Internet Use Management Program: Its Effects on the Lifestyle of High School Students

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Abstract

The study determined the effects of an Internet use management program on the lifestyle of high school students. The study utilized a quasi-experimental design – a two-group pretest-posttest design. The experimental group (n = 51) were exposed to the four-week Internet use management program; the control group (n = 46) did not undergo any intervention. At baseline, the experimental group had *a fair* dietary lifestyle and sleeping patterns, and *poor* physical activity. The control group had *fair* dietary lifestyle and physical activity, and *good* sleeping patterns. Both groups used the Internet *moderately*.

After the intervention, the experimental group exhibited *good* dietary lifestyle and physical activity. Sleeping patterns were *very good* and Internet use was *mild*. The experimental group showed a significant difference in their lifestyle, while the control group had no significant difference in baseline and endline scores. When the gain scores of both groups were compared, a significant difference was found in their lifestyles, with the experimental group having higher gain scores in dietary lifestyle, physical activity, sleeping patterns, and Internet use. There was no significant difference in gain scores when gender was considered. The results of this study suggest that the Internet use management program was effective in promoting healthy lifestyle practices in diet, physical activity, sleep, and Internet use among high school students.

Keywords: *High school students, diet, physical activity, sleep, Internet use*

Introduction

High school students have unhealthier lifestyle and problematic Internet use (PIU) because they spend a relatively higher amount of time on the Internet. It has been estimated that one to 18% of adolescents have problematic Internet use in both Western and Eastern societies (Cao, & Su, 2007; Jang, Hwang, & Choi, 2008). More specifically, about one to two percent of Italian students have moderate to severe PIU (Poli & Agrimi,2012), while one to 12% of children and adolescents in Middle Eastern countries (Canan, Ataoglu, & Nichols, Yildirim and Ozturk, 2010) and two to 18% of high school students in Asian countries appear to have PIU (Cao & Su, 2007). Small scale studies in Korea and China revealed that around two percent (210,000) of South Korean children aged six to 19 years have PIU and many require treatment (Choi, 2007), while about 10 million high school Internet users in China meet criteria for Internet addiction.

In the Philippines, almost three-fourths (74%) of the population have access to the Internet. High school children in the Visayas and Metro Manila have greater access than those in the Cordilleras (mountains in northern Luzon) and in Mindanao, as approximately nine out of 10 schoolchildren in these areas are Internet users. A Synovate Media Atlas study conducted nationwide from July 2008 to June 2009 reported that Internet access in the Philippines stands at 40%, with the younger segment having the highest usage at 60%. In the Greater Manila area, 46% of respondents had Internet access.

As Internet usage among high school students grows rapidly each year, it may cause some negative impacts on individuals and on society as a whole. Excessive Internet use is problematic because an individual lacks the ability to control his or her online schedule. Yet, stopping Internet use can lead to anxious feelings as well as maladaptive cognitions and behaviors. Addicted individuals may neglect exercise, remain sedentary for long periods and reduce social activities with friends and family. They are more likely to stay up late because of Internet use, thereby reversing their sleep pattern. A cross

sectional study by Kim and Chun (2005) reported that high-risk Internet users reported more irregular sleep patterns and more episodes of sleep disturbance than non-risk Internet users. Studies among Chinese and American children found that computer use among high school students was associated with later bed times, later waking times, less restful sleep and an overall decrease in sleep. The use of computers before bedtime has also raised concerns among sleep experts that the light from screens is affecting circadian rhythms and possibly contributing to insomnia (Ko, Yen, Chen, Yeh, & Yen, 2009). Moreover, these abnormal patterns of use cause lack of sleep because the user stays awake during late night hours in order to surf different web pages (Yuen & Lavin, 2004).

A longitudinal study by Owens (2004) indicated that high school students who spend more than three hours on the Internet per day were at a significantly elevated risk for frequent sleep problems by early adulthood. The study also indicated that adolescents who reduced Internet use from more than one hour per day to less than one hour per day experienced a significant reduction in risk for subsequent sleep problems. Furthermore, a similar study by Hiquchi, Motohashi, Liu, and Maeda (2005) also demonstrated that stimulating online games increase sleep latency and shorten rapid eye movement (REM) sleep, thereby leading to a high state of arousal, a shorter duration of sleep, and poor sleep quality. These results suggest that adolescents' sleep behaviors are influenced by the current diversity of Internet use exposure. In addition, sleep disturbance could increase the risk of mental health problems as well as substance abuse. Hence, high-risk Internet users are more likely to experience physical and mental health problems.

