Correlates of excessive Pokemon Go playing among medical students

ABSTRACT

Mili Ashar, Liz Thaliath, Kimaya Sali, Suprakash Chaudhury1, Biswajit L. Jagtap, Anand A. Patil, Spandana Devabhaktuni1
Department of Psychiatry, Rural Medical College, PIMS (DU), Loni, 1Department of Psychiatry, Dr. DY Patil Medical College, Hospital and Research Centre, Dr. DY Patil Vidyapeeth, Pune - 411 018, Maharashtra, India

Background: A new virus “Pokémon GO” is infecting Homo sapiens at an exponential rate. The symptoms include swaying your cell phone in air and focusing in blankness, straying into the unknown in search “Pikachu”. In the “Pokedemiological” triad, the host is a medical student, agent is Pokémon GO, and the environment is a chaos of childhood fantasies and peer pressure turning into a vicious cycle of addiction, stress, anxiety, and depression. Aim: The aim was to study the correlates of excessive playing of Pokémon GO in medical students. Materials and Methods: By purposive sampling, fifty MBBS students who were regularly playing Pokémon GO for more than 2 weeks and equal number of age- and sex-matched students who were not playing any computer games were included in this study with their consent. They were assessed with a pro forma asking information about their habit and the depression, anxiety, and stress scale. Statistical analysis was done using t-test, Chi-square test, and Mann–Whitney U-test. Results: Reasons for starting to play Pokémon GO included liking the concept (n = 39), peer pressure (n = 8), and free availability (n = 3). Wandering outside their residence alone until way after dark to play the game was reported by 27 players, and six admitted to stopping in the middle of a road to catch a rare pokemon. Twenty-eight players admitted that the game had adversely affected their behavior. Twenty players play much longer than they originally planned, whereas 22 lost track of time while playing the game. The players were under significantly more stress, anxiety, and depression compared to nonplayers. Conclusion: Regular playing of Pokémon GO results in adverse consequences including exposure to dangerous situations, stress, anxiety, and depression.

Keywords: Anxiety, depression, Pokemon Go, smartphones, stress, video games

INTRODUCTION

People love to play games for entertainment and enjoyment, but sometimes games are also used for information and education. Goals, challenges, rules, and interaction are the key components of games. It generally involves mental or physical stimulation, and often both. A number of games serve as a form of exercise, help in developing practical skills, or otherwise perform an educational or psychological role.[1] In the 1990s, people used to enjoy playing board games with the family and friends, which lead to social interaction and bonding. Due to the recent explosion of computers, video games, and smartphones with almost continuous access to the Internet, face-to-face social interaction seems to be decreased. In India, there are about 400 million smartphone users.[3] Smartphone companies are constantly improving their phones by making it more user-friendly and expanding the functions of the phone. This encourages overuse and the
likelihood of addiction. The prevalence rates range between 1% and 18% worldwide, with females showing up to ten times lower rate of addiction.\(^\text{[9]}\)

Pokémon (Japanese for “Pocket Monsters”) was introduced in 1995 as a series of video games consisting of capturing, training, and battling whimsical and cute little creatures. Gradually, Pokémon cards, television shows, and movies became available all over the world. At present, there exist dozens of games using the 700 Pokémon characters. Pokémon Go is a new online game available on smartphones in which players try to catch Pokémon at specific locations. It includes simple, nostalgic graphical representations of only the original 151 Pokémon characters. Most of the present generation of undergraduate students, being familiar with Pokémon at an younger age, are the prime target of Pokémon Go. Studies found that being a fan of Pokémon was the most frequent motivation to start playing.\(^\text{[1,3,4]}\)

The defining feature of Pokémon Go is that augmented reality (AR) is a fundamental part of the game. AR as opposed to virtual reality creates an interactive experience with the objects enhanced by computer-generated perceptual information residing in the real world. By artistically transforming reality, AR produces a great amount of astonishment and interest in users and is potentially addictive, especially in children.\(^\text{[8]}\) Another factor contributing to the attraction of online games is the use of random ratio reinforcement schedules (operant condition processes) that underlie repetitive behavior. In ordinary language, it means that interest in games of chance or online games such as Pokémon Go is maintained because the rewards (catching a Pikachu) are neither regular nor predictable. In the long run, knowing when a reward is coming gets boring, but when the player does not know when the next reward is coming, he becomes curious. Similar to actual rewards, anticipated rewards also facilitate dopamine release in the body, especially the reward circuit in the brain.\(^\text{[6,7]}\) Launched in 2016, Pokémon Go has been downloaded 500 million times and at its peak, had 44 million users, making it the most successful mobile video game in the US history.\(^\text{[5]}\) The popularity of the game and the sheer number of people playing it has raised concerns about the physical and mental risks the players are creating and encountering.\(^\text{[3,8,9]}\) The easy availability of the game on a smartphone has led to an increased amount of time spent playing the game.

