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Policy and prevention approaches for disordered and hazardous gaming and Internet use: An international perspective

Daniel L. King[1*]
Paul H. Delfabbro[1]
Young Yim Doh[2]
Anise M. S. Wu[3]
Daria J. Kuss[4]
Ståle Pallesen[5]
Rune Mentzoni[5]
Natacha Carragher[6]
Hiroshi Sakuma[7]

[1]*School of Psychology, The University of Adelaide, Australia*
[2]*Graduate School of Culture Technology, Korea Advanced Institute of Science and Technology, Republic of Korea*
[3] *Department of Psychology, University of Macau, China*
[4] *International Gaming Research Unit, Nottingham Trent University, United Kingdom*
[5] *Department of Psychosocial Science, University of Bergen, Norway*
[6] *Office of Medical Education, University of New South Wales*
[7] *National Hospital Organization, Kurihama Medical and Addiction Center, Japan*

*Corresponding author. School of Psychology, Level 5, Hughes Building, The University of Adelaide, Adelaide, SA 5005, Australia. Tel: +61 8 8313 3740; fax: +61 8 8303 3770

ABSTRACT

Problems related to high levels of gaming and Internet usage are increasingly recognized as a potential public health burden across the developed world. The aim of this review was to present an international perspective on prevention strategies for Internet gaming disorder and related health conditions (e.g., Internet addiction), as well as hazardous gaming and Internet use. A systematic review of quantitative research evidence was conducted, followed by a search of governmental reports, policy and position statements, and health guidelines in the last decade. The regional scope included the United States, United Kingdom, Australia, China, Germany, Japan, and South Korea. Prevention studies have mainly involved school-based programs to train healthier Internet use habits in adolescents. The efficacy of selective prevention is promising but warrants further empirical attention. On an international scale, the formal recognition of gaming or Internet use as a disorder or as having quantifiable harms at certain levels of usage has been foundational to developing structured prevention responses. The South Korean model, in particular, is an exemplar of a coordinated response to a public health threat, with extensive government initiatives and long-term strategic plans at all three levels of prevention (i.e., universal, selective, and indicated). Western regions, by comparison, are dominated by prevention approaches led by non-profit organizations and private enterprise. The future of prevention of gaming and Internet problems ultimately relies upon all stakeholders working collaboratively in the public interest, confronting the reality of the evidence base and developing practical, ethical, and sustainable countermeasures.

Keywords:

Internet gaming disorder; Internet addiction; prevention; public health; policy; DSM-5

1. Introduction

Problems related to high levels of gaming and Internet use are increasingly recognized as a potential public health burden across the developed world (Kuss & Lopez-Fernandez, 2016; Mak et al., 2014). In 2013, Internet gaming disorder (IGD) was included in Section III of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a condition for further study. The IGD criteria set are similar in content to gambling disorder. More recently, the beta draft International Classification of Diseases (ICD-11) listed 'Gaming disorder' as referring to "persistent or recurrent gaming behavior characterized by an impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities and continuation of gaming despite the occurrence of negative consequences." The draft ICD-11 also lists 'hazardous' gaming, referring to a pattern of use that increases the risk of harmful physical or mental health consequences, typically related to high frequency of use. There is a growing evidence base that links excessive gaming and Internet use to anxiety and depression (King, Delfabbro, Zwaans, & Kaptsis, 2013), physical health problems (Kelley & Gruber, 2012), school disconnection (Lawrence et al., 2015), decreased job productivity and unemployment (Young, 2010), and social isolation (Ceyhan & Ceyhan, 2008). Although the definitions of disordered and hazardous use vary across studies and regions, due to the use of different tools and guidelines for screen time, epidemiological studies to date have reported that young populations are particularly at risk of gaming and Internet-related problems, with prevalence rates of 'addictive' use at around 3% of users (Ferguson, Coulson, & Barnett, 2011) and rates of problem use as high as 8% (see King, Delfabbro, & Delfabbro, 2012).

Government health departments across Eastern and Western countries have recommended that gaming and Internet activities should be used only in moderation (i.e., for no longer than a certain number of hours per day, based on medical opinion [e.g., American Academy of Pediatrics, 2011]) and have implemented measures to protect more vulnerable users (Dau, Hoffman, & Banger, 2015; Department of Health, 2014; Kwon, 2011; Lim, 2012). Academic studies have often set a cut-off of 4 hours of Internet use per day or 30 hours per week to indicate 'excessive' or 'harmful' use (see King & Delfabbro, 2014). Some countermeasures for problem

gaming, particularly 'boot camps' across East Asia (see Koo, Wati, Lee, & Oh, 2011), have received international media coverage, but to date there have been few comprehensive summaries with objective appraisals of prevention efforts on a global scale. The purpose of this review was to present an international perspective on public health policy and strategies for gaming and Internet-related problems, to inform best practice and identify future directions for all relevant stakeholders.

Prevention has been conceptualized as including one or more of the following: (1) a cessation in a problem behavior from ever occurring; (2) a delay in the onset of a problem behavior, especially for those at-risk for the problem; (3) a reduction in the impact of a problem behavior; (4) strengthening knowledge, attitudes, and behaviors that promote emotional and physical well-being; and (5) promoting institutional, community, and government policies that further physical, social, and emotional well-being of the larger community (Romano & Hage, 2000). Whereas public health burdens, such as tobacco use, have clear research-informed guidelines on how harm is caused, it has been a challenge to define the levels or types of Internet use that are detrimental to users. Although many Internet activities, such as gaming, may be considered 'addictive' for some users (Griffiths, 2009), these activities may not be classified by all stakeholders as being inherently harmful, or incrementally harmful according to level of use (Gentile, 2009). Rather, there are many uses of games and the Internet which are adaptive, productive, socially significant, and increase the psychological wellbeing of users (Yee, 2006). Thus, organized prevention efforts may not necessarily intend to reduce population-level use to its lowest possible point, nor impose unnecessary restrictions upon healthy users.

1.1. The present review

The aim of this review was to summarize peer-reviewed prevention studies, as well as available grey literature, on policy and prevention measures for hazardous gaming or Internet use and Internet gaming disorder (IGD) or Internet addiction (IA). While the term 'Internet addiction' is imprecise, it is commonly employed in the literature to refer to and classify problems related to excessive use of online-enabled devices. In line with the draft ICD-11 criteria, the term

'hazardous' in this review refers broadly to gaming or Internet use that "appreciably increases the risk of harmful physical or mental health consequences to the individual or to others around this individual", acknowledging that this may vary according to population and context. The definition of 'gaming disorder' was informed by the DSM-5 and draft ICD-11 criteria. The analytic scope was to identify current prevention strategies (i.e., universal, selective, or indicated), policy approaches, and prevention service organization and delivery. The regional scope included the United States, United Kingdom, Australia, China, Germany, Japan, and South Korea, on the basis that these countries had high rates of IA (Gentile, 2009; King et al., 2013; Mak et al., 2014) and would provide insight into both Eastern and Western approaches.

