment and violent at school were also reported on some cases in Korea caused by gaming addiction.<sup>15</sup> There are 206 kids and teenagers who had been treated and diagnosed with gaming addiction at the psychiatric hospital in West Java since 2016.<sup>16</sup>

Based on the issues stated, prevention is needed to avoid gaming addiction. Prevention can be done with identification of the predisposing factor of gaming addiction. Predisposing factor is risk factors and protective that affect the quality and quantity of resources to subdue the risk of addiction. The predisposing factor consists of psychological, biological, and socio-cultural factors.<sup>9</sup> Thus, writers suggest that we need to discover specifically the predisposing factor of gaming addiction and identification of prevention towards gaming addiction can be done.

## **MATERIAL AND METHODS**

### **Aim**

The goal of this systematic review is to gain information about predisposing factors of gaming addiction. The predisposing factors consist of risk factors and protective factors.

### **Resources**

We collected the articles from ProQuest, ScienceDirect, Scopus, SAGE Publication, and EBSCO host databases which were published on 2015-2020. The title and abstract keywords used for the search were: (“risk factor” or “predictor”) AND (“internet

gaming disorder” or “online gaming addiction”).

### **Inclusion and Exclusion Criteria**

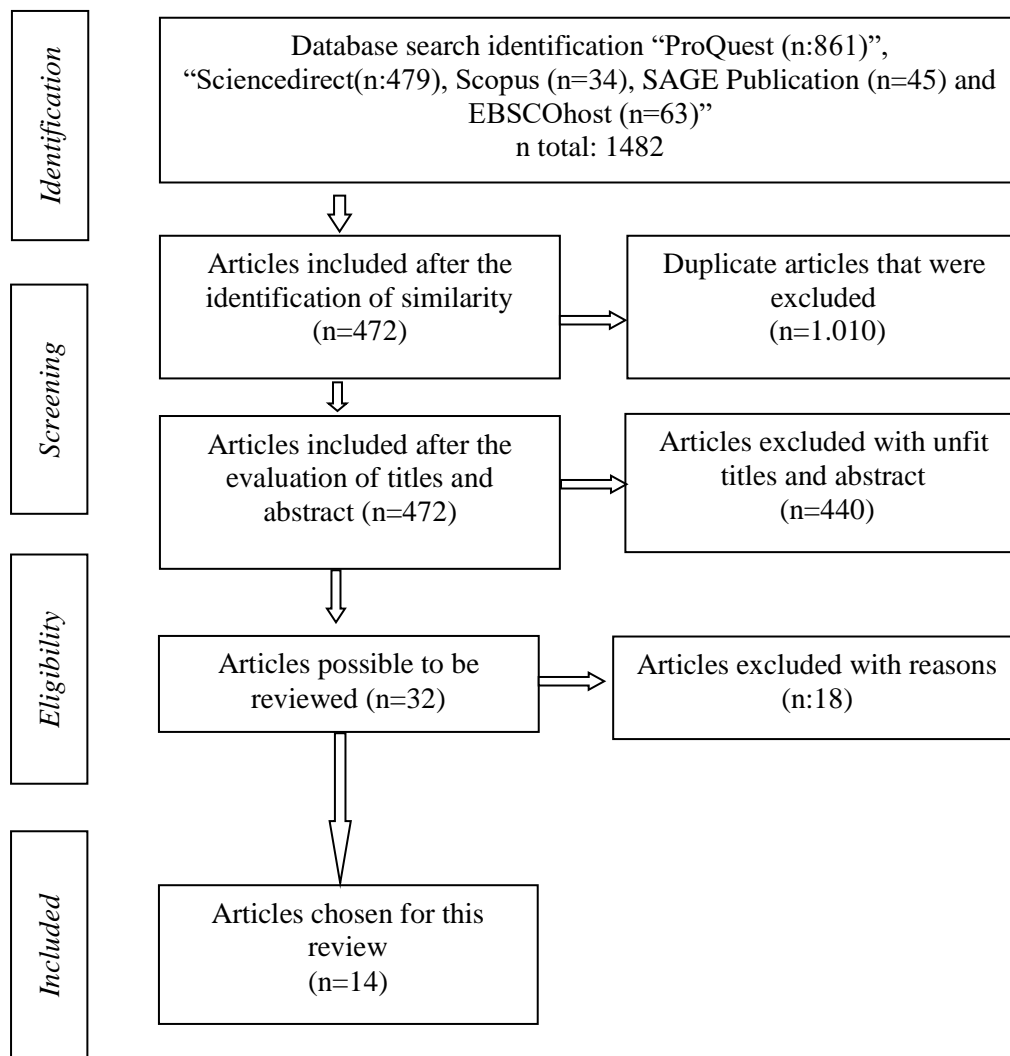
The articles should meet these criteria: (1) written in English, (2) quantitative studies, (3) the subjects were teenagers or adults who frequently play online game, (4) subjects had or had not been diagnosed with internet gaming disorder (IGD). Articles would be excluded if: (1) explained about treatment of IGD, (2) systematic review studies.