Four basic motivations for playing the game include: curiosity, astonishment, and interest; cognitive stimulation; enjoyment of a different lifestyle in virtual environments; and recreational refreshment.\(^\text{[10]}\) The Pokémon go game also has components of nostalgia, motivation, and collecting items. Research review has noted that nostalgia strengthens approach orientation, raises optimism, evokes inspiration, boosts creativity, and kindles prosociality.\(^\text{[11]}\) Researchers in the area of games and people who play games know that to be a success a game should be motivating to play. Motivation in Pokémon Go is maintained by the achievement of goals and obtaining rewards.\(^\text{[7]}\) It has been mentioned that collecting Pokémon is a lot like building a coin or stamp collection. The thrill of a hunt and showing the collection to your friends is what keeps the player interested.\(^\text{[7]}\) Despite reports of widespread and excessive Pokémon Go abuse, very few studies have been undertaken and none in medical students. In this context, the present work was undertaken to evaluate the causes and effects of excessive playing of Pokémon Go in medical students.

### MATERIALS AND METHODS

This cross-sectional analytical study was carried out among the medical undergraduate students of a medical college located in a rural area. The study protocol was submitted to the institutional ethical committee and approved by them. All the participants gave written informed consent.

#### Sample

By purposive sampling, fifty MBBS students who were regularly playing Pokémon GO for more than 4 h a day for at least 2 weeks and equal number of age- and sex-matched students who were not playing any computer games were included in this study. Equal number of age- and sex-matched students who did not play Pokémon Go or computer games regularly formed the control group.

#### Tools

**Sociodemographic and clinical pro forma**

This self-made questionnaire contained questions about demographic details of the participants and questions about their habit of playing Pokémon Go.

**Depression anxiety stress scale**

The depression, anxiety, and stress scale (DASS) is a self-report scale which measures the levels of depression, anxiety, and stress. There are two versions of the scale: short and long. In the present study, the short version of the scale was used. It contains a total of 21 items, 7 each for depression, anxiety, and stress, respectively. Each item is scored on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much). The sum of the items of each subscale gives us the scores of depression, anxiety, and stress, respectively.\(^\text{[12]}\) The three subscales have adequate reliability with test–retest reliability being 0.71 for depression, 0.79 for anxiety, and 0.81 for stress.\(^\text{[13]}\)
Procedure
After explaining the purpose of the study, written informed consent was obtained from all the participants. They were assessed with a self-designed pro forma containing questions about demographic data and information about their habits and playing computer games. Thereafter, the DASS scale was administered individually. The scale was scored as per the scoring instructions. The data were then tabulated and analyzed.

Statistical analysis
Statistical analysis was done using SPSS 16 (IBM, Chicago, USA). For the comparison of groups, appropriate statistical tests were used, namely students “t”-test for continuous data, Chi-square test for frequency data, and Mann–Whitney U-test for ordinal data.

A significance level of $P < 0.05$ and a confidence level of 95% were utilized for statistical analysis.

RESULTS
There was no significant difference in age, sex, religion, family type, habits, or stressful events in the past year between the Pokemon Go players and nonplayers. Significantly more players had watched the Pokemon cartoon series in their childhood [Table 1]. Reasons for starting to play Pokemon Go given by the players included peer pressure ($n = 8$), liking the concept ($n = 39$), and free availability ($n = 3$). Among the players, 16 had recharged their phone Internet just to play the game, whereas 10 had visited a metropolitan area to able to play the game in a better way. Wandering outside their residence alone until way after dark to play the game was reported by 27, playing during class by 23, whereas 9 had pulled his/her hair each time the pokeball froze. Eleven players had caught 1–20 Pokémon, 15 players had caught between 21 and 50 Pokémon, 22 players had caught 51–100 Pokémon, whereas 2 had caught all. Six players admitted to stopping in the middle of a road to catch a rare Pokémon. Twenty-seven players admitted to stopping in the middle of a road to catch a Pokémon, but only if there was no traffic while 17 players said they never stop in the middle of a road. Thirty-four players had explored new places after starting to play the game. Fifteen players had owned a gym, whereas 33 had participated in a Poke-walk. Twenty-eight players admitted that the game had adversely affected their behavior. Thirty-three players admitted to be thinking about the game when not playing, whereas 38 admitted to feeling of depression and irritability when not playing the game. Twenty players play much longer than they originally planned, whereas 22 lose track of time while playing the game. Twenty-five players admitted that their friends have complained that they are gaming too long. Thirty-six players said that they have tried unsuccessfully to cut down the time spent playing. Forty-one admitted to neglecting other activities to spend time playing. The most common reason given by students for not playing was waste of time ($n = 16$), have better use of the Internet ($n = 15$), dislike for walking ($n = 15$), and knowledge about the