2. Methods

2.1. Identification of quantitative studies

To identify peer-reviewed academic studies, a computer database search of *Academic Search Premier*, *PubMed*, *PsychINFO*, *ScienceDirect*, *Scopus*, and *Web of Science* was conducted, using the following search terms and logic: prevent* AND (gam* OR Internet). The terms 'disorder' and 'addiction' were not included to avoid exclusion of studies that targeted non-addictive (e.g., hazardous or excessive) Internet use. All searches were limited to full text papers published from 2007 to 2016, representing the era in which Internet games such as massively multiplayer games (MMOs) have been most prevalent and online social networking sites (e.g., Facebook) gained widespread popularity. These database search parameters yielded a total of 2,049 hits, which included the following results in each database: *Academic Search Premier* (384 results), *Scopus* (222 results), *PubMed* (274 results), *PsychINFO* (448 results), *ScienceDirect* (267 results), and *Web of Science* (454 results). A Google Scholar (215,000 results) search was also conducted, which did not identify any additional studies of relevance. The inclusion criteria were original peer-reviewed empirical studies on the effectiveness of a prevention strategy for hazardous gaming or Internet use and/or IA or related disorders (e.g., Internet gaming disorder). Relevant reviews on the topic were consulted (Kuss & Lopez-Fernandez, 2016; Fang et al., 2015).

Intervention studies (i.e., clinical trials) (*N*=30) were excluded because trials were examined in a separate review (see King et al., 2017). A total of 13 studies were identified.

2.2. Identification of grey literature

The second aim was to identify grey literature related to universal and selective prevention strategies for hazardous gaming or Internet use and IA or gaming disorder. The scope of this search was on official materials related to the United States, United Kingdom, Australia, Germany, China, Japan, and South Korea. Grey material included governmental documents and reports, policy and position statements, health guidelines, book chapters, and official bulletins. Unpublished theses or dissertations, pamphlets, newsletters, interviews, letters, and informal communication (e.g., blogs) were excluded, because these non-primary sources may oversimplify or misrepresent information. The first step was to identify relevant material using a register of regulatory authority and health ministry websites listed on www.who.int and www.pda.org. The identified websites of relevant health organizational bodies in each country were searched for content related to "Internet AND prevention". For example, the terms "internet prevention" were typed into the search bar of the Ministry of Health in People's Republic of China official website. This search protocol yielded the following results: *WHO.int* (11 results; 3 relevant); *Pan American Health Organization* (217 results; none relevant), *European Commission Directorate General for Health & Consumers* (1 relevant result); *People's Republic of China: Ministry of Health* (23 results, 0 relevant); *German Federal Ministry of Health* (45 results; 3 relevant); *Hong Kong: Department of Health* (7 results, 2 relevant); *Japan: Ministry of Health, Labor and Welfare* (5 results; 1 relevant); *Korea: Ministry of Health and Welfare* (1 result); *Australia NHMRC website* (471 results; 1 relevant); and *UK: Department of Health* (0 results). Information related to general cyber-safety practices, Internet-related fraud (i.e., scams and phishing) and unregulated online products (e.g., overseas medicines) was excluded.

Multiple subsequent approaches to database searches were conducted to maximize relevant results. A search of established grey literature databases was conducted using the inclusive terms "Internet AND prevent*" on the following sites: *Open Grey* (82 results; 0 relevant), *The Grey*

Literature Report (25 results; 0 relevant), *MedNar* (2,286 results; 0 relevant), and *PsycEXTRA* (5,005 results; 0 relevant). A Google search (775,000 results) was then conducted using the search parameters (prevent* AND [gam* OR Internet]). All yielded results were inspected until no further results were displayed. This initial search was then repeated with the specifiers "filetype:pdf" and "site:org" (12,500 results) to prioritize reports from organizations. A final Google search was then conducted with the keywords "Internet AND prevention" and specifiers referring to specific countries or regions (i.e., "American OR United States", "United Kingdom OR British", "Australia", "Japan", "China OR Chinese", "Korea", and "Germany"). Given the large number of yielded results of indeterminate relevance (>1,000,000 results), including many results of dubious quality (e.g., independent news websites, blog posts), it was beyond the scope of the review to exhaustively search all Google results. A total of 93 references were collected, however not all sources provided uniquely relevant information. Given the caveats of access restrictions or inadequate indexing of grey literature, along with potential terminology issues related to Internet-related problems, the presented material should be considered a narrative review rather than a systematic, comprehensive summary.

[INSERT TABLE 1]

3. Results

3.1. Quantitative prevention studies

Table 1 presents a summary of the 13 quantitative studies on prevention, from regions including South Korea (*n*=6), China or Hong Kong (*n*=2), Germany (*n*=2), the United States (*n*=1), Spain (*n*=1), and South Africa (*n*=1). Nine out of the 13 studies were conducted in secondary or elementary student populations (combined sample *N*=9,395). The majority of studies employed pretest-posttest research designs (*n*=6) and most studies included control groups (*n*=8), with only one randomized controlled trial (RCT) (Walther et al., 2014). Prevention strategies were predominantly selective (i.e., aimed at a subpopulation at greater risk of developing gaming problems or excessive Internet use) and involved psycho-education. Psycho-

education modules included: understanding the concept of problematic use of electronic media activities; teaching stress management and self-control techniques; developing social relationships; Internet time limit-setting and time management skills; and identifying alternative activities, including physical activities. These modules have been routinely employed in intervention studies in these areas (see King, Delfabbro, Griffiths, & Gradisar, 2012).

The duration of school-based prevention programs (*n*=6 studies) ranged from three to 10 sessions, with an average of 6.5 sessions. In terms of outcomes, four of the six studies reported a successful reduction in problem Internet use symptom scores (Deng et al., 2013; Joo & Park, 2010; Mun & Lee, 2015; Walther et al., 2014), and one study reported no change in symptom levels (Koo, 2013). There were mixed outcomes for school programs in reducing levels of gaming or Internet activity, with one study reporting a reduction in Internet use (Mun & Lee, 2015); another study reporting no change (Yang & Oh, 2007); and one reporting decreased Internet gaming, but no change in Internet use (Walther et al., 2014). Only one study (Montag et al., 2015) employed a universal prevention measure (i.e., wearing a watch to reduce incidental and habitual smartphone use), but this study did not assess an Internet disorder as an outcome variable. A study by Lee et al. (2014) employed a selective/indicated technological measure (i.e., a smartphone usage tracking system) designed for all types of Internet users. A laboratory study (Davies & Blake, 2016) investigated the effectiveness of technical systems to reduce gaming activity (e.g., timer-based automatic shutdown) but did not assess disordered use as an outcome.

