

## Effect of internet on the psychosomatic health of adolescent school children in Rourkela - A cross-sectional study

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### ABSTRACT

**Objective:** The objective of the study was to determine the effect of internet use on the psychosomatic health of adolescent school children in Rourkela. **Methods:** The study involved a population of 484 school students of Rourkela in the age groups of 13-18 years. History taking and clinical examination were done to know any existing health problem. Young people's internet usage questionnaire" was handed over to enquire internet use practices. The parents of these children were asked to fill in "pediatric symptom checklist" to know psychological problems. Each answered questionnaire was given a specific serial number. The data collected from these matched sets of questionnaires as per serial number were analyzed using Chi-square test and ANOVA (to compare average number of health problems among the groups). A  $p < 0.05$  is considered significant. **Results:** It was found that more frequent internet user suffered from sleeplessness ( $p=0.048$ ), increased interest in sexual activity ( $p < 0.001$ ), and conduct problems ( $p=0.013$ ). Getting cyberbullied had statistically significant association with increased interest in sex ( $p=0.012$ ), low mood ( $p=0.001$ ), lack of concentration ( $p < 0.001$ ), anxiety ( $p=0.002$ ), aggression ( $p=0.003$ ), backache ( $p=0.001$ ), headache ( $p=0.001$ ), eye pain ( $p < 0.001$ ), and attention problems ( $p=0.017$ ). Visiting porn sites were associated with interest in sex ( $p < 0.001$ ), low mood ( $p < 0.001$ ), lack of concentration ( $p=0.020$ ), and unexplained anxiety ( $p < 0.001$ ). **Conclusions:** Frequency of internet use, cyberbullying, and visiting pornographic sites had a significant association with some physical and psychological health problems. For the victims of cyberbullying, average number inexplicable diseases/problems are significantly more than that of nonvictims ( $p < 0.001$ ).

**Key words:** Adolescent, Cyberbullying, Internet, Pornography

Since the infectious diseases have largely been brought under control by newer antibiotics and vaccination, the focus is now shifting on lifestyle associated disorders worldwide. The pediatric age group has not been spared by this emerging problem. According to a newspaper article by Pandey, children are now the targets of lifestyle diseases - major reasons being gorging on junk food, addiction to media, and aversion to outdoor activities and stressful lifestyle [1].

The most recent entity in the changing lifestyle of the current generation is the internet cult. The internet has become an indispensable part of today's society with more than 1.5 billion user's worldwide. The internet has revolutionized the computer and communications world like nothing before. The internet has at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location.

Population of adolescents is 253.2 million according to the census 2011 [2]. The adolescents have a tendency to experiment with anything that is new. They also try to be independent from

the family and venture out with peers. Their innate vulnerability is another factor. Considering the above factors, it is no surprise that they become easy victims of any new temptation. According to Ramdhonee, nearly all teenagers now use internet with more than 80% spending a large amount of time on line [3]. Strasburg et al. highlight that with its growing popularity, the internet has been claimed to be an important tool for their overall development [4].

Ray and Jat state that the effects of mass media have been found to be far-reaching and potentially harmful in influencing the health-related behaviors of children and adolescents; many of whom are not yet mature enough to distinguish fantasy from reality [5]. Research suggests that internet use displaces an adolescent's "Real Interactions" with peers and family. Researchers such as Blais and Gross et al. reported similar findings [6,7].

According to Beranger et al., a U-shaped relationship was found between intensity of internet use and poorer mental health of adolescents [8]. In a study by Long and Chen on the internet usage had shown an impact on four dimensions of identity development (avoidance decision-making, identity

formation, selfreflection, and ego strength or fidelity) [9]. Research by Moreno and Kolb has shown that approximately half of all adolescents' social networking site profiles contain references to risky health behaviors such as violence, sexual activity, and substance abuse [10]. Owens et al., in their research review paper, discussed that early exposure to pornography and antisocial behavior resulted in a distorted view of sexuality and the glorification of promiscuity and several other psychological problems [11]. Wolak et al.'s survey reflected similar results [12]. Li et al. reveal that excessive internet use leads to interrupted sleep and sleep disturbances. Bedtime resistance and sleep anxiety were most affected by the presence of internet in the bedroom [13]. The centers for disease control and prevention defines electronic aggression as any type of harassment or bullying (teasing, telling lies, spreading rumors, making rude and mean comments, making threatening, or aggressive comments) that occurs through e-mail, chat rooms, instant messaging, blogs, text messaging or videos, and photos posted on website or sent via cell phone [14]. According to a recent article in Times of India, a study conducted among 1422 children and adolescents across seven states of India revealed that one in three Indian children and adolescents had experienced the pain of being bullied online, while half had come across peers who have faced cyberbullying [15].