### **Article Identification**

PRISMA guidelines were followed to identify the articles using these steps: (1) identify the topics to be reviewed, (2) assign the questions for the research, (3) determine the keywords used for literature search adopting PICO methods, articles that met the criteria were listed manually (4) screened the similarity among selected articles from all databases, (5) articles with relevant titles and abstracts were selected, (6) filter the article according the inclusion and exclusion criteria, (7) decide the chosen articles to be analyzed. Figure 1 shows a summary of articles selection using PRISMA guidelines.

### **Article Selection**

The search from all databases gathered 1482 articles, then the articles sorted by the similarity among all databases manually and gathered 472 articles. The evaluation of titles and abstracts gathered 32 articles. The articles identified according inclusion and exclusion lists. We identified 14 potential articles in this review. Table 1 provided a list of 14 articles which were chosen and analysed using tools Joanna Briggs Institute 2017. Samples were taken from gamers, students, teenagers, adults, and individual who has or has not been diagnosed with IGD. The studies were located on Asia and Europe to collect more diverse data characteristics.



**Figure 1.** Article selection process

## RESULTS

Biological predisposing factors of gaming addiction are dysfunctional impulsivity, boys, and appetite. Psychological features are previous emotional neglect at young ages, previous physical or verbal harassment at young ages, previous bullying by gaming friends, stress, anxiety, depression, low self-control, low self-efficacy, poor tenacity, motivation to play, emotional intelligence,

and affection from the surroundings. The sociocultural aspects are social control, duration of playing games, equipment to play games such as smartphone and computer, types of the game, hyperactive, sensational seeking, dissociation behavior, activities other than playing games, and active participation in gaming community.