3.1.1. Policy implications of research evidence

Academic research studies are usually designed to test theories and thus do not always interpret their findings in relation to policy. Given the applied topic, however, each of the reviewed studies offered at least a brief (and perhaps, facile) statement of relevance to policy. Compared to other regions, East Asian countries appeared to place a greater emphasis on: (i) school-based early intervention programs, (ii) mandatory technical systems to reduce gaming (e.g., shutdown/blocking software) and (iii) national health policies that recognize excessive use of gaming or the Internet as a disorder. This contrasted with the less structured and rigorous

interventions in other regions, such as brief workshops (Spain), online education (United States), and public health messages to set limits on use and wear watches instead of relying on smartphones to check the time (Germany). Although this review was not equipped to extract broader cultural differences in detail, it seemed that East Asian regions have focused on teaching adolescents stress management, self-discipline and/or self-control, on the assumption that this equips them to better handle familial and cultural expectations stemming from small families (e.g., the one-child policy in China) and pressures to succeed academically (Lim, 2012).

One of the earliest recommendations in the East Asian research literature was for greater recognition of Internet and gaming addictions in national health policies (Yang & Oh, 2007), as well as collaboration between educational and medical institutions. This was supported by calls for increasing funding for school-based programs and epidemiological studies to assess the health impacts of IA (Yang & Doh, 2007). The main argument to expand universal prevention was based on its greater cost-effectiveness and efficacy compared to treatment (Koo, 2013), recognizing that even brief programs yielded positive outcomes (Deng et al., 2013). Two population subgroups argued to be of highest priority for selective prevention were elementary school-aged children (i.e., aged 8-12 years) and parents (Lee, 2012). It was advised that health policies should support education for parents on how the Internet works, including practical tips for monitoring and setting limits (e.g., software controls) (Lee, 2012). The recommended approach to educating young people about disordered use of the Internet or games was to use interactive and visual materials to encourage self-reflection, rather than employ authoritarian anti-gaming messaging (Joo & Park, 2010). Another recommendation was to integrate clinical measures of disordered gaming or Internet use into existing adolescent development programs.

Walther et al. (2014) argued that policies should reflect the changing social norms for Internet use, noting that epidemiological research is needed to update understanding of normative and low-impact Internet use. Davies and Blake (2016) argued that gaming shutdown laws may not have intended preventative effects, and could strengthen some players' motivations for gaming. They noted that Western jurisdictions have not yet introduced this type of legislation and recommended caution in considering any such proposal. Additionally, the authors cited the need

for greater industry responsibility, particularly that the Internet gaming industry should recognize its "power over gamers" (p. 56) and assume some of the responsibility for player welfare, as in the case of the gambling industry in some regions (Blaszczynski, Ladouceur, & Shaffer, 2004). It has been proposed that the industry should at least inform consumers of known risks and provide customer care and referral services (Van Rooij et al., 2010).

[INSERT TABLE 2]

3.2. Types of prevention

Table 2 provides a broad overview of policy and prevention strategies implemented internationally. Many strategies designed for hazardous and disordered use of gaming or the Internet tend to overlap, given that conceptualizations of these disorders include hazardous use, and hazardous use may be an early sign of an emerging disorder (e.g., gaming disorder).

3.2.1. Universal prevention

Universal prevention strategies are measures that target the general population, irrespective of known risk level, with the intent of holding Internet use or gaming at low (i.e., safe) levels. This approach assumes that all individuals who use games or the Internet are at risk and therefore can benefit from information and skills to prevent the occurrence of associated problems. Identified universal prevention strategies included: (1) *educational resources*, such as information on healthy levels of use (e.g., no more than two hours of use per day [American Academy of Pediatrics, 2011]), digital literacy courses to increase productive or goal-directed Internet use, physical activity recommendations, and promotion of other activities to decrease reliance on Internet-based activities; (2) *legislative action*, such as mandated shutdown of Internet gaming services at certain times of the day; (3) *technological measures*, such as parental locks, filters, and time-limit settings on gaming consoles, wearing analogue zeitgebers (watches) instead of carrying smartphones, user notifications for excessive time spent on a device; (4) *public awareness*, such as national days that encourage non-use of the Internet, and campaigns that

describe the basic signs of IA and provide information on relevant services; and (5) *behavioral measures*, such as reducing the number of owned devices and removing devices from bedrooms to reduce habitual night-time Internet use or gaming (e.g., Xu, Turel, & Yuan, 2012).

3.2.2. Selective prevention

Selective prevention strategies focus on individuals who are at above-average risk for developing gaming or other Internet-related problems. Male youths, particularly those with comorbid psychological difficulties (e.g., attention deficit problems, mood disorders), lower academic ability or school engagement, lacking alternative interests, and/or low family support or supervision, are one such group at risk of gaming disorder (King et al., 2013). Understandably, there was overlap between universal and selective prevention, given their similar public health function of reducing online behaviors and increasing participation in alternative activities. Identified selective prevention strategies included: (1) *regular screening*, including epidemiological research to identify emerging cases, typically in schools and universities; (2) *mental health checks*, including consultation with medical practitioners to screen for emotional distress or underlying problems that increase risk of Internet use as a maladaptive coping mechanism; (3) *school-based educational programs*, with a focus on teaching healthy Internet use, and engagement in other hobbies and physical activities to build self-esteem and empowerment; and (4) *workplace Internet policy*, including rules for Internet access privileges for non-essential purposes in vocational settings.

3.2.3. Indicated interventions

Indicated prevention targets individuals who are already engaged in hazardous gaming or Internet use, or who demonstrate detectable signs or symptoms foreshadowing disordered use. However, given the tentative status of gaming disorder or IA in many regions (e.g., the United States or Australia), it may be difficult for high-risk individuals to be recognized from a medico-legal perspective. Indicated prevention strategies included: (1) *support groups*, including community groups and online self-help communities; (2) *outpatient medical and mental health*

services, including treatment of mental disorders and medical problems that may underlie or contribute to gaming or Internet problems; (3) *psychosocial rehabilitation*, including 'digital detox' and other structured programs with a focus on socialization and developing alternative interests; and (4) *psycho-education*, including specialized information about symptoms and strategies for regulating Internet use to minimize harm. For a review of the evidence on IA treatment in the past decade, see King et al. (2017).

[INSERT TABLE 3]

3.3. Service organization and delivery

Table 3 provides a summary of case examples of current policy frameworks and prevention strategies implemented across multiple regions. The aim was to spotlight major international developments and models of prevention, and identify potential gaps in services and policy. These case examples are discussed in detail below.

