



Original Research

ANALYSIS OF SMARTPHONE ADDICTION WITH ANXIETY IN SCHOOL-AGED CHILDREN

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ARTICLE HISTORY

Received: Dec 32, 2024

Revised: February 12, 2024

Accepted: March 04, 2024

Available online: March 04, 2024

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ABSTRACT

Introduction: Increasing smartphone overuse among children is an addictive behavior that not only creates physical difficulties, but also affects their mental health in ways such as mood changes, withdrawal, emotional discomfort, fear and worry regarding certain social situation. The study aimed at determining the analysis correlation between smartphone addiction with anxiety in Pawyatan Daha elementary school, Kediri, East Java.

Methods: This study use a cross-sectional design. The sampling method was simple random sampling and 154 students from Pawyatan Daha elementary school, Kediri, East Java comprised the sample. Data collection was carried out in November to December 2022. In this study, the independent variable was smartphone addiction as measured by the smartphone addiction risk children questionnaire (SARCQ), and the dependent variable was anxiety as measured by the revised child anxiety and depression scale (RCADS). Data analysis was using the spearman rho test with $\alpha=0.05$.

Result: The study showed the majority 77.3% of respondents are addicted smartphone in the high category, anxiety majority 52.6% of respondents are general anxiety disorders category and statistical test result show a significant correlation with a p-value of 0.001 ($p<0.005$) and $r = 0.330$.

Conclusions: Smartphone addiction has a correlation with anxiety in school-aged children, parents must supervise their children's smartphone use in order to help them develop character and avoid addicted behavior and nurse can act as counselors by providing regular counseling service visits to elementary school to reduce smartphone addiction.

Keyword: anxiety; children; mental health; smartphone addiction

Cite this as:

Erindia, F., Yusuf, A., Tristiana, R. & Soleha, U.S. (2024). Analysis of Smartphone Addiction With Anxiety in School-Aged Children. *Psych. Nurs. J.*, 6(1). 27-33. doi.org/10.53344/pnj.v6.i1.48033

1. INTRODUCTION

The increasingly technological and communicative era makes smartphone ownership a requirement (Ravipati, 2020). The advent of smartphones has not only altered the lives of adults, but also those of children, who almost daily use their devices to play games and access other entertainment applications (Dore et al., 2020). Even though school-aged children's mental development is not optimal, there is a tendency for them to become addicted to smartphones if they use them frequently and for an extended period of time (Ali & Bharat, 2021). Children with smartphone addiction are more likely

to experience unstable emotional problems, such as mood swings, withdrawal, emotional discomfort, fear, and anxiety in certain social situations (Wang et al., 2022).

China is the country with the largest number of smartphone users, accounting for 63.4 % of the world's total smartphone users, according to data (Newzoo, 2020). Commonly used between the ages of 9 and 17 (Wacks & Weinstein, 2021). Based on the prevalence of smartphone users in Indonesia, it is conceivable that it will surpass China, India, and the United States to become the country with the fourth

largest number of active smartphone users in the world (Statista Research Department, 2023). Since 2000, there has been an increase in the number of adolescents who use mobile phones. In the United States, 52 % of families with children owned a smartphone in 2011, and this number increased to 98 % in 2017 (Buctot et al., 2020). In the United States, as many as 35 % of children aged 0-8 have used smartphones for an average of 14.2 hours per week, whereas in Australia, children aged 2-5 spend as much as 25.9 hours per week using smartphones (Cha & Seo, 2018)

According to a study conducted by the Indonesian Child Protection Commission approximately 71.3% of school-aged children have devices and/or play them for extended periods of time each day, and as many as 55% of them spend their time playing mobile phone games, either online or offline (Komisi Perlindungan Anak Indonesia, 2020). The median prevalence of problematic smartphone usage among children and young people in the United Kingdom is 23.3%, furthermore, problematic smartphone usage is associated with an increased likelihood of depression (78%), anxiety (95%), and stress (65%) (Cha & Seo, 2018). In India, the prevalence of smartphone addiction among school-aged adolescents ranges from 2.4% to 60.3% (Gangadharan et al., 2022). According to a separate study, as many as 17.9% of 1.63 million adolescents are addicted to their devices, and more than 24% of children have been diagnosed with internet addiction and must receive hospital treatment (Kim et al., 2019). An initial study conducted by researchers on 15 elementary school students revealed that from each of them, 7 children felt anxious and nervous if their smartphone was left behind or forgotten while traveling, 4 children said they were worried if their smartphone ran out of battery, and 4 children said they were anxious and worried if you can't check incoming messages or notifications on your smartphone.