High-risk Internet use may also affect an individual's level of physical activity. Nationally representative data indicate that the vast majority of adolescents do not achieve five or more bouts of moderate physical activity per week, and that they continue to fail to achieve this amount of activity as they become adults. Among all respondents who were active during adolescence, there is a substantial age-related decline in activity. Similar differences, although of less magnitude, are seen for computer and online game use. Just less than one quarter of the adolescents failed to achieve favorable sedentary behavior patterns. They engaged in 14 hours of screen time per week and continued to engage in this amount of sedentary behavior as adults (Gordon-Larsen, Nelson, & Popkin, 2004).

Diet quality was also worst among teens when they were on the Internet. The frequency of skipping dinner in high-risk Internet users is significantly more than non-risk Internet users. This is consistent with a cross sectional study by Kim and Chun (2005) which reported a high incidence of meal skipping in Internet addicts. The high frequency of skipping dinner could be related to snacking; more frequent snacking was observed in high-risk Internet users than non-risk Internet users. The quality of the diet of high-risk Internet users as measured using a mini-dietary assessment index was also poor.

Primary prevention in order to mitigate the adverse effects of excessive Internet use can be conducted in numerous ways. Since computers have important functions in daily life, treatment models that require complete avoidance of the Internet are not practical. Unlike other addictions, the therapy here should involve goal-oriented techniques that encourage orderly and controlled Internet use and alternative activities that keep one away from the Internet (Young, 2007). One of the possibilities is that one can build adaptive lifestyle patterns conflicting with Internet use, such as association with other people, learning to prioritize, practicing enjoyable activities or hobbies, and time management skills.

Furthermore, in order to develop effective methods of managing Internet use, the underlying mechanisms should be understood very well. One of the most comprehensive studies made towards this end is the cognitive behavioral model designed by Davis. This model places maladaptive cognitions in the center of pathologic Internet use. The cognitive behavioral model of problematic Internet use defines the healthy use of the Internet as a manner of using the Internet for a clear purpose for a period of time that can be considered reasonable under the conditions specific to the user. It also recognizes the difference between real communication, and communication through the Internet, without assuming a different personality (Davis, 2001).

It may be impossible for the adolescent to completely stop all use of the Internet and not have some online contact. Therefore, there is a need for health programs that do not attempt to block Internet use but instead empower adolescents to manage their usage appropriately while also improving their dietary habits, physical exercise, and sleeping patterns at the same time. With the high prevalence of Internet use and increasing lifestyle-related issues among adolescents, it is imperative that such programs are implemented and evaluated in order to effectively address this fast-rising epidemic.

Objectives of the Study

The purpose of this study was to determine the effect of an Internet use management program on the lifestyle (sleeping pattern, diet, and physical activity) of students in a selected high school.

Theoretical Framework

The intervention was based on the PRECEDE-PROCEED model, which provides a comprehensive structure for assessing health and quality-of-life needs and for designing, implementing, and evaluating health promotion and other public health programs to meet those needs. PRECEDE (Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation) outlines a diagnostic planning process to assist in the development of targeted and focused public health programs. PROCEED (Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) guides the implementation and evaluation of the programs designed using PRECEDE.

PRECEDE consists of five steps or phases. In this research, Phase One involved determining the quality of life or social problems and needs of the population. Through the pre-assessment, the researcher found that there was a need to educate high school students on Internet use. Phase Two consisted of identifying the health determinants of these problems and needs. This step involved identifying the epidemiological details of the problem and characteristics of the adolescents. It was found that high school students are the most vulnerable age group when it comes to spending time on the Internet. Phase Three involved identifying the factors that predispose, reinforce, and enable adolescents to spend excessive amounts of time on the Internet. Phases Four and Five ascertained health promotion and health education interventions that were best suited to encourage the desired changes in the behaviors or environments and the factors that support those behaviors and environments.