## MATERIALS AND METHODS

This cross-sectional study was conducted from November 2012 to November 2014 after taking ethics committee approval. Informed consents were also taken from the school authorities, parents, and students. The study population consisted of high school students of a public school in Rourkela between the age groups of 13 and 18 years. People from all over India work in Rourkela Steel Plant and other central government organizations. Their children study in the selected school. Thus, we had a fairly cosmopolitan group of students.

School children of Rourkela between the age group of 13 and 18 years were included in the study. Children with pre-existing psychosomatic illnesses, nonconsent, and television viewing duration of more than eighty percent of time spent on the internet were excluded from the study. Based on the time and resources available to conduct the survey, initially, we decided to interview around 400 school children and their parents. We canvassed questionnaires to all students (numbering more than 550 children) in classes IX to XI. but we could get complete set of three questionnaires from 484 students only. We decided to use the entire set.

The recruited children were medically examined and briefly interviewed to know any existing health problem. A semi-structured questionnaire based on "Young people's internet usage questionnaire" was handed to the subjects [16]. Each answered questionnaire was given a specific serial number. The parent of each student was given a "pediatric symptom checklist (PSC)" [17]. The data collected from these matched sets of questionnaires as per serial number were analyzed.

## Scoring Process

We used one questionnaire based on "Young people's internet usage questionnaire". One question was about facing certain inexplicable sudden health problems, and a total of 12 problems were mentioned. In addition to these, we made an overall health problem indicator by simply adding the number of problems faced by them. It could have a score between 0 and 12. Average number of health problems was computed for different sets of children with different internet usage patterns.

In the "PSC," parents ticked against "never," "occasionally" and "sometimes" as the case might be, for 35 psychological problems faced by their ward. Following standard procedure, a value of 0 was assigned to "never," 1 to "sometimes," and 2 to "often." These values were added to obtain a score for the entire test. The presence of significant behavioral or emotional difficulties is suggested when the score for a child is 28 or more points. Three factor scores on the PSC, i.e., attention, externalization (conduct), and internalizing (depression) also determine the type of mental health problems in the children. Thus, based on the PSC schedule filled in by the parents, relevant scores were computed to categorize a child as a sufferer or not of (i) overall problem, (ii) attention problem, (iii) conduct problem, and (iv) depression problem.

## Measurement of Association

Once the scores were computed, association between several diseases/health problems and various internet related factors were measured using cross tabulation and Chi-square tests. It is a very powerful but simple statistical test which is widely used. We also used one-way analysis of variance (ANOVA) to test for equality of means of average number of health problems.

## RESULTS

As evident from Table 1, a statistically significant association was found between increased frequency of internet viewing and sleep problems ( $p=0.048$ ). It was found that frequency of Internet use was also significantly associated with increased interest in sexual activity ( $p<0.001$ ) and conduct problems ( $p=0.013$ ). Getting cyberbullied has statistically significant association with increased interest in sex ( $p=0.012$ ), low mood ( $p=0.001$ ), lack of concentration ( $p<0.001$ ), anxiety ( $p=0.002$ ), aggression ( $p=0.003$ ), backache ( $p=0.001$ ), headache ( $p=0.001$ ), eye pain ( $p<0.001$ ), and attention problems ( $p=0.017$ ). Visiting pornographic sites were associated with interest in sex ( $p<0.001$ ), low mood ( $p<0.001$ ), lack of concentration ( $p=0.020$ ), and unexplained anxiety ( $p<0.001$ ).

Table 2 shows that for the victims of cyberbullying, average number inexplicable diseases/problems was significantly more at around 6 than that of non-victims ( $p<0.001$ ). For the visitors to pornographic sites, average number of inexplicable disease/problem was around 6 and it was significantly more ( $p<0.001$ ) from that of nonvictims (4.11).

Internet safety lessons served as a protective factor against pornography (Table 3), and significantly less number of trained students visited vulgar sites (p=0.042).

The frequency of daily internet use was significantly lesser at home (p=0.001) as shown in Table 4. Home environment may serve as a protective factor against both pornography and cyberbullying. Although not statistically significant, the incidence of cyberbullying and visiting porn sites (Table 5) was relatively less at home (p=0.188 and p=0.068, respectively).