Low social skills, traumatic events, and family conflicts can all contribute to the development of smartphone addiction, and parental styles have a significant impact on children's perspectives (Buctot et al., 2020). According to the social learning theory, children learn by observing what other people do through observation (modeling), which is cognitively conveyed by the observed behavior of other people. Appropriate parental styles can cultivate self-control and responsibility in children, including the responsibility of smartphone usage (Bijandi & Nabavi, 2012). Smartphone addiction, if left unchecked, can cause complex health problems such as depression, neuroticism, and obsessive-compulsive behavior disorder, as well as affect academic achievement and gadget addiction can cause emotional disturbances including stress, anxiety, and even depression (Sohn et al., 2019)

We are interested in analyzing smartphone addiction for anxiety as an early detection of anxiety disorders in childhood. If a child experiences a disorder, can be given early treatment to cure the condition, so that it does not become serious when they are adults (Brodersen et al., 2022). The effects of technological advancements necessitate special consideration to the mental health of minors. As a nurse, he or she must be able to detect children suffering from psychological disorders caused by smartphone addiction as early as possible in order to prevent the child's mental condition from deteriorating. The purpose of this research is to determine the relationship between smartphone addiction and anxiety in the Pawyatan Daha Elementary School, Kediri, East Java.

2. MATERIALS AND METHODS

This study uses a cross-sectional design. The population in this study was 250 students at Pawyatan Daha elementary school. Subjects were taken from this population who met the inclusion criteria, namely being aged ≥ 7 years, having their own smartphone, using a smartphone for about 6 hours or more a day, and being able to read and write. The sampling method was simple random sampling. The sample size calculated using the Slovin formula with 154 students from Pawyatan Daha Elementary School, Kediri, East Java, included the sample.

In this study, the independent variable was smartphone addiction as measured by the smartphone addiction risk children questionnaire (SARCQ) which consists of 13 statement items with validity test results of $r_{\text{count}} 0.625 > r_{\text{table}} 0.444$, and a reliability value of 0.861 for the collected data then categorized into mild (score 13-26), moderate (score 27-39) and severe (score 40-52) smartphone addiction, and the dependent variable was anxiety as measured by the revised child anxiety and depression scale (RCADS) which consists of 47 statement items with validity test results $r_{\text{count}} 0.746 > r_{\text{table}} 0.444$ and a reliability value of 0.758, the data collected was then categorized into social phobia (score 47-75), major depressive disorder (score 76-103), panic disorder (score 104-131), general anxiety disorder (score 132-159) and separation anxiety disorder (score 160-188). Data analysis used SPSS for windows version 26 software with Spearman rho test with $\alpha = 0.05$. This research has passed the ethical clearance test by the ethics committee of the Brahmanda Lantera Chakra Institute.

3. RESULTS

Table 2 explains the cross tabulation between

Table 1. Demographic characteristics of the respondents

Characteristics	N	%
Gender		
Male	74	48.1
Female	80	51.9
Age		
7 years old	24	15.6
8 years old	22	14.3
9 years old	21	13.6
10 years old	34	22.1
11 years old	26	16.9
12 years old	27	17.5
Mother's education		
PhD	4	3.2
MA	58	37.7
Bachelor	87	56.5
High school	5	2.6
Father's education		
PhD	3	1.9
MA	10	6.5
Bachelor	141	91.6
Parent's marital status		
legally married	98	63.6
Separated	56	36.4
All family members have a smartphone		
Yes	100	100
Purpose of smartphone use		
Play games	94	61
Play social media	52	33.8
Other	8	5.2
Parents' employment status		
One of the parents is working	37	24
Both of the parents are working	117	76