**Table 1.** Predisposing factors of game online addiction

No	Title	Author	Year	Design	Country	Subjects	Result	
							Risk Factors	Protective Factors
1	Adverse childhood experiences, dissociation, and anxious attachment style as risk factors of gaming disorder. <sup>17</sup>	Piotr Grajewski dan Małgorzata Dragan	2020	<i>A cross-sectional survey</i>	Poland	1.288 gamer	Previous neglect and emotional harassment at young age, dissociation behavior, and anxiety can be the predictors of IGD	
2	Prevalence and Interpersonal Correlates of Internet Gaming Disorders among Chinese Adolescents. <sup>18</sup>	Xue Yang, Xuewen Jiang, Phoenix Kit-han Mo, Yong Cai, Le Ma dan Joseph Tak-fai Lau	2020	<i>A cross-sectional survey</i>	China	2.666 teenagers	Previous psychological control by parents, verbal or physical harassment from parents or teachers, bullied by friends at school or online friends have correlation on incidence of IGD	
3	The Predictive Value of Emotional Intelligence for Internet Gaming Disorder: A 1-Year Longitudinal Study Della. <sup>19</sup>	Della L. Dang, Meng Xuan Zhang, Karlas Kin-hei Leong dan Anise M. S. Wu	2019	<i>A Longitudinal Study</i>	China	282 students of Chinese university		The result stated that emotional intelligence can protect individual towards the tendency of getting IGD
4	A Comparison of Risk and Protective Factors for Excessive Internet Game Play between Koreans in Korea and Immigrant Koreans in the United States. <sup>20</sup>	Ji Sun Hong, Sun Mi Kim, Jae-Woo Jung, So Young Kim, Un-Sun Chung, dan Doug Hyun Han	2019	<i>A cross-sectional survey</i>	South Korea	94 teenagers and 133 Korean immigrants in USA		Having physical activities, extracurricular classes, reading books, and playing musical instruments are protecting factors in the occurrence of IGD
5	Associations among resilience, stress, depression, and internet gaming disorder in young adults. <sup>21</sup>	Ju-Yu Yen, Huang-Chi Lin, Wei-Po Chou, Tai-Ling Liu dan Chih-Hung Ko	2019	<i>A cross-sectional survey</i>	China	174 subjects, which 87 people diagnosed with IGD and 87 people without IGD	Individuals with poor tenacity are at risk of having IGD	
6	Examining the factors contributing to adolescents' online game addiction. <sup>22</sup>	Seyhan Bekir dan Eyüp Çelikk	2019	<i>A cross-sectional survey</i>	Turkey	214 high school students	There is a positive and significant relation between IGD, sensation seeking behavior, and the urge of fulfilling psychological needs	

7	A longitudinal study on psychosocial causes and consequences of Internet gaming disorder in adolescence. <sup>23</sup>	Lutz Wartberg, Levente Kriston, Matthias Zieglmeier, Tania Lincoln dan Rudolf Kammerl	2019	<i>A longitudinal study</i>	Germany	1095 families who have 12-14 years old teenagers	Boys, hyperactive behavior, lack of attention, and pride issues are risk factors of the development of IGD	
8	Predicting the time spent playing computer and mobile games among medical undergraduate students using interpersonal relations and social cognitive theory: A cross-sectional survey in Chongqing, China. <sup>24</sup>	Li Chen, Ruiyi Liu, Huan Zeng, Xianglong Xu, Rui Zhu, Manoj Sharma dan Yong Zhao	2018	<i>A cross-sectional survey</i>	China	1557 medical university students	Self-control, self-efficacy, and low hopes are individual risk factors of IGD incidence	
9	Risk factors for internet gaming disorder: Psychological factors and internet gaming characteristics. <sup>25</sup>	Mi Jung Rho, Hyeseon Lee, Taek-Ho Lee, Hyun Cho, Dong Jin Jung, Dai-Jin Kim dan In Young Choi	2018	<i>A cross-sectional survey</i>	Korea	3568 internet gamers	The risk factors of internet gaming disorder are impulsivity dysfunctional, low self-esteem, anxiety, appetite, money and time spent for playing games, and participating in gaming community	
10	Predicting Internet Gaming Disorder symptoms in young adolescents: A one-year follow-up study. <sup>26</sup>	Margot Peeters, Ina Koning dan Regina van den Eijnden	2018	<i>A longitudinal study</i>	Netherland	544 participants	Teenagers with attention issues and social vulnerability have higher risks of getting IGD	
11	The interplay among stress, frustration tolerance, mindfulness, and social support in Internet gaming disorder symptoms among Chinese working adults. <sup>27</sup>	Shu Yu, Sijie Mao dan Anise M.S. Wu	2018	<i>A cross-sectional study</i>	China	327 adults	Stress is one of the risk factors of IGD	Tolerance towards frustration, affection, and social support are the inhibition factor of having IGD
12	Video gaming in a hyperconnected world: A cross-sectional study of heavy gaming, problematic gaming symptoms, and	Michelle Colder Carras, Antonius J. Van Rooij, Dike Van de Mheen, Rashelle	2017	<i>A cross-sectional survey</i>	Netherland	9733 teenagers	Types of online games that have a lot of interactions online have a low risk of causing the internet gaming disorder	