3.3.1. South Korea

South Korea has developed a coordinated system to respond to the region's high prevalence of gaming and Internet-related problems (Koh, 2015; Ministry of Science, ICT & Future Planning, 2016). This region is unique in that its government has been at the forefront of prevention efforts, particularly in contrast to the United States, Western Europe, and Oceania, where private services and non-profit organizations are the primary stakeholders for prevention. South Korea has eight ministries responsible for its disordered gaming and Internet agenda, including (but not limited to): (1) the Ministry of Science, ICT and Future Planning, which is responsible for the oversight and strategic development of national responses to the problem; (2) the Ministry of Culture, Sports and Tourism, which oversees interventions specifically for Internet gaming problems according to the 'Game Industry Promotion Act', including awareness campaigns, survey investigations, literacy and training programs, and hospital care; (3) the Ministry of Gender Equality and Family, which oversees youth protection according to the

'Juvenile Protection Act', including establishment of youth counseling centers and residential schools for short-term care; (4) the Ministry of Health and Welfare, which conducts medical research and develops models of treatment and oversees more than 200 mental health clinics countrywide; and (5) the Ministry of Education, which oversees school-based prevention projects.

Another important agency is the National Information Society Agency (NIA), which plans and executes policies to support the work of the Ministry of Science, ICT and Future Planning. With its budgets and projects ratified by the National Assembly, the NIA opened the Internet Addiction Prevention Center (IAPC) in 2002, and has established Internet addiction centers across 13 regional governments. Similarly, the Ministry of Gender Equality and Family established the Korea Youth Counseling and Welfare Institute, which provides prevention services for IA to complement its counseling services for youth problems including mood disorders, adjustment difficulties, and family conflict issues. For more extreme cases, the IAPC offers Internet abstinence rehabilitation camps through the National Center for Youth Internet Addiction Treatment (NYIT). Besides these tertiary level initiatives, there have been numerous universal prevention measures, such as public education to promote a healthy online gaming culture. Several agencies including the Korea Education and Research Information Service (KERIS, comprising 178 Wee Centers national wide) and Seoul Metropolitan Government (including six 'I Will' Centers in Seoul City) work together to create a healthy online culture.

3.3.2. China

A defining feature of China's legislative approach to gaming problems has been its selective restriction and censorship of Internet gaming activities. For example, from 2000 to 2014, foreign gaming consoles, such as the Sony Playstation system, were banned from commercial sale in China. In 2007, the Ministry of Culture (MoC) were responsible for the implementation of the Online Game Anti-Addiction System (OGAAS). This system requires all Internet game service developers to collect age-verification data and monitor individuals' usage. Individuals under the age of 18 years are restricted from playing Internet games for more than three hours a day, with longer playtime resulting in automatic deactivation or compromised in-game reward mechanisms

(i.e., 'fatigue system'). In compliance with the OGAAS, players are required to log in using their verified ID. In April 2011, the Ministry of Culture implemented the Interim Provisions on the Administration of Internet Culture, as a means of gaining more control over Internet-based services. Under these regulations, Internet games (and any online products) are not permitted to include gambling, pornography, or violence, or any content considered to erode social morals or violate laws. The regulations also forbid underage players from purchasing virtual currency in Internet games. However, many stakeholders argue that the system is compromised by the loophole of users using alternative IDs (Zhan & Chan, 2012).

China's commitment to prevention of gaming and Internet-related disorders has been enshrined in numerous legislations, including: (1) Protection of Minors Act (revised 2006), article 33: *The State adopts measures to prevent the minors from internet addiction….encourages research and development of internet products which are conducive to the healthy growth of minors and promotes the use of new technologies for preventing minors from internet addiction*; and (2) Regulations on the Administration of Business Sites of Internet Access Service (revised 2011), article 9: *No business site of Internet access services may be set up within 200 meters around the campus of any secondary or elementary schools or in any residential buildings*. With regard to universal prevention, one major case example was the "Be NetWise" campaign launched in Hong Kong in 2009. This campaign involved over 1,000 educational talks and training workshops to more than 150,000 students, parents, teachers and social workers, and over 88,000 home visits. Over 50,000 counselling sessions were provided through the "Be NetWise" Family Support Center, and an exhibition bus touring visited over 300 schools and public locations, attracting some 22,000 visitors. Over 100,000 copies of a handbook on Internet usage were distributed to parents, and a professional education resource kit was provided to all primary and secondary schools for teachers and social workers.

As an additional measure, the Ministry of Culture proposed the Comprehensive Prevention Program Plan for Minors' Online Gaming Addition in 2013 with the goals of conducting research on prevalence, and developing diagnostic tools and intervention models. Central and local governments have funded independent research undertaken by various institutes, such as the

National Key Laboratory of Cognitive Neuroscience and Learning at Beijing Normal University and the School of Public Health and Primary Care at the Chinese University of Hong Kong, to investigate the prevalence of IA across multiple regions in China (Li, 2013; Li et al., 2014; Mak et al., 2014; Wang, Wu, & Lau, 2016). Internet gaming addiction is a recognized disorder in mainland China, and affected individuals may obtain treatment at specialist outpatient clinics in public hospitals. Private hospitals, NGOs and private practitioners also provide mental health services for at-risk populations.

3.3.3. Japan

The Japanese government has three ministries whose portfolios relate to hazardous and disordered Internet use, including: (1) the Ministry of Internal Affairs and Communications (MIC), which oversees regulations for Internet use in general; (2) the Ministry of Health, Labor and Welfare, which is responsible for health and prevention initiatives related to Internet use, and; (3) the Ministry of Education, Culture, Sports, Science and Technology (MEXT), which oversees prevention measures for hazardous Internet use among school-age children. The Japanese government recognizes both Internet use and content as potentially 'harmful' under certain conditions, particularly for young populations. To combat these issues, the Act on Development of an Environment that Provides Safe and Secure Internet Use for Young People (Act No. 79 of 2008) states the following service-related provisions: (1) increase public awareness and education on appropriate Internet use; (2) introduction of legal obligations for Internet service providers to provide a filter service; and (3) support for private organizations (e.g., NGOs) to teach young people the skills for appropriate Internet use.

Several prevention initiatives have been undertaken in Japan in the last five years. In 2012, the MIC launched an education-based initiative involving via lectures and training resources to increase information technology and knowledge of Internet misuse. In 2014, the MEXT launched the 'IT moral developing project for children' which raised awareness of hazardous Internet use, particularly in relation to smartphone use. Since 2014, the Japan Internet Safety Promotion Association (JISPA) has conducted a campaign that teaches safe Internet use to children. JISPA is

a non-profit organization that receives government funding via MEXT and MIC. The campaign also targets parents and involves lectures and promotion of Internet filtering and monitoring. The MEXT launched a clinical trial for IA for young people in 2014, which includes an outdoor program overseen by the National Institution for Youth Education in collaboration with the Kurihama Medical and Addiction Center, which has also treated IA since 2011.