Table 2. Analysis of smartphone addiction with anxiety

Smartphone addiction	Anxiety								p value	Coeff correlation
	Major depressive disorder		Panic disorder		General anxiety disorder		Separation anxiety disorder			
	n	%	n	%	n	%	n	%		
High	11	7,1%	50	32,5%	46	29,9%	12	7,8%	0.001	0.330
Medium	0	0%	0	0%	35	22,7%	0	0%		
Total	11	7,1%	50	32,5%	81	52,6%	12	7,8%		

Table 1 explains that most of the 51.9% of respondents are female, a small portion of 22.1% of respondents in this study are 10 years old. The educational history of parents, especially mothers in this study, is mostly 56.5% undergraduate and almost all of father's education is 91.6% undergraduate, then having a smartphone in the whole family 100% of the family has a smartphone, and the purpose of children using smartphones is most 61% to play games and some 76% of respondents both parents work.

smartphone addiction and anxiety in respondents. There were 11 respondents (7,1%) included in the category of high smartphone addiction with major depressive disorder, then 50 respondents (32,5%) included in the category of high smartphone addiction with panic disorders, 46 respondents (29,9%) included in the category of high smartphone addiction with general anxiety disorder, and 12 respondents (7,8%) included in the high smartphone addiction category with separation anxiety disorder. 35 respondents (22,7%) were included in the

moderate smartphone addiction category with general anxiety disorder, and statistical test results showed a significant correlation with a p-value of 0.001 ($p < 0.005$) and $r = 0.330$ so it can be said that smartphone addiction is positively correlated with anxiety in school-aged children. The positive correlation coefficient means that the higher the level of smartphone addiction, the higher the child's anxiety level.

4. DISCUSSION

Smartphone Addiction

Based on the research results, the majority of respondents experienced a high category of smartphone addiction. One of the factors causing smartphone addiction is high media exposure about smartphones and the facilities or application features on smartphones that make individuals feel ease and comfort in using them. Children are individuals who have a high level of curiosity about information or new things, the ease and comfort obtained when using a smartphone makes children continuously use the smartphone and cannot be separated from the smartphone and cannot control the use of the smartphone, thus causing smartphone addiction (Haripriya et al., 2019). Based on research results, smartphone addiction is mostly experienced by female respondents than male respondents, in this result line with previous studies, stating that the average level of smartphone addiction mostly occurs in women compared to men, because men tend to use smartphones to complete tasks, browse, play games and entertainment while women tend to spend their free time on social relations and instant messages in cyberspace (Alhazmi et al., 2018). Women have a higher desire to communicate than men, this is what encourages women to always check their smartphones all the time. In addition, women think they are afraid of delays in information about entertainment, and everything that exists in cyberspace so that women will use smartphones more often and for longer periods of time, these uses are more than making calls, playing games but also checking smartphones to find information and social networking sites, such as Instagram and Facebook.

The research results showed the majority of respondents were 10 years old and majority of children's parents work, as with primary school education in Indonesia, the age range for beginning school is between 6 and 12 years old, which corresponds to the age range of the respondents between 6-9 years of middle childhood and 10 to 12 years of late childhood. When a child reaches the final stage of childhood, he or she will undergo not only

significant physical but also psychological development. At this stage of physical development, children will have improved play skills such as reading, counting, and speaking, allowing them to better comprehend the functions of a smartphone (Prasetyo, 2020). When both parents are employed, parental supervision will be limited because they will be preoccupied with their jobs. As a result, children will lack supervision and attention, such as playtime with their parents, and opt to play on their smartphones (Fu et al., 2020). The various features available on smartphones make it simpler to access information related to school teachings or other vital information, leading children to believe that smartphones must be constantly active. Even though excessive, unsupervised smartphone use renders children incapable of controlling and dependent on internet-based technology users. In addition, children who are left by both parents to work surmount feelings of loneliness by playing online and communicating with peers in cyberspace to the point where they spend the majority of their time using smartphones (Lee & Ogbolu, 2018). Smartphones have played a significant role in the lives of their users, beginning with the simplicity of communication that connects them to anyone, anywhere, and the ease of accessing information. Thus, a person becomes more dependent on a smartphone than in the past, which will exacerbate the anxiety induced by a smartphone (Ravipati, 2020).