PROCEED was composed of four additional phases. In Phase Six, the interventions identified in Phase Five were implemented. Phase Seven entailed a process evaluation of those interventions, while Phase Eight involved evaluating the impact of the interventions on the factors supporting behavior, and on behavior itself. The ninth and last phase was comprised of outcome evaluation, which is determining the ultimate effects of the interventions on the health and quality of life of the adolescents.

Methodology

Research Design and Participant Selection

This study utilized the quasi-experimental design using a two-group pretest-posttest design to evaluate the effect of Internet use management on the lifestyle of high school students. Purposive sampling was utilized to select respondents for both groups of the study. In addition, participants in the experimental group were more specifically chosen according to the following criteria: willing to attend the one-month Internet use management program and have access to Internet services.

The participants of the study were 97 first-year high school students, of which 51 were in the experimental group and 46 were in the control group. The experimental group came from a different high school than the control group; however, both schools were selected from within the same province. Both groups had similar distribution in terms of gender; 65.2% of the participants in the control group were females, while 52.9% of the participants in the experimental group were female.

A majority of the participants in both groups utilized a combination of their family computers and computers from Internet cafes. The average amount of time spent on the Internet was three to four hours each day, all of which was done after class. Regarding the terms of Internet use, 74.5% of the participants in the experimental group purchased unlimited Internet credits. In contrast, per-hour credits were more utilized in the control group, with 58.7% of participants utilizing this form of Internet access.

The experimental group was exposed to the intervention consisting of a daily health education program conducted over a period of four weeks, for a total of 14 sessions. Each session lasted for one and a half hours. Participants were given lectures on Internet misuse and its effects on lifestyle. Activities included group discussions on the signs and symptoms of problematic Internet use, listing of activities that have been neglected since their excessive online habits, skill building of alternative hobbies they could engage in, and film showings of short movies related to Internet use. The control group received no intervention at all.

A self-constructed questionnaire was administered to both participants before and after the program started. The research instrument consisted of two parts, namely: demographic profile and the lifestyle of adolescents considering diet, physical activity, sleeping pattern, and Internet use. The questionnaire was validated by ten experts and piloted on 39 respondents prior to its use. The pilot study was found reliable in all categories of the questionnaire as the Cronbach's alpha was within an acceptable internal consistency range.

In order to analyze the data gathered from the participants, the Statistical Package for Social Sciences was used. Frequency count and percentage were used to determine the demographic profile of the respondents while central tendency and dispersion measures such mean and standard deviation were used to determine the extent of the lifestyle practice of participants. Paired t-test and independent t-test was used to determine the differences between pretest and posttest scores and the difference in gain score between the control group and experimental group. Dependent t-test was used to determine the difference in gain score between the control group and experimental group.

Results and Discussion
Baseline Lifestyle Practices
Table 1 shows the baseline lifestyle scores of both the experimental and control groups.

Table 1. Baseline Scores of Diet, Physical Activity, Sleeping Patterns and Internet Use in the *Experimental and Control Groups*

Lifestyle Variable	N	Mean	SD	Verbal Interpretation
Diet				
Experimental	51	2.79	0.58	Fair
Control	46	3.28	0.53	Fair
Physical Activity				
Experimental	51	2.50	0.61	Poor
Control	46	2.76	0.68	Fair
Sleeping Patterns				
Experimental	51	3.05	0.65	Fair
Control	46	3.83	0.82	Good
Internet Use				
Experimental	51	73.47	15.71	Moderate Use
Control	46	65.50	16.67	Moderate Use

Diet, physical activity, sleeping patterns: 4.51-5.00 = Very Good; 3.51-4.50 = Good; 2.51-3.50 = Fair; 1.51-2.50 = Poor; Internet use: 20 – 49 Mild Use; 50 – 79 Moderate Use; and 80-100 Severe Use

The baseline dietary practices of the participants were assessed by asking them questions regarding their food and drink habits while using the Internet. The dietary practices of both the

experimental and control groups were interpreted as *fair.* These findings are consistent with similar assessments on adolescents that showed that poor eating habits such as missing breakfast and eating high quantities of fatty and fried food are common in this age group (Kim, et al., 2010; Savige, et al., 2007; Majeed, 2003). Furthermore, a study by Kim and Chun (2005) showed that high-risk Internet users are likely to have low meal regularity scores, reflected by a higher rate of skipping meals in high-risk Internet users than non-risk Internet users.