3.3.4. Germany

Germany has had an increasing number of referrals for disordered gaming or Internet use to its existing addiction treatment centers over the past decade (Dau et al., 2015). This presented a challenge for treatment providers because a service for these problems could only be provided if it also presented with a comorbid disorder (e.g., depression, substance use), due to IA or gaming disorder having no official psychiatric status. However, in 2012, the Federal Ministry of Health updated its drug and addiction policy to specify new initiatives for IA. The primary directive was to support the process of adopting a gaming-related disorder category in line with the ICD-11, due for release by 2018. The Ministry's report also outlined the provision of: (1) further training and qualification of teachers and professionals in the field of parental and family counselling; (2) education for parents about possible risks of online activities, including technological measures (e.g., parental locks); (3) improved protection of children and young people in relation to computer games; (4) criteria to identify risky and pathological Internet use and adopting these criteria in rating systems for Internet games; (5) diagnostic instruments for Internet and gaming addiction for use in treatment settings (Drug Commissioner, 2012).

Germany has a range of public services for addiction treatment, in addition to self-help and support services. There are numerous websites in the field of addiction support, which provide information, self-report IA tests, consultation webchats and email support, and self-help interventions. There are several university institutions engaged in treatment and prevention research in this area, investigating, for example, selective prevention programs in schools (Dreier, Wölfling, Beutel, & Müller, 2015). A professional association for IA has been established ("Fachverband Medienabhängigkeit e.V." or Media Addiction Association) and the German

Association for Psychiatry, Psychotherapy and Psychosomatics (Deutsche Gesellschaft für Psychiatrie, Psychosomatik und Nervenheilkunde) has founded a group for the investigation and classification of Internet-related problems. In addition to this, the German Federal Parliament's Office for Technology-Outcome Assessment (Büro für Technikfolgen-Abschätzung) advises the Parliament and its committees regarding questions concerning technological and social change, including questions on new electronic media and behavioral addictions (Evers-Wölk et al., 2016).

Several outpatient treatment centers have emerged in Germany over the past decade. The Schwerin Media Addiction Counselling center for 'excessive media use and media addiction' was established in 2006 as a joint project between the Mecklenburg-Vorpommern Evangelical Addiction Help and the Schwerin Helios medical centers. The Computer Game Addiction Outpatient Clinic of the University Hospital in Mainz was opened in 2008. The service offers cognitive-behavioral therapy in manualized individual and group formats and provides free telephone support for friends and families of clients. Another service is the independent consulting and treatment service for media dependency in the outpatient clinic of the Department of Addictions and Psychotherapy, at the LVR Clinic in Bonn, which was established in 2009.

3.3.5. United Kingdom, United States, and Australia

The United Kingdom, United States, and Australia have much in common with respect to their national approaches to gaming disorder and Internet addiction prevention and treatment. All three regions do not currently recognize gaming disorder as a fully legitimate disorder, in line with the preliminary DSM-5 guidelines (i.e., IGD), which impedes access to treatment via health insurance schemes. These regions' health policies and public services do not make specific reference to gaming or Internet-related disorders, but have recognized excessive screen time as a health hazard, usually under an umbrella term like 'sedentary behavior'. In the UK, for example, gaming or Internet-based disorders are not recognized by the National Institute for Health and Care Excellence (NICE) but section 1.6.3 of its guidelines for obesity (CG189) refers to reducing "using a computer or playing video games". Detailed guidelines and policy recommendations for addressing Internet use are increasingly being produced over time, such as the American

Academy of Pediatrics' (2011) position statement on screen time in younger children. This position statement includes recommendations for the US to adopt a prevention model comparable to those in East Asia, such as implementing mandatory media education in school curricula.

Another feature of these regions is that their governments have not widely funded specialized gaming or other Internet-related disorder treatment services, but have offered funding to non-profit organizations for universal and secondary prevention. As one exception in the case of treatment, an unfunded pilot program in London, at the Centre for Compulsive and Addictive Behaviours, was operated for a three-year period, but then was terminated indefinitely. The National Health Service (NHS), the publicly funded healthcare system in the UK, refers to Internet addiction on its homepage and offers information on referrals to various addiction treatment centers (e.g., hospitals and outpatient treatment centers). In the United States and Australia, there are numerous private providers (e.g. the reSTART Internet Addiction Recovery Programme in Seattle), including online psychological practices (e.g., www.netaddiction.com in the US, established by Dr Kimberly Young) and independent residential programs. These regions have a strong network of independent councils and international societies dedicated to educating parents and users about risks related to gaming and Internet use. There are several organizations in the UK that collaborate across national government, industry, law, academia and charity sectors to help keep children safe online, including (1) the UK Council for Child Internet Safety (UKCCIS); (2) National Society for the Prevention of Cruelty to Children; (3) UK Safer Internet Centre; and (4) Childnet International. In the US, there are similar private, non-profit organizations including the National Center for Missing & Exploited Children (NCMEC) and the Family Online Safety Institute. Collectively, these bodies provide practical parenting resources for hazardous Internet use, and have a strong focus on supporting law enforcement in tackling illegal online activities involving children.

The bulk of research into treatment and prevention is generally undertaken by university institutions in these regions. Competitive funding opportunities for gaming or Internet-related research appear to be limited, which has negatively affected the overall scope and quality of the research base and its compliance with international standards for health and clinical research

(King et al., 2011). Australia's leading expert body for health and medical research, the National Health and Medical Research Council (NHMRC) has not funded a project on gaming disorder or Internet addiction in its history. The main Australian governmental body concerned with gaming and Internet-related issues is the Australian Communications and Media Authority (ACMA). The ACMA is an independent statutory authority tasked with ensuring media and communications legislation operates in the public interest. The ACMA has acknowledged excessive gaming and Internet use and provided parenting resources, and supported epidemiological research.

3.3.6. Other industry responses

Two main types of industry responses to hazardous gaming and Internet use warrant acknowledgement: (i) age classification system for gaming products; and (ii) safety guidelines for online services and products. The age classification of digital games intended for commercial sale is undertaken by different regulatory bodies depending on region. For example, all video games intended for commercial sale in the United States must first be reviewed by the Entertainment Software Rating Board (ESRB), an industry body that provides consumer advice and warnings in relation to the age-appropriateness of gaming material. Similar age rating systems operate in other jurisdictions, such as the Pan European Gaming Information (PEGI) ratings system. In some regions, such as Australia and South Korea, the rating system is administered by a statutory classification body. Ratings systems often recommend parental guidance or adult use only for some games, but they lack reference to specific game content or types of games (e.g., MMORPGs and MOBAs) with stronger research evidence on hazardous use.