Anxiety

The anxiety category among respondents is general anxiety disorder, this condition, if not treated, can limit a child's ability to think at school, relate to other people, and relationships with family. The more severe impact of general anxiety disorder can disrupt sleep quality and trigger depression (Park et al., 2021). Anxiety is a psychological disorder that has characteristics in the form of fear, concern, and prolonged feelings about something (Gangadharan et al., 2022). The more often children use smartphones in everyday life, the higher the level of anxiety they have regarding smartphones. The problems shown are impatience when experiencing delays, easily get annoyed, become angry because of trivial things, easily irritated and exhausted because of anxiety. Anxiety arises because they cannot make calls, send messages, browse or make any contact with other people (family and friends). Using smartphones without control will cause social problems in the surrounding environment. This will make a person withdraw from their social environment, triggering

feelings of anxiety and loss if they are far from their smartphone. Good self-control will make individuals regulate their smartphone use to suit their needs and not be excessive (Pratama et al., 2020). Individuals with anxiety have a high risk of smartphone addiction because they avoid real friendships. Social relationships in cyberspace can reduce feelings of fear or the appearance of physical symptoms related to anxiety. Communication via smartphone provides a sense of freedom and can behave without a perception of pressure (Scheeringa & Burns, 2018).

The research results show that students at Pawyatan Daha elementary school are allowed to carry smartphones for learning purposes and communicating with parents. However, some students cannot use smartphones as needed. These students were playing with their smartphones secretly while lessons were in progress, some students were caught opening their smartphones while lessons were in progress and this ultimately resulted in disruption of learning time. There are many factors that cause children to focus more on smartphones, one of which is the facilities of the smartphone itself, including applications such as online games, TikTok, WhatsApp. Apart from that, external factors also come from the family and environment (society, peers, and technological advances)(Ali & Bharat, 2021).

Individuals with smartphone addiction apart from having less control in using smartphones, the length of time individuals use smartphones results in reduced direct face-to-face interactions. This results in the emergence of anxiety disorders. A study conducted by (Park et al., 2021) there is a relationship between a lack of ability to socialize directly and social anxiety, individuals with smartphone addiction tend to communicate online by presenting themselves as best as possible to get a positive impression from other people, so that sometimes the impression given does not match the original. This situation makes individuals with smartphone addiction experience social anxiety. Smartphone addiction is known to cause mental problems such as decreased self-control, impulsive behavior, and anxiety which can be important obstacles when engaging in positive relationships with other people, school activities, and psychological well-being (Woo et al., 2021).

Correlation Smartphone Addiction with Anxiety

The results of the Spearman Rho test indicate that there is a positive relationship between smartphone addiction and anxiety, The results of the

questionnaire showed that the majority of respondents experienced high category smartphone addiction and general anxiety disorder, which is consistent with previous research indicating that smartphone addiction can cause anxiety in all walks of life, and even causes children to lose a great deal of energy due to excessive smartphone use at school (Haripriya et al., 2019). There are several factors that influence children's anxiety, one of which is the environment. An environment that frequently uses smartphones can cause someone to communicate less with the people around them and spend more time with smartphones. According to the research results, all respondents in this study had their own smartphones and brought their smartphones to school. In other words, respondents are in an environment where the people around them are smartphone users who spend their time with smartphones. One of the supporting factors for smartphone addiction is the inability to exercise self-control when using a smartphone. Anxious individuals, particularly those with social anxiety, are at a high risk for smartphone addiction because they avoid genuine friendships. Social connections in cyberspace can lessen fear or the emergence of physical symptoms, smartphone communication provides a sense of freedom without the perception of duress (Annoni et al., 2021)

Anxiety is a psychological disorder characterized by persistent anxiety or concern about something (Scheeringa & Burns, 2018). The greater the frequency with which children use smartphones in their daily lives, the higher their level of apprehension towards smartphones. The symptoms include impatience when experiencing delays, irritability, anger over inconsequential matters, irritability, and weariness due to anxiety (Shoukat, 2019). They experience anxiety because they are unable to make calls, send messages, browse the internet, or otherwise communicate with other people (family and acquaintances). The unrestrained use of mobile devices will cause social problems in the adjacent community (Velthoven et al., 2018). This will cause someone to withdraw from their social environment, causing them to experience feelings of anxiety and loss if they are separated from their smartphone. Individuals with good self-control will manage their smartphone usage to meet their requirements and not exceed them (Troll et al., 2021).The use of smartphones among students does not have a completely negative impact, smartphones

can have a positive effect if users use them according to their needs and limitations (Nursalam et al., 2023)