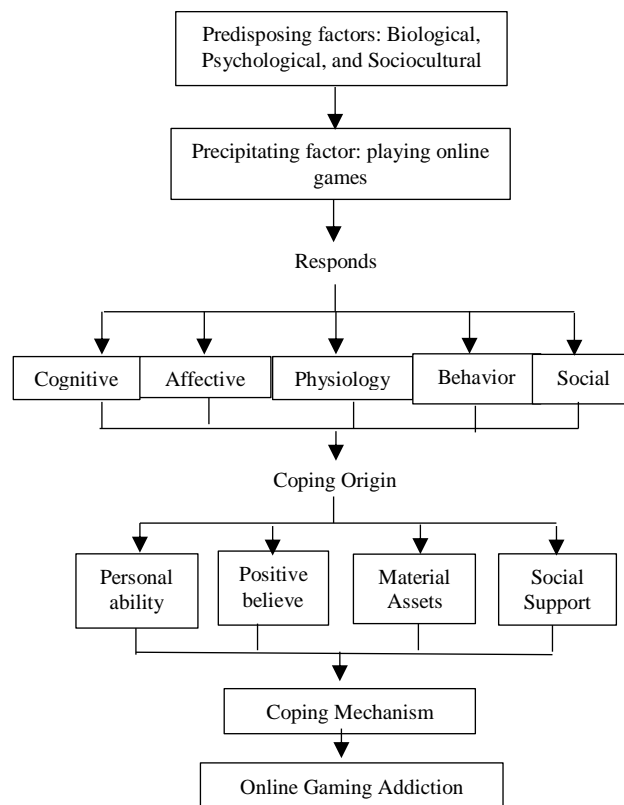
	online socializing in adolescents. <sup>28</sup>	Musci, Qian-Li Xue dan Tamar Mend						
13	Gaming device usage patterns predict internet gaming disorder: Comparison across different gaming device usage patterns. <sup>29</sup>	Soo-Hyun Paik, Hyun Cho, Ji-Won Chun, Jo-Eun Jeong dan Dai-Jin Kim	2017	<i>A cross-sectional survey</i>	Korea	7200 participants		Individual who plays game from computer and smartphone has higher risks of getting IGD, while individual who plays game only from smartphone has lower risks of having IGD
14	Internet gaming disorder, motives, game genres and psychopathology. <sup>30</sup>	St_ephanie Laconi, Sophie Pires dan Henri Chabrol	2017	<i>A cross-sectional survey</i>	France	418 online gamers		Duration of playing online games, individual motivation in playing games, and depression symptoms are significant predictors of occurrence of IGD

## DISCUSSION

Biological predisposing factor of online gaming are dysfunctional impulsivity, boys, and appetite. Online gaming shows competitive gaming structure and attracts boys' attention rather than girls'.<sup>30</sup> Boys have mild aggressiveness with hostility as the dominant aspect.<sup>31</sup> This condition is supported by the availability of violent games,<sup>32</sup> such as FPS (first person shooter) and MMROPG (massively multiplayer online role play gaming) types, for instance PUBG (Player Unknown Battle Ground) or GTA (Grand Theft Auto).

Psychological predisposing aspects are low self-resilience.<sup>21</sup> Low self-resilience can cause individuals prone of having psychological problems, such as anxiety, depression, low self-esteem, and suicidal thoughts.<sup>33</sup> Those psychological problems

can affect their emotional intelligence and coping ability. Individuals with good emotional intelligence have lower risk of getting game online addiction.<sup>19,23</sup> Psychopathologic conditions (ADHD, anxiety, depression, and impulsivity) are the risk factors of online gaming addiction.<sup>34</sup> An individual with low self-control is also at risk having online gaming addiction.<sup>23-25</sup> Teenagers with attention problems and social vulnerability are also have the same risks.<sup>24</sup> Previous harassment, physical or verbal violence, bullied by friends, and have dissociation attitude can be the predictor factors of online gaming addiction.<sup>17,18</sup> Individual with previous neglect or emotional torture can lead to emotional dysregulation or inability to control emotion in daily life.<sup>35</sup>