Several major software companies with international markets have provided user guidelines for safe Internet use. For example, Microsoft (2016) have developed an online 'Healthy Gaming Guide' that states "*repetitive movements, poor posture and overindulgence…can sometimes cause numbness, tingling and other issues that might escalate into serious health problems*". Recommendations for safe use primarily concern the physical action of use (e.g., posture, viewing distance, method of pressing buttons), with suggestions of taking breaks, managing stress, making healthy lifestyle choices, and consulting health professionals as

required. Similarly, Microsoft, Sony and Nintendo provide online guides and video demonstrations on setting time limits and content restrictions on their gaming systems. Major online service companies, such as Apple and Google, have developed safe use guidelines for parents that explain privacy, filtering, and monitoring options, but these guides also lack acknowledgement of IA. In China, a virtual game website for children reminds players to take a break every 45 minutes and the game is shut down from 12 am-6 am daily (Lim, 2012). This review did not identify substantive material concerning gaming developers' stance on their social responsibility related to problematic gaming. As a rare example, one leading gaming publisher, Blizzard Entertainment, issued an official statement to CNN in 2012: "*it is never our intent for our players to play our games to the exclusion of other activities*… [but] *it's ultimately up to the individual game player or his or her parent or guardian to determine how long he or she should spend playing any game*" (Sutter, 2012).

4. Discussion

This review was designed to summarize the current state of international efforts in prevention of disordered and hazardous gaming and Internet use. To our knowledge, there have been no published academic reviews on gaming or Internet-related disorder prevention with an international focus, despite the great diversity of regional approaches and models in this area. This review indicates firstly that the English-language research base on structured prevention of problematic gaming or Internet use is much less developed than the corresponding treatment evidence base, with only 13 studies in the last decade identified in this review. The policy implications of current research have suggested greater investment in educational measures that include youth and their families, with a focus on teaching Internet skills and use in moderation while also fostering other interests and individual competencies. A higher proportion of prevention studies have emerged from South Korea and China, reflecting the greater prioritization and expenditure of resources in East Asia on gaming and Internet-related issues as compared to the rest of the world. Research on prevention has had a strong focus on school-based programs to train healthier Internet use habits in children. The efficacy of selective prevention approaches in

combating gaming and Internet disorders appears promising but warrants further empirical attention and evaluation, given that findings are somewhat mixed and studies have lacked clinical assessment and long-term follow up. There is also a need for empirical data on the efficacy and cost-effectiveness of targeted government and independent services, such as 'boot camps' and similar youth-targeted initiatives and programs. Similarly, universal prevention strategies were prevalent across regions but their effectiveness was not clear and could be further investigated. One option, for example, is to examine the uptake and use of prevention measures at a population level and to assess their impact on the incidence rate of gaming or Internet problems over time. There were only limited indications that the industry has taken steps to work proactively on prevention of harms, and no evidence of providing funding or collaboration with public health bodies or research institutions for epidemiological (e.g., data-sharing) and intervention studies.

A notable feature of East Asian models of prevention was their formal acknowledgement of gaming or Internet use as a disorder with quantifiable harms. This was in contrast to policy in other regions, particularly the US and Australia, which acknowledge indirect harms related to excessive screen time but appear ambivalent in endorsing a psychiatric disorder. The South Korean model of gaming disorder prevention is an exemplar of a coordinated response to a public health threat, with extensive government initiatives and long-term strategic plans at all three levels of prevention. A major advantage of their approach has been their organization of services and strategies with a long term plan, thereby enabling the development of a cohesive evidence base in a field that has historically encountered many methodological inconsistencies (King et al., 2013; Petry et al., 2014). South Korea's government initiatives also enable a greater geographical reach of services and links with existing service providers. While the South Korean model may not be suitable or necessary for other regions, nor entirely transposable due to unique cultural factors or specific regional needs, other nations seeking to take stronger governmental action may still benefit from consulting their model. However, there may also be some weaknesses of an extensive governmental approach, such as the potentially higher national tax burden associated with these measures, the potential implementation of services prior to local testing, and the duplication of services and associated administration costs.

The Chinese approach to prevention, with its focus on restriction and censorship, is also useful to consider from a utilitarian perspective, putting aside criticisms from a civil libertarian viewpoint. The Chinese government has invested heavily in developing technological measures aimed to restricting the hours of under-18 access to Internet gaming services. It is pertinent, however, to evaluate so-called 'shutdown laws' in relation to their impact on incidence and prevalence of problems. Preliminary laboratory-based evidence suggests that these measures could be counterproductive (Davies & Blake, 2016) or even ineffectual given potential loopholes. Understanding these systems would be helpful in regions like Australia, where there have previously been proposals to introduce Internet filters and/or 'broadband-throttling' to reduce Internet access (Joint Select Committee on Cyber-Safety, 2011).

Western regions are dominated by prevention and treatment approaches led by non-profit organizations and private enterprise. On the one hand, this may place a lower burden on government-funded services and infrastructure if they provide effective solutions. However, an objective evaluation is required to appraise whether a network of independent private service providers is actually effective. Another concern in the Western context is the lack of competitive research funding opportunities for researchers to pursue more rigorous epidemiological, prevention, and intervention research agendas. Although there may be significant public interest and media attention on gaming and Internet-related problems, without high-quality scientific investigation it may be difficult to elevate public understanding and discussion of risks beyond unqualified opinion and moral panic. The German prevention model would suggest that one way forward for governments may be to develop a strategic plan outlining various initiatives to standardize efforts (e.g., treatment models, assessment tools, and training). This could be especially advantageous for countries which do not have a national health policy on hazardous and disordered gaming and/or Internet use (e.g., Australia).

4.1 Limitations

This review should be considered in light of its limitations. First, this review employed a systematic search protocol to identify academic studies on prevention, but it was difficult to

locate relevant grey literature across all regions, possibly due to this material being listed using inadequate keyword indexing and/or archival in inaccessible subdirectories. Additionally, recent developments in policy and practice may be recorded on internal memorandums (i.e., not in the public domain) not easily obtained. Thus, this review should be considered only as a broad snapshot of international case examples in prevention, particularly in relation to the complex systems reported in South Korea and China. Definitions of disordered and hazardous gaming and Internet use also vary according to region, which may affect the extent to which this review can draw comparisons between regions. All information from sources outside of Australia (i.e., first author's region) was checked by other raters (i.e., co-authors) in each region under study (e.g., Japan) to check that the first author's comprehension of the relevant policy information was correct. For example, the first author read and summarized a key reference and then sent the summary to the co-author to check its accuracy. The co-author either approved or sent back minor corrections or a revised summary of the document. This process was rather informal and therefore an inter-reliability index was not calculated. The initial report based on this review was circulated at a meeting of over 30 international experts attended by the first author, who requested that any errors be reported back to him. Another limitation was the lack of coverage of regional differences in patterns of gaming and Internet use and the profile of high-risk users. This review did not examine the nature and organization of gaming and/or Internet services and technological environments in each region. This work should therefore be considered in consultation with reviews on these topics for a more complete understanding of each regional context.