Referring to the conditions above, nurses can act as counselors by providing regular counseling service visits to elementary schools to reduce smartphone addiction. Counseling services can be carried out by applying rational emotive therapy techniques or counseling based on cognitive behavior therapy approaches and nurses can optimize their role as parent educators, by providing health education regarding the impact of gadget addiction on children's health and development. So that parents can educate their children according to their age and growth and development.

5. CONCLUSION

Due to the correlation between smartphone addiction and anxiety in children of school age, parents should monitor their children's smartphone use to help them develop character and avoid addictive behavior. Parents are advised to pay more attention to the use of smartphone for children at home by setting time limits for playing gadgets by doing interesting things such as inviting children to play outside the home, inviting children to do more activities such as sports, playing music, and socializing with peers and friends, and nurse can act as counselors by providing regular counseling service visits to elementary schools to reduce smartphone addiction.

6. REFERENCES

- Alhazmi, A. A., Alzahrani, S. H., Baig, M., Salawati, E. M., & Alkatheri, A. (2018). Prevalence and factors associated with smartphone addiction among medical students at King Abdulaziz University, Jeddah. *Pakistan Journal of Medical Sciences*, *34*(4), 984–988. <https://doi.org/10.12669/pjms.344.15294>
- Ali, A., & Bharat. (2021). Impact of Smartphone: A Review on Negative Effects on Students. *PalArch's Journal of Archaeology of Egypt*, *18*(4), 5710–5718.
- Annoni, A. M., Petrocchi, S., Camerini, A. L., & Marciano, L. (2021). The relationship between social anxiety, smartphone use, dispositional trust and problematic smartphone use: A moderated mediation model. *International Journal of Environmental Research and Public Health*, *18*(5), 1–16. <https://doi.org/10.3390/ijerph18052452>
- Bijandi, M. S., & Nabavi, R. T. (2012). *Bandura's Social Learning Theory & Social Cognitive Learning Theory Title: Bandura's Social Learning Theory & Social Cognitive Learning Theory*. <https://www.researchgate.net/publication/267750204>
- Brodersen, K., Hammami, N., & Katapally, T. R. (2022). Smartphone Use and Mental Health among Youth: It Is Time to Develop Smartphone-Specific Screen Time Guidelines. *Youth*, *2*(1), 23–38. <https://doi.org/10.3390/youth2010003>
- Buctot, D. B., Kim, N., & Kim, J. J. (2020). Factors associated with smartphone addiction prevalence and its predictive capacity for health-related quality of life among Filipino adolescents. *Children and Youth Services Review*, *110*. <https://doi.org/10.1016/j.chilyouth.2020.104758>
- Cha, S. S., & Seo, B. K. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health Psychology Open*, *5*(1). <https://doi.org/10.1177/2055102918755046>
- Dore, R. A., Logan, J., Lin, T. J., Purtell, K. M., & Justice, L. M. (2020). Associations Between Children's Media Use and Language and Literacy Skills. *Frontiers in Psychology*, *11*. <https://doi.org/10.3389/fpsyg.2020.01734>
- Fu, X., Liu, J., Liu, R. De, Ding, Y., Wang, J., Zhen, R., & Jin, F. (2020). Parental monitoring and adolescent problematic mobile phone use: The mediating role of escape motivation and the moderating role of shyness. *International Journal of Environmental Research and Public Health*, *17*(5). <https://doi.org/10.3390/ijerph17051487>
- Gangadharan, N., Borle, A. L., & Basu, S. (2022). Mobile Phone Addiction as an Emerging Behavioral Form of Addiction Among Adolescents in India. *Cureus*. <https://doi.org/10.7759/cureus.23798>
- HariPriya, S., Samuel, S. E., & Megha, M. (2019). Correlation between Smartphone Addiction, Sleep Quality and Physical Activity among Young Adults. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH*. <https://doi.org/10.7860/jcdr/2019/42168.13212>
- Kim, S. G., Park, J., Kim, H. T., Pan, Z., Lee, Y., & McIntyre, R. S. (2019). The relationship between smartphone addiction and symptoms of depression, anxiety, and attention-deficit/hyperactivity in South Korean adolescents. *Annals of General Psychiatry*, *18*(1). <https://doi.org/10.1186/s12991-019-0224-8>
- Komisi Perlindungan Anak Indonesia. (2020). *Komisi Perlindungan Anak Indonesia KPAI. In Jakarta Pusat*.
- Lee, E. J., & Ogbolu, Y. (2018). Does Parental Control Work with Smartphone Addiction?: A Cross-