**Figure 2.** Steps of online gaming addiction

Sociocultural predisposing factors are individual with social problems or ability of socializing in real life.<sup>26</sup> Teenagers who could not socializing in real life,<sup>24</sup> use games as their runaway to hide the problem.<sup>28</sup> Online gaming provides feature to gain friends and interact with other players. This condition is prone to social mechanism.<sup>36</sup> Games compensate the need of having interpersonal relation for individuals who have anti-social behavior. Individuals who withdraw themselves are also at risk getting online gaming addiction.<sup>37</sup> This condition can increase the game screentime.<sup>30</sup> The risk of getting addicted will be higher if the duration of playing games is longer.<sup>33</sup>

Predisposing factors stated before are triggering the online gaming addiction when supported by the precipitating factor, which is playing the online games. This condition depends on the way an individual responding to the trigger. The responds can be cognitive, affective, physiology, behavior, and social aspects (Figure 2). From cognitive aspect, individual acknowledges the fun they get from playing games and notice the further effect on cognitive ability.<sup>38</sup> Individual can think about their games during daily activities.<sup>39</sup> Gamers have difficulty on self-assessment and surroundings,<sup>40</sup> perseverance issues, and trouble in speaking words, sentences, or ideas<sup>34</sup>

There are also several affective responds caused by playing games. Frequent gaming can lead to anxiety, depression, or inability to control emotions.<sup>40</sup> Individual can also experience anger, anxious, and lose interest on other activities than playing games<sup>39</sup> On social aspect, gamers play their game as a way of socializing with other gamers because they are not able to socialize in real life. They can also lose their relation with others because they choose to play games. This condition is affected by their inability to tolerate, control or decrease their screen time to play games.<sup>39</sup>

Physiologically, online gaming can cause lower physiological function and lead to decrease sleep time and food intake. Insomnia, cardiovascular problems, eyesight problems, pain on the wrist, and hyperactive can also happen.<sup>11</sup> It can also cause uncontrollable behavior when playing games to fulfill pleasure, as a form of getaway to connect with other gamers, reduce anxiety, sadness, or depression. Individual who is satisfied will not seek for sensation to fill their psychological needs. Person with low life-satisfaction tends to depend on games in fulfilling their satisfaction.<sup>41</sup>

Those conditions increase the risk of having online gaming addiction if not supported by adequate coping sources (Figure 2). Coping sources which can be used are personal ability, social support, material assets, and personal beliefs, so an individual can avoid the addiction. Ability to inhibit the addiction is to limit the screen time and only play the game on spare time or for hobbies without neglecting other activities, such as school works, house or work duties. Individual with physical activity, extracurricular classes, habit of reading books or playing musical instruments can protect oneself from online gaming addiction.<sup>20</sup> The ability to tolerate towards frustration or psychosocial problems can also protect from addiction.<sup>27</sup> Individuals are expected to search information, identify problems, find alternatives, and implement actions towards risks of having online gaming addiction.<sup>9</sup>

Always monitor and warn someone to limit their screen time on games are forms of social support. Their surroundings need to support other activities and act as social control towards their habit of playing games<sup>27</sup> Supervision and attention are needed for teenagers who play online games.<sup>23</sup> The aim of supervision is to inhibit the action of playing games repeatedly<sup>42</sup> Material assets are stuff or anything that can be bought with money. Good financial condition can provide resources for coping towards stressors.<sup>9</sup> Whereas personal belief



is the hope for individuals to overcome stressor with adaptive coping mechanisms.<sup>9</sup>

Coping sources are affected by personal judgements towards stressor. The judgements then form coping mechanisms. Individuals with adequate coping sources will overcome stressor with the right way, which called constructive coping mechanisms, and create adaptive responds. On the contrary, when someone could not handle the stressor, called destructive coping mechanisms, maladaptive respond will occur.<sup>9</sup> These conditions are the predictor of which coping mechanisms will be used by individuals to manage their habit of playing online games.