4.2 Conclusions

All individuals born into industrialized societies will be raised in environments where digital technologies are ever-present, easily accessible, and an integral part of everyday life. A major challenge is to implement measures that can prevent as many of these individuals from engaging in forms of gaming and Internet use that cause significant harm or disruption to healthy functioning. Stakeholders, including governments, policymakers, researchers, educators, and clinicians, increasingly recognize that the rapid expansion of treatment services must also be

complemented by a similar push for early preventative measures. The research base on disordered gaming and Internet use prevention is in its infancy but demonstrates some signs of effective and economical strategies, particularly in school-based education. There is a need for greater empirical evaluation of policies to identify best practice approaches across populations and regions. It is vital for researchers to work together with relevant stakeholders to apply their knowledge and assist in the development and testing of models of care and prevention. Research studies should make stronger attempts to apply their findings to the local policy context on gaming and Internet issues. Internet and gaming service industries have not introduced substantial user welfare measures, and they appear to be mostly silent on their role in public health issues. Industry inaction may be due to poorly defined boundaries of responsibility, and a perceived lack of commercial benefit. The way forward in prevention ultimately rests upon all stakeholders working together in the public interest, confronting the reality of the evidence base and developing practical, ethical, and sustainable countermeasures.

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The authors declare that they have no conflict of interest.

Ethical approval and informed consent

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Table 1
Prevention strategies for gaming and Internet-based disorders: Key findings and policy implications

Study	Sample	Design	Prevention type	Strategies	Duration	Outcome measures	Findings	Policy implications	Region
Yang & Oh (2007)	269 elementary school students	Repeated measures, quasi-experimental; controlled	Selective	School-based education: - Stress and coping - Time management - Friendship - Alternative activities	6 weeks	Game usage; Self-control (SCOGS)	- No sign. change in Internet gaming playing time - Sign. improvement in self-control score	- Research to examine impact of education on IA and related disorders should be prioritized. - IA should be considered in health policies for youth. - Consideration of parental input in developing further prevention efforts. - Education should be practical and interactive.	SK
Joo & Park (2010)	48 middle school students	Pretest-posttest design; controlled	Selective	School-based education: - Stress-control - Social relationships - Time management - Self-control	8 sessions	Empowerment (IES); K-Scale (IA); Stress survey	- Sign. improvement in IA scores, stress levels, and empowerment	- Programs are more feasible with collaboration of researchers and teachers. - Programs are more effective with non-authoritarian leadership styles. - Programs should be more available in the community (hospitals, churches), not just in schools.	SK
Shek & Sun* (2010)	6,978 high school students	Six-wave longitudinal; controlled	Selective	Project P.A.T.H.S. - Broad-based positive development youth program	3 years	CPYDS; LS; TH; BI; SA; SOS	- Sign. positive benefit in youth development - Sign. positive difference in self-restraint using the computer	- A holistic approach to youth development may address IA and related issues. - Importance of positive development measures in combination with those targeting negative behaviors.	HK
Lee (2012)	600 child-mother pairs	Cross-sectional survey design	Selective	Parental restrictive mediation of Internet use - Limit setting - Prohibition	Varied	Child self-control; IAT; Usage and risk exposure survey	- Restrictive mediation sign. reduced time spent online - Restrictive mediation did not sign. reduce IA	- Parents require internet skills or literacy to implement mediation strategies. - Socioeconomically disadvantaged families have a greater digital generation gap. - Need for formal education programs for parents (e.g., use of filtering and monitoring software).	SK
Deng et al. (2013)	143 high school students	Pretest-posttest design; controlled	Selective	School-based education: - Pros-cons analysis - Goal setting - Psychological needs - Alternative choices	3 sessions	IAT; IDBQ	- Sign. reduction in IA scores in the prevention group - However, clinical change was limited.	- Need for more prevention programs in schools. - Challenging perceived benefits of Internet use may be an effective persuasion strategy - Prevention may be more cost-effective and deliver better outcomes than treatment.	CH
Koo (2013)	58 elementary students	Pretest-posttest design; controlled	Selective	School-based education: - Understanding media - Self-understanding - Control of media use	10 sessions	IAT; BIS	- Sign. improvement in television addiction - No sign. change in IA at post-test or 2-month follow-up	- Parents and teachers should be included to ensure viability of prevention programs. - Preschool students should be targeted for prevention.	SK
Lee et al. (2014)	14 adults	Pilot study	Selective / Indicated	SAMS Smartphone app: - Usage monitoring - Behavioural feedback - Notifications/pop-ups - Interface with clinicians	1 week	K-SAS	- Results demonstrate feasibility of technology with caveats related to measurement	- Smartphone use tracking systems may be feasible for further health-based research. - Objective data may inform public policy on IA in areas that survey-based data are limited.	SK
Walther et al (2014)	1,843 secondary	Randomized controlled	Selective	School-based education: - Self-monitoring	4 sessions	Internet usage;	- Students in the intervention group demonstrated less gaming time, lower	- Prevention policy should target change in social norms of Internet use.	DE

	students	trial		- Understanding addiction - Self-reflection - Gaming preferences, motives and time		KFN-CSAS-II	excessive gaming; Internet time do not sign. change - Clinically sign.change in IA status for intervention group	- Beneficial outcomes for problematic gamers can be achieved with relatively brief prevention, requiring minimal resources for clinically significant gains.	
Fontalba-Navas et al. (2015)	1200 high students	Summary of intervention	Selective	Workshop for adolescents	1 session	Not reported	No published results	- Increase funding of research on normative use. - Clarify appropriate use of information technology.	ES
Montag et al. (2015)	3084 adults	Cross-sectional survey	Universal	Analogue zeitgebers (wristwatch/analogue clock)	Daily use	Smartphone usage	- Use of analogue zeitgebers decreased time spent on smartphones	- Analogue zeitgebers may be a helpful public health measure to curb excessive smartphone use. - Need for public health messages on benefits of owning/using analogue zeitgebers. - Need to consider appropriate mix of analogue and digital technology in everyday life.	DE
Mun & Lee (2015)	56 elementary students	Pretest-posttest design with non-equivalent control group	Selective	School-based program - IA education - empowerment - behavioural modification	8 sessions	Internet usage; Self-control (SCRS); K-Scale (IA);	- The program sign. reduced IA scores and Internet use, and improved self-regulation scores	- Prevention programs should be included in early education - Visual aids (pictures, videos) are more effective - Health dialogue should focus on empowerment rather than reinforcing notion of victimhood. - Control approaches should consider inclusion of CBT. - Need to prioritize prevention in funding agendas.	SK
Turel et al. (2015)	223 adults	Pretest-posttest design	Selective	Video-based education intervention	Single view	VAT; PANAS; Attitudes towards reducing Internet use	- Educational video on Internet use significantly changed viewers' attitudes toward decreasing Internet use	- Educational videos should be informative and novel to change attitudes about Internet use - Prevention is less expensive than treatment. - Video-based education should be implemented in universities (e.g., courses, orientation, lectures). - Videos could be improved with lectures and role-plays by professionals.	US
Davies & Blake (2016)	31 adults	Pretest-posttest design; three counter-balanced conditions (including control)	Indicated	Shutdown and fatigue systems to limit game play	3 sessions	Game usage; PANAS; FSS	- Longer game time on fatigue systems than on shutdown systems - Players in shutdown condition reported stronger intention to return to gaming - Shutdown produced strongest negative affect	- Gaming industry should assume greater social responsibility. - Shutdown laws reduce time spent playing but increase player desire to play and compromise enjoyment. - Fatigue systems have lower negative effect on enjoyment, but could be improved to accommodate game design (e.g., implement suitable exit points). - Games should be treated differently to drugs - Fatigue system preferable to shutdown/prohibition law	ZA