Physical activity was assessed by asking the participants questions regarding their participation in activities such as exercise, play, physical education classes as well as the average duration of sitting when online. The control group's lifestyle practices were interpreted as *fair,* while the experimental group's practices were interpreted as *poor.* These low scores may be indicative of poor lifestyle practices such as neglecting exercise and remaining sedentary for long periods of time, especially when online. As Canan, Ataoglu, Nichols, Yildirim, and Ozturk (2010) stated, children who grow up in homes with Internet spend more time using these entertainment devices than they do in play or physical activity. The more time spent on the Internet, the more likely they were to have problematic Internet use and unhealthier lifestyle because of the lack of ability to control their online schedule.

The participants' sleeping patterns were assessed through questions about time and amount of sleep, daytime sleepiness, preferences between sleep or Internet, and regularity of sleep patterns. It was found that the control group had *good* sleeping patterns while the experimental group had *fair* sleeping patterns. The fair and good sleeping patterns of high school students confirm the studies among Chinese and American children published in the Journal of Sleep and the Journal of the American Academy of Pediatrics, as cited in Ko, Yen, Chen, Yeh, and Yen (2009). These stated that computer use among high school students was associated with later bedtimes, later waking times, less restful sleep and an overall decrease in sleep. Furthermore, similar findings of Hiquchi, Motohashi, Liu, and Maeda (2005) revealed that stimulating online games may increase sleep latency and shorten rapid eye movement (REM) sleep, thereby leading to a high state of arousal, a shorter duration of sleep, and poor sleep quality. These results suggest that the sleep behaviors of adolescents are influenced by their current exposure to the Internet.

Finally, both experimental and control groups exhibited *moderate* Internet usage. Although both groups were classified as moderate Internet users, the experimental group's higher scores show that their usage of the Internet was heavier than the control group, hence showing a greater need for the program.

Table 2. Differences in the Baseline Lifestyle of the Participants in the Experimental and Control Groups

Lifestyle Variable	Mean	Mean Difference	P Value	Verbal Interpretation
Diet				
Experimental	2.79			
Control	3.28	-0.49	0.000	Significant
Physical Activity				
Experimental	2.49			
Control	2.76	-0.26	0.047	Significant
Sleeping Patterns				
Experimental	3.05			
Control	3.83	-0.77	0.000	Significant
Internet Use				
Experimental	73.47			
Control	65.50	7.9706	0.017	Significant

Table 2 shows that the mean differences in diet, physical activity, sleeping pattern and Internet use between the two groups are -0.49, -0.26, -0.77, and 0.39, respectively. The *p-values* are 0.000, 0.047, 0.000, and 0.017, which indicate that there is a significant difference in diet, physical activity, sleeping

pattern and Internet use between the experimental and control groups. This implies that the two groups were not comparable in baseline lifestyle. However, the table shows that the experimental group had a lower score than the control group in all lifestyle areas while maintaining heavier Internet use at the same time. This confirms that the need for the Internet use management program was greater in the experimental group than the control group.

End Line Lifestyle

Table 3 shows the baseline lifestyle scores of both the experimental and control groups.

Table 3. *End Line Lifestyle Practice Scores of the Experimental and Control Groups*

Lifestyle Variable	N	Mean	SD	Verbal Interpretation
Diet				
Experimental	51	4.33	0.39	Good
Control	46	3.22	0.56	Fair
Physical Activity				
Experimental	51	4.00	0.66	Good
Control	46	2.86	0.57	Fair
Sleeping Patterns				
Experimental	51	4.64	0.61	Very Good
Control	46	3.84	0.92	Good
Internet Use				
Experimental	51	29.00	6.59	Mild Use
Control	46	65.89	15.62	Moderate Use

Diet, physical activity, sleeping patterns: 4.51-5.00 = Very Good; 3.51-4.50 = Good; 2.51-3.50 = Fair; 1.51-2.50 = Poor; Internet use: 20 – 49 Mild Use; 50 – 79 Moderate Use; and 80-100 Severe Use

The result shows that the control group's pre-test and post-test did not change in terms of diet, physical activity, sleeping patterns and Internet use. However, the experimental group's diet went from *fair* to *very good,* physical activity increased from *poor* to *good,* sleeping patterns improved from *fair* to *very good,* and Internet use decreased from *moderate use* to *mild use.*

Moreover, Table 4 shows that there is a significant difference in the gain score among the experimental and control groups in terms of diet, physical activity, sleeping patterns, and Internet use.