## CONCLUSION

Predisposing factors can be used to portray risks of having online gaming addiction and affected by behaviors when playing online games. Family support and supervision are needed to increase the usage of positive coping mechanisms towards the behavior of playing games.

Development of early detection instruments is necessary for determination of further action towards online gaming addiction preventions.

## REFERENCES

1. Sanditaria W. ADIKSI BERMAIN GAME ONLINE PADA ANAK USIA SEKOLAH DI WARUNG INTERNET PENYEDIA GAME ONLINE JATINANGOR SUMEDANG. *Fak Ilmu Keperawatan Univ Padjadjaran*. 2012;1(1):1–15.
2. Kim EJ, Namkoong K, Ku T, Kim SJ. The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *Eur Psychiatry*. 2008;23(3):212–8.
3. Aburahmah L, Alrawi H, Izz Y, Syed L. Online Social Gaming and Social Networking Sites. *Procedia Comput Sci [Internet]*. 2016;82(March):72–9. Available from: <http://dx.doi.org/10.1016/j.procs.2016.04.011>
4. Hanum K. Aktivitas Game Online Siswa SD ( Kelas 3-6 ) ( Studi Deskriptif Di Warnet Kelurahan Gunung Anyar Kota Surabaya ). *AntroUnairdotNet*. 2015;4(2):137–46.
5. Kominfo. Perilaku Pengguna Internet Indonesia. 2017; Available from: [https://web.kominfo.go.id/sites/default/files/Laporan\\_Survei\\_APJII\\_2017\\_v1.3.pdf](https://web.kominfo.go.id/sites/default/files/Laporan_Survei_APJII_2017_v1.3.pdf)
6. Nabila. Melirik Potensi Besar Industri “Gaming” di Indonesia. Nabila, M. (2017). Melirik Potensi Besar Industri “Gaming” di Indonesia. Retrieved from <https://dailysocial.id/post/melirik-potensi-besar-industri-gaming-di-indonesia> [Internet]. Daily Social id : business. 2017. Available from: <https://dailysocial.id/post/melirik-potensi-besar-industri-gaming-di-indonesia>
7. Weinstein. AM. Computer and video game addiction – a comparison between game users and non game users. *The American Journal of Drug and Alcohol Abuse*. 2010;
8. American Psychiatric Association. Internet Gaming Disorder. 2013;2014(01.02.2014):8640. Available from: [http://www.dsm5.org/Documents/Internet\\_Gaming\\_Disorder\\_Fact\\_Sheet.pdf](http://www.dsm5.org/Documents/Internet_Gaming_Disorder_Fact_Sheet.pdf) %0Ahttps://www.psychiatry.org/psychiatrists/practice/dsm/educational-resources/dsm-5-fact-sheets
9. Stuart GW. Prinsip dan Praktik Keperawatan Kesehatan Jiwa Stuart (J. P. Buni Anna Keliat, Trans. J. P. Budi Anna Keliat Ed.). Singapore: Elsevier; 2016.
10. Altintas E, Karaca Y, Hullaert T, Tassi P. Sleep quality and video game playing: Effect of intensity of video game playing and mental health. *Psychiatry Res [Internet]*. 2019;273(January):487–92. Available from: <https://doi.org/10.1016/j.psychres.2019.01.030>