- Sectional Study of Children in South Korea. *Journal of Addictions Nursing*, 29(2), 128–138. <https://doi.org/10.1097/JAN.0000000000000222>
- Nursalam, Iswanti, D. I., Agustinarsih, N., Rohmi, F., Permana, B., & Erwansyah, R. A. (2023). Factors contributing to online game addiction in adolescents: a systematic review. *International Journal of Public Health Science*, 12(4), 1763–1770. <https://doi.org/10.11591/ijphs.v12i4.23260>
- Park, J. H., & Park, M. (2021). Smartphone use patterns and problematic smartphone use among preschool children. *PLoS ONE*, 16(3 March). <https://doi.org/10.1371/journal.pone.0244276>
- Pratama, M. O., Harinitha, D., Indriani, S., Denov, B., & Mahayana, D. (2020). Influence Factors of Social Media and Gadget Addiction of Adolescent in Indonesia. *Jurnal Sistem Informasi*, 16(1), 16–24. <https://doi.org/10.21609/jsi.v16i1.918>
- Rahman Prasetyo, A. (2020). Early Childhood Physical, Cognitive, Socio-Emotional Development. *Jurnal Pendidikan Anak Usia Dini*, 4(2). <https://doi.org/10.29313/ga:jpau.v4i2.6049>
- Ravipati, K. S. (2020). *Mobiles have changed the way we communicate The need of professional communication skills View project*. 40–43. <https://www.researchgate.net/publication/347829200>
- Scheeringa, M. S., & Burns, L. C. (2018). Generalized anxiety disorder in very young children: First case reports on stability and developmental considerations. *Case Reports in Psychiatry*, 2018. <https://doi.org/10.1155/2018/7093178>
- Shoukat, S. (2019). Cell phone addiction and psychological and physiological health in adolescents. In *EXCLI Journal* (Vol. 18, pp. 47–50). Leibniz Research Centre for Working Environment and Human Factors. <https://doi.org/10.17179/excli2018-2006>
- Sohn, S., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence. In *BMC Psychiatry* (Vol. 19, Issue 1). BioMed Central Ltd. <https://doi.org/10.1186/s12888-019-2350-x>
- Statista Research Department. (2023, May 2). *Smartphone users in Indonesia 2017-2028*. Statista Statistics.
- Troll, E. S., Friese, M., & Loschelder, D. D. (2021). How students' self-control and smartphone-use explain their academic performance. *Computers in Human Behavior*, 117. <https://doi.org/10.1016/j.chb.2020.106624>
- van Velthoven, M. H., Powell, J., & Powell, G. (2018). Problematic smartphone use: Digital approaches to an emerging public health problem. *DIGITAL HEALTH*, 4, 205520761875916. <https://doi.org/10.1177/2055207618759167>
- Wacks, Y., & Weinstein, A. M. (2021). Excessive Smartphone Use Is Associated With Health Problems in Adolescents and Young Adults. In *Frontiers in Psychiatry* (Vol. 12). Frontiers Media S.A. <https://doi.org/10.3389/fpsy.2021.669042>
- Wang, J. C., Hsieh, C. Y., & Kung, S. H. (2022). The impact of smartphone use on learning effectiveness: A case study of primary school students. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-022-11430-9>
- Woo, K. S., Bong, S. H., Choi, T. Y., & Kim, J. W. (2021). Mental health, smartphone use type, and screen time among adolescents in south korea. *Psychology Research and Behavior Management*, 14, 1419–1428. <https://doi.org/10.2147/PRBM.S324235>