Table 4. *Comparison of Gain Score between Participants of the Experimental and the Control Group*

Lifestyle Variable	Experimental Group	Control Group	Mean Difference	*t*	*P*	Verbal Interpretation
Diet	1.541	-0.0619	1.6034	15.084	0.000	Significant
Physical Activity	1.502	0.1000	1.4020	9.635	0.000	Significant
Sleeping Patterns	1.5824	0.0109	1.5715	10.039	0.000	Significant
Internet Use	44.47	0.6087	43.86	19.037	0.000	Significant

Comparing the mean scores between the two groups, the experimental group's mean score was found to be significantly higher than the control group. The result of this study echoes the study of Roszanadia and Norazmir (2011) on the effects of an intervention program on the attitude, practice, and lifestyle of 80 adolescents. The results showed a significant improvement in students' lifestyle, attitude, and practice scores among the group that received an intervention program. No significant differences were seen in the knowledge, attitude, and practices of the control group in between tests.

The significant differences in the gain score in the Internet use between the experimental and control groups of this study signifies that the Internet use management program was effective in enhancing the lifestyle of the students in the experimental group. Part of this impact may be due to

the emphasis of the program on spending time with family/friends. Family, friends, and outdoor activities significantly reduced the likelihood of developing Internet misuse or overuse. Students who spend more time away from the computer and with family or friends were more likely to have a better lifestyle, and were less likely to be addicted to the Internet. A study by Caplan, Williams, and Yee (2009) reported significant positive correlations between problematic Internet use and deriving a sense of community from face-to-face relationships. The more players derived a sense of community from online relationships rather than face-to-face interaction, the greater their level of problematic Internet use. Because the Internet offers a false sense of belonging, effective programs must replace Internet relationships with true relationships (Sharf, 2011).

Another reason behind these significant differences may be due to the program's incorporation of the personal inventory technique suggested by Young and Abreu (2010). As Internet addicts tend to neglect their hobbies and other interests due to the time spent searching for virtual interests, the individual is encouraged to complete an inventory containing the activities that used to be carried out and were disregarded after the problem emerged. Such interventions work by practicing the opposite, which is, making adolescents break their current Internet use routine and develop a newer, more adaptive behavioral pattern. This allowed patients to reflect from an experience and allow common problems such as stress and lack of time for personal interests and different outdoor activities and physical activities to be solved more effortlessly. This activity may help individuals become aware of their choices and thus become motivated to try to resume the previous activities that have been lost (Young & Abreu, 2010).

Finally, the time management aspect of the program facilitated behavior change by providing the participants with the set of principles, practices, skills, tools, and systems that work together so that the right time is allocated to the right activity. By studying how adolescents spend their time, activities that can promote its wiser use can be identified. Time management also reduces stress, improves lifestyle by allowing meals to be taken at the right time, promotes different activities while still gaining time and getting enough sleep, and reduces avoidance while eliminating the over use of the Internet. A cross-sectional study to explore the association between Internet use and high school students' lifestyles in China showed that certain Internet habits, such as excessive online time, and accessing the Internet in an Internet bar, are related to poor lifestyle habits in adolescents. However, using the Internet responsibly, managing time, and improving social communication and other activities positively predicted healthy lifestyles. (Wanga, Luo, Luo, Gao, & Kong, 2012).

Conclusion

After full implementation of the Internet use management program, it was found that there was a significant difference in the gain scores between the experimental and treatment groups, indicating that the management program had an impact on the participants' lifestyle and Internet use.

It is recommended that similar lifestyle programs about Internet use and its impact should be provided for students through the Philippine educational system. High school students who have greater access to commercial establishments and Internet cafes should be targeted. Public health educators are encouraged to expand the program and emphasize the connection between the use of the Internet and lifestyle. Finally, it is recommended that longitudinal research be conducted on participants to see whether the impact of the program was sustained as well as to determine the long-term impact of problematic Internet use on lifestyle and health.

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