11. Choi JO. Influence of youth internet game addiction on ADHD and academic achievement - focusing on elementary school students in Seoul, Incheon, and Gyeonggi region. *Korea Inst Youth Facil Environ* [Internet]. 2014;12(2):19–28. Available from: <https://www.scopus.com/record/display.uri?eid=2-s2.0-85053783759&origin=inward&txGid=1eb9e38f06e0b1e509137f062f2d27c2>
12. Barger AH, Hormes JM. Psychosocial correlates of internet gaming disorder: Psychopathology, life satisfaction, and impulsivity. *Comput Human Behav* [Internet]. 2017;68:388–94. Available from: <http://dx.doi.org/10.1016/j.chb.2016.11.029>
13. Zhang J, Liu X, Fang L. Combined effects of depression and anxiety on suicide: A case-control psychological autopsy study in rural China. *Psychiatry Res*. 2019;271(January 2018):370–3.
14. Rondon MB, Stewart DE. Excessive gambling and gaming: addictive disorders? *The Lancet Psychiatry* [Internet]. 2018;4(6):433–5. Available from: [http://dx.doi.org/10.1016/S2215-0366\(17\)30210-9](http://dx.doi.org/10.1016/S2215-0366(17)30210-9)
15. Kim JY, Lee JS, Oh S. A Path Model of School Violence Perpetration: Introducing Online Game Addiction as a New Risk Factor. *J Interpers Violence*. 2017;32(21):3205–25.
16. Kamaludin. Waspada! Game Online, Sudah 209 Anak Dirawat di RS Jiwa Cisarua karena Kecanduan Main Handphone [Internet]. *Tribun Jabar*. 2019. Available from: <https://jabar.tribunnews.com/2019/10/15/waspada-game-online-sudah-209-anak-dirawat-di-rs-jiwa-cisarua-karena-kecanduan-main-handphone>
17. Grajewski P, Dragan M. Addictive Behaviors Reports Adverse childhood experiences, dissociation, and anxious attachment style as risk factors of gaming disorder. *Addict Behav Reports* [Internet]. 2020;(February):100269. Available from: <https://doi.org/10.1016/j.abrep.2020.100269>
18. Yang X, Jiang X, Mo PKH, Cai Y, Ma L, Lau JTF. Prevalence and interpersonal correlates of internet gaming disorders among Chinese adolescents. *Int J Environ Res Public Health*. 2020;17(2).
19. Dang DL, Zhang MX, Leong KKH, Anise MSW. The predictive value of emotional intelligence for internet gaming disorder: A 1-year longitudinal study. *Int J Environ Res Public Health*. 2019;16(15):12–5.
20. Hong JS, Kim SM, Jung JW, Kim SY, Chung US, Han DH. A comparison of risk and protective factors for excessive internet game play between Koreans in Korea and immigrant Koreans in the United States. *J Korean Med Sci*. 2019;34(23):1–13.
21. Yen JY, Lin HC, Chou WP, Liu TL, Ko CH. Associations among resilience, stress, depression, and internet gaming disorder in young adults. *Int J Environ Res Public Health*. 2019;16(17).
22. Bekir S, Çelik E. Examining the factors contributing to adolescents' online game addiction. *An Psicol*. 2019;35(3):444–52.
23. Wartberg L, Kriston L, Zieglmeier M, Lincoln T, Kammerl R. A longitudinal study on psychosocial causes and consequences of Internet gaming disorder in adolescence. *Psychol Med*. 2019;49(2):287–94.
24. Chen L, Liu R, Zeng H, Xu X, Zhu R, Sharma M, et al. Predicting the time spent playing computer and mobile games among medical undergraduate students using interpersonal relations and social cognitive theory: A cross-sectional survey in Chongqing, China. *Int J Environ Res Public Health*. 2018;15(8).
25. Rho MJ, Lee H, Lee TH, Cho H, Jung