BI: Behavioral Intention Scale; BIS: Barratt Impulsiveness Scale; CH: China; CPYDS: Chinese Positive Youth Development Scale; DE: Germany; ES: Spain; FSS: Flow Short Scale; HK: Hong Kong; IA: Internet Addiction; IDBQ: Internet addiction Decisional Balance Questionnaire; IAT: Internet Addiction Test; IES: Intrapersonal Empowerment Scale; K-Scale: Korean Internet Addiction Scale; K-SAS: Korean-Smartphone Addiction Scale; KFN-CSAS-II: German Gaming Addiction Scale; LS: Life Satisfaction Scale; NA: Not assessed; PANAS: Positive and Negative Affect; SA: School Adjustment Measures; SAMS: Smartphone Addiction Management System; SCOGS: Self-Control of Gaming Scale; SCRS: Self-control Rating Scale; SK: South Korea; SOS: Subjective Outcomes Scale; TH: Thriving Scale; VAT: Video game Addiction Test; ZA: South Africa. *See also Shek and Yu (2011) for further findings.

Table 2
Overview of prevention strategies for hazardous gaming or Internet use and gaming disorder or Internet addiction

Strategic target	**Level of prevention**		
	Universal	*Selective*	*Indicated*
Hazardous gaming or Internet use (i.e., excessive or risky levels of use, unhealthy levels of use)	**Legislation and enforcement** - Shutdown/fatigue systems - Ban or restriction on Internet use - Retail POS restrictions (e.g., R18+ rating) **Technological measures** - Use of appropriate media - Parental locks and limit-setting - Smartphone apps - Use of analogue zeitgebers - Internet speed restriction/'throttling' - In-game feedback for breaks **Education and guidelines** - Physical activity recommendations - Engagement in alternative activities - Digital media literacy training - Safe Internet use orientation courses - Promotion via youth media ambassadors - Avoid/minimise riskier game types	**Education and programs** - Education on healthy Internet use - Address comorbid mental health issues - Youth empowerment approaches **Legislation and enforcement** - Reduce opening hours for Internet cafes - Regulations for safe use **Workplace Internet policies** - Proactive vs reactive policies - Staff training and central monitoring **Regular examination and screening** - Screening risky use (GP, MH providers) - Stress management - Self-monitoring online activity **Parental role** - Family media agreements, limit-setting - Facilitate alternatives to Internet use	**Support groups** - Online self-help communities - Community groups **National health guidelines** - Exercise and diet - Screen time restrictions **Education and awareness** - Self-monitoring/Limit-setting - Goal-directed Internet use - Awareness days (e.g., 'Smart Off Day') **Mental health services** - Treatment for primary disorders **Outpatient medical services** - Treatment for medical disorders (inc. pain, injury, other illness) - Psychosocial rehabilitation
Gaming disorder or Internet addiction (i.e., meets criteria for DSM-5 or ICD-11 gaming disorders, psychiatrically diagnosed Internet-related problems)	**Legislation and enforcement** - Restrictions on riskier games (e.g., MMOs) - Shutdown/fatigue systems **Technological measures** - Online monitoring of use - Clinical user feedback apps - Game account deactivation (voluntary) - Device-free environments (e.g., bedrooms) **Education and guidelines** - Defining Internet addiction - What is healthy Internet use - Relationship of IA to other disorders - Target student population - Interactive lectures/workshops	**Education and programs** - Education for users/carers - Self-control/self-regulation strategies - Contingency management & goal-setting - regimented exercise/outdoor activities **Regular examination and screening** - Mental health checks - Epidemiological surveys on IA - Online self-assessment of IA criteria **Technological measures** - Limit-setting software **Parental role** - Family media agreements, limit-setting - Facilitate alternatives to Internet use	**Support groups** - Online self-help - Community groups - Community engagement / mentors **Rehabilitation programs** - 'Digital detox' - Boot camps and retreats - Hospitalization - Psychosocial rehabilitation - Exercise programs **Psychological therapy/pharmacology** - CBT/ACT/MI therapy - Group/individual-based - Medication (e.g., antidepressants).

ACT: Acceptance and Commitment Therapy; CBT: Cognitive-behavioral therapy; GP: General Practitioner; IA: Internet addiction; MH: Mental health. POS: Point of sale

Table 3
Case examples of prevention policy and strategies for hazardous gaming or Internet use and gaming disorder or IA across regions

	South Korea	**China**	**Japan**	**United States**	**United Kingdom**	**Germany**	**Australia**
Legislation/enforcement	Shutdown Law (2011); Game Industry Promotion Act (2006)	Protection of Minors Act (2006); Online Game Anti-Addiction System	Act on Development of an Environment that Provides Safe and Secure Internet Use for Young People (2008)	None	None	None	None
Awareness; Education; Guidelines	Korea Internet Addiction Prevention Centers (IAPC); KOCCA; Wee Center; I Will Center;	"Be NetWise" Internet Education Campaign in 2009/2010	Ministry of Internal Affairs and Communications	American Academic of Pediatrics: Screentime recommendations; NGO websites	UK Council for Child Internet Safety; UK Safer Internet Centre; Childnet International	Federal Ministry of Health drug and addiction policy initiatives	Australian Communications and Media Authority; RaisingChildren.net; Cybersmart
Population screening	Korea Internet Addiction Prevention Centers Korea Youth Counselling and Welfare Institute	Government-funded independent research	The Ministry of Health, Labor, and Welfare survey (2012)	Government-funded independent research	Government-funded independent research	Government-funded independent research	The Mental Health of Children and Adolescents Survey
Early/Selective prevention	Korea Internet Addiction Prevention Center(IAPC); Korea Youth Counselling and Welfare Institute	Social Welfare Department: School-based programs	No public service	No public service	No public service	No public service	No public service
Mental health services	Korea Youth Counselling and Welfare Institute; I Will Center; Wee Center;	Various public and private mental health services	Kurihama Medical and Addiction Center (outpatient service)	No public service; Multiple private providers	Centre for Compulsive and Addictive Behaviours (ended)	LVR Clinic in Bonn	No specific public service; Multiple private providers; NGO services