| Characteristics of Pokemon Go players and nonplayers |
|------------------------------------------------------|
| Players | Nonplayers | $t$/$\chi^2$ | $P$ |
|---|---|---|---|
| **Age (years)** | 20.4±0.93 | 20.48±0.89 | 0.441* | 0.660 (NS) |
| **Sex** | | | | |
| Male | 26 | 23 | 0.160; df=1 | 0.6891 (NS) |
| Female | 24 | 27 | | |
| **Religion** | 42 | 41 | 0.212; df=2 | 0.8994 (NS) |
| Hindu | 6 | 6 | | |
| Muslim | 2 | 3 | | |
| **Family type** | | | | |
| Nuclear | 42 | 38 | 1.4; df=2 | 0.4964 (NS) |
| Joint | 7 | 7 | | |
| Extended | 2 | 5 | | |
| **Habits** | | | | |
| Smoking | 1 | 1 | 0.710; df=2 | 0.701 (NS) |
| Alcohol | 2 | 4 | | |
| None | 47 | 45 | | |
| **Watched pokemon cartoon series** | 46 | 13 | $\chi^2=42.332; df=1$ | 0.0001 (NS) |
| Yes | 4 | 37 | | |

SD – Standard deviation, NS – Not significant
addicting nature of the game \((n = 4)\). Thirteen students had been ridiculed by their friends for not playing, whereas 14 had strained relations with friends who began playing Pokémon. Thirteen nonplayers had accompanied their friends on a “Pokehunt.” The Pokémon players were under significantly more stress, anxiety, and depression compared to nonplayers [Table 2 and Figures 1-3].

**DISCUSSION**

Pokemon Go, an AR smartphone game, was developed by Niantic for iOS and Android devices. The AR makes characters feel “more alive”. In the game, digital “pocket monsters” (Pokémon), superimposed over the real world, are displayed on the smartphone screen. The Pokémon world connects to the real world with AR, and players are required to physically move about to play the game. To progress in the game, participants are required to catch pokémon characters at specific locations or PokéStops, achieve bonuses, and “hatch” new characters. The physical component of the game requires players to walk around their neighborhood with the help of the global positioning system to capture the pokémon. As Pokemon Go incentivizes exercise, it has the potential to promote and sustain physical activity.[14] However, one study found an increase in the number of steps taken by a player in the 1st week after the installation of the game, but the association was modest, and by the 6th week, the number of daily steps reverted back to preinstallation levels.[8]

An important finding of the present study was that wandering outside their residence alone until way after dark was reported by 27 students, whereas six players admitted to stopping in the middle of a road to catch a rare Pokémon. This is consistent with an earlier report that though movement is an important component of the game and resulted in increased physical activity, several cases of road traffic accidents and physical injuries have been reported in users who played while walking, cycling, or driving on the streets.[15,16] A disproportionate increase in crashes and associated vehicular damages, injuries, and fatalities in the vicinity of locations where users can play the game while driving has also been reported.[17]

| Variables                  | Players       | Nonplayers  | Mann-Whitney U | \(P\)     |
|----------------------------|---------------|-------------|----------------|----------|
| Depression, mean±SD        | 12.16 (4.98)  | 2.96 (3.19) | 145.00         | <0.001   |
| Distribution of depression |               |             |                |          |
| Normal                     | 12            | 49          |                |          |
| Mild                       | 19            | 1           |                |          |
| Moderate                   | 18            | 0           |                |          |
| Severe                     | 1             | 0           |                |          |
| Anxiety, mean±SD           | 11.64 (5.65)  | 4.24 (3.54) | 342.5          | <0.001   |
| Distribution of anxiety    |               |             |                |          |
| Normal                     | 8             | 41          |                |          |
| Mild                       | 9             | 3           |                |          |
| Moderate                   | 20            | 6           |                |          |
| Severe                     | 8             | 0           |                |          |
| Extremely                  | 5             | 0           |                |          |
| Stress, mean±SD            | 13.04 (6.86)  | 3.92 (3.48) | 261.0          | <0.001   |
| Distribution of stress     |               |             |                |          |
| Normal                     | 36            | 50          |                |          |
| Mild                       | 6             | 0           |                |          |
| Moderate                   | 4             | 0           |                |          |
| Severe                     | 4             | 0           |                |          |