- DJ, Kim DJ, et al. Risk factors for internet gaming disorder: Psychological factors and internet gaming characteristics. *Int J Environ Res Public Health*. 2018;15(1):1–12.
26. Peeters M, Koning I, van den Eijnden R. Predicting Internet Gaming Disorder symptoms in young adolescents: A one-year follow-up study. *Comput Human Behav [Internet]*. 2018;80:255–61. Available from: <https://doi.org/10.1016/j.chb.2017.11.008>
  27. Yu S, Mao S, Wu AMS. The interplay among stress, frustration tolerance, mindfulness, and social support in Internet gaming disorder symptoms among Chinese working adults. *Asia-Pacific Psychiatry*. 2018;10(4).
  28. Colder Carras M, Van Rooij AJ, Van de Mheen D, Musci R, Xue QL, Mendelson T. Video gaming in a hyperconnected world: A cross-sectional study of heavy gaming, problematic gaming symptoms, and online socializing in adolescents. *Comput Human Behav [Internet]*. 2017;68:472–9. Available from: <http://dx.doi.org/10.1016/j.chb.2016.11.060>
  29. Paik SH, Cho H, Chun JW, Jeong JE, Kim DJ. Gaming device usage patterns predict internet gaming disorder: Comparison across different gaming device usage patterns. *Int J Environ Res Public Health*. 2017;14(12).
  30. Laconi S, Pirès S, Chabrol H. Internet gaming disorder, motives, game genres and psychopathology. *Comput Human Behav*. 2017;75:652–9.
  31. Fitri, Luawo, Puspasari. GAMBARAN AGRESIVITAS PADA REMAJA LAKI-LAKI SISWA SMA NEGERI DI DKI JAKARTA. *Insight J Bimbingan Konseling*. 2016;5(2):155–68.
  32. Buiza-Aguado C, Alonso-Canovas A, Conde-Mateos C, Buiza-Navarrete JJ, Gentile D. Problematic video gaming in a young Spanish population: Association with psychosocial health. *Cyberpsychology, Behav Soc Netw*. 2018;21(6):388–94.
  33. Jeong H, Yim HW, Lee SY, Lee HK, Potenza MN, Kwon JH, et al. Discordance between self-report and clinical diagnosis of Internet gaming disorder in adolescents. *Sci Rep [Internet]*. 2018;8(1):1–8. Available from: <http://dx.doi.org/10.1038/s41598-018-28478-8>
  34. Hyun GJ, Han DH, Lee YS, Kang KD, Yoo SK, Chung US, et al. Risk factors associated with online game addiction: A hierarchical model. *Comput Human Behav [Internet]*. 2015;48:706–13. Available from: <http://dx.doi.org/10.1016/j.chb.2015.02.008>
  35. Khosravani V, Messman-Moore TL, Mohammadzadeh A, Ghorbani F, Amirinezhad A. Effects of childhood emotional maltreatment on depressive symptoms through emotion dysregulation in treatment-seeking patients with heroin-dependence. *J Affect Disord [Internet]*. 2019;256(February):448–57. Available from: <https://doi.org/10.1016/j.jad.2019.06.021>
  36. King DL, Delfabbro PH. The cognitive psychology of Internet gaming disorder. *Clin Psychol Rev [Internet]*. 2014;34(4):298–308. Available from: <http://dx.doi.org/10.1016/j.cpr.2014.03.006>
  37. Stavropoulos V, Anderson EE, Beard C, Latifi MQ, Kuss D, Griffiths M. A preliminary cross-cultural study of Hikikomori and Internet Gaming Disorder: The moderating effects of game-playing time and living with parents. *Addict Behav Reports [Internet]*. 2019;9(June 2018):100137. Available from: <https://doi.org/10.1016/j.abrep.2018.10.001>
  38. Nuyens F, J.Kuss D, Lopez-Fernandez O, Griffiths MD. The experimental

- analysis of problematic video gaming and cognitive skills: A systematic review. *J Thérapie Comport Cogn [Internet]*. 2017;27(3):110–7. Available from: <https://doi.org/10.1016/j.jtcc.2017.05.001>
39. Jorgenson AG, Hsiao RCJ, Yen CF. Internet Addiction and Other Behavioral Addictions. *Child Adolesc Psychiatr Clin N Am*. 2016;25(3):509–20.
  40. Yen JY, Yeh YC, Wang PW, Liu TL, Chen YY, Ko CH. Emotional regulation in young adults with internet gaming disorder. *Int J Environ Res Public Health*. 2018;15(1):1–12.
  41. Aydın B, Sar SV. Internet addiction among adolescents: The role of self-esteem. *Procedia - Soc Behav Sci*. 2011;15:3500–5.
  42. Wichstrøm L, Stenseng F, Belsky J, von Soest T, Hygen BW. Symptoms of Internet Gaming Disorder in Youth: Predictors and Comorbidity. *J Abnorm Child Psychol*. 2019;47(1):71–83.