\(SD – Standard deviation\)
Figure 3: Stress levels in Pokemon Go players and nonplayers

The major finding of the present study is that regular players of Pokemon Go had significantly higher levels of depression, anxiety, and stress as compared to nonplayers. Further analysis revealed that 66% of the players had moderate or higher anxiety compared to 12% of the nonplayers. More importantly, 38% of the players had moderate to severe depression compared to none of the nonplayers. These findings are a matter of concern and highlight the emotional effects of excessive playing of online games.

Limitations

The sample size was modest, and the study was done at a single location which will limit the generalizability of our findings.

CONCLUSION

Regular playing of Pokemon Go results in adverse consequences including exposure to dangerous situations, stress, anxiety, and depression.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Marquet O, Alberico C, Adlakha D, Hipp JA. Examining motivations to play pokémon go and their influence on perceived outcomes and physical activity. Weber I, ed. JMIR Serious Games 2017;5:e21.
2. Pandey N. Chinese smartphone makers ringing in more investments into India. Livemint 29 Aug 2019. Available at: https://www.livemint.com/technology/tech-news/chinese-smartphone-makers-ringing-in-more-investments-into-india-156701673892.html. [Last accessed on 2020 May 27].
3. Spada MM. An overview of problematic internet use. Addict Behav 2014;39:3-6.
4. Rasche P, Schloemann A, Mertens A. Who is still playing pokémon go? A web-based survey. JMIR Serious Games 2017;5:e7.
5. Bujak KR, Radu I, Catrambone R, MacIntyre B, Zheng R, Golubski G. A psychological perspective on augmented reality in the mathematics classroom. Comput Educ 2013;68:536-44.
6. Anselme P, Robinson MJ. What motivates gambling behavior? Insight into dopamine’s role. Front Behav Neurosci 2013;7:182.
7. Griffiths M. 10 Psychosocial Reasons why Pokémon Go is so Appealing. Gamasutra; 2016. Available from: http://www.gamasutra.com/blogs/MarkGriffiths/20160801/278248/10-psychosocial_reasons_why_Pokmon_Go_is_so_appealing.php. [Last accessed on 2018 Oct 16].
8. Howe KB, Suhaerlim C, Ueda P, Howe D, Kawachi I, Rimm EB. Gotta catch’em all! Pokémon GO and physical activity among young adults: Difference in differences study. BMJ 2016;355:i6270.
9. Ayers JW, Leas EC, Dredze M, Allem JP, Grabowski JG, Hill L. Pokémon GO-A new distraction for drivers and pedestrians. JAMA Intern Med 2016;176:1865-6.
10. Voiskounsky AE, Mitina OV, Avetisova AV. Playing online games: Flow experience. Psychol J 2004;2:259-81.
11. Sedikides C, Wildschut T. Past forward: Nostalgia as a motivational force. Trends Cogn Sci 2016;20:319-21.
12. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the beck depression and anxiety inventories. Behav Res Ther 1995;33:335-43.
13. Brown TA, Chorpita BF, Korotitsch W, Barlow DH. Psychometric properties of the depression anxiety stress scales (DASS) in clinical samples. Behav Res Ther 1997;35:79-89.
14. Boulos MN, Yang SP. Exergames for health and fitness: The roles of GPS and geosocial apps. Int J Health Geogr 2013;12:8.
15. Barbieri S, Vettore G, Pietrantonio V, Snenghi R, Tredese A, Bargamini M, et al. Pedestrian inattention blindness while playing Pokémon Go as an emerging health-risk behavior: A case report. J Med Internet Res 2017;19:e86.
16. Pourmand A, Lombardi K, Kuhl E, O’Connell F. Videogame-related illness and injury: A review of the literature and predictions for Pokémon Go! Games Health J 2017;6:9-18.
17. Faccio M, McConnell JJ. John J. Death by Pokémon Go. The Economic and Human Cost of Using Apps While Driving; 2 February, 2018. Available from: https://ssrn.com/abstract=3073723. [Last accessed on 2018 Nov 16].