**Table 1: Association of health problems with frequency of internet use, getting cyberbullied and visit to porn sites**

Health problem	Frequency of internet use	Getting cyberbullied*	Visiting porn sites*
Sleeplessness	0.048	NS	NS
Interest in sex	<0.001	0.012	<0.001
Low mood	NS	0.001	<0.001
Lack of concentration	NS	<0.001	0.020
Anxiety	NS	0.002	<0.001
Aggression	NS	0.003	NS
Backache	NS	0.001	NS
Headache	NS	0.001	NS
Eye pain	NS	<0.001	NS
Overall (PSC)	NS	NS	0.009
Conduct (PSC)	0.013	NS	0.007
Depression (PSC)	NS	NS	NS
Attention (PSC)	NS	0.017	0.032

p values for Chi-square tests, NS indicates not significant (>0.05), PSC: Pediatric symptom checklist

**Table 2: Average number of inexplicable diseases with cyberbullying and pornography**

Parameters	Number of students	Average number of diseases	p value
Victim of cyberbullying			
Yes	65	6.03	<0.001
No	408	3.97	
Total	473	4.25	
Downloaded vulgar picture			
Yes	35	5.97	<0.001
No	443	4.11	
All	478	4.25	

**Table 3: Internet safety lessons and pornography**

Visited porn sites	Received internet safety lessons		
	Yes	No	Total
Yes	16	19	35
No	275	161	436
All	291	180	471
% Children visiting porn sites	5.50	10.56	7.43

**DISCUSSION**

In our study, a significant association was found between increased frequency of internet viewing and sleep problems (p=0.048). Several factors may be contributory for the same. First, the glare from the computer screen may suppress the nocturnal secretion of melatonin leading to decreased sleep. Second, the stimulating content viewed online may cause heightened alertness of the central nervous system which may inhibit relaxation, hence sleep. Finally, the sleep sacrifice made by the adolescent to stay online for a longer time may shorten the sleep duration. Chronic sleep debt may manifest as lack of concentration, attention problems, mood swings, and somatic problems such as headache and backache. Similar hypotheses were postulated by Li et al. regarding media and sleep problems [13].

The fact that frequent users experienced significant aggression and by extrapolation of the “circle of violence hypothesis, one may conclude that the constant mental aggression faced by the victims may be a precursor for aggression. In a survey of young children in 2005, it was reported that 9% were victims of online harassment. It was an interesting finding that 7-14 % reported being both the victim and perpetrator suggesting a behavioral link between the two roles [13]. Ybarra and Mitchel study also showed a similar relationship between a victim and the perpetrator [18].

Getting cyberbullied had a significant association between both psychological and somatic problems. Getting cyberbullied can lead to enormous stress levels as the bully is usually “faceless” and the threat remains even if the adolescent is not online. The increased stress levels may lead to the above problems. Another study by Donnerstein reported that 10-35% of young people have experienced electronic aggression which has significant psychosocial effects on the victims, including depression, anxiety, social isolation, and suicide attempts [19]. In a recent study based on PHQ9 questionnaire, Agarwal et al. reported that about 83% males and 74% females of the victims of cyber violence suffered from depression. They suggested a strong need for comprehensive, school-based programs directed at cyber-violence prevention and intervention [20].

Pornography was significantly associated with several psychological problems in adolescents. Due to the structural immaturity of the adolescent brain and relative inexperience, they are unable to process the myriad nature of sexual content online which may lead to attention problems, anxiety, and depression. Depiction of violence or anti-social behavior on online pornography may be a precursor of conduct problems. Similar results were reflected by Owens et al. [11]. Internet safety lessons served as a protective factor against pornography. This may be attributed to the fact that trained students were aware that online sexual content was not a depiction of reality. Home environment may serve as a protective factor against increased frequency of internet use, pornography and cyberbullying. This may be attributed to constant parental supervision and limited duration of internet usage.

To prevent such problems, students need to be trained thoroughly in internet safety. Parents and educators can place

**Table 4: Frequency and place of internet use**

Location of internet facility	Frequency of internet use				
	Everyday	More than once a week	Once a week	Once a month	Less than once a month
Home	154	76	81	29	34
Other places	61	19	11	5	9
Total	215	95	92	34	43
% Children using internet at home	71.63	80.00	88.04	85.29	79.07

**Table 5: Effect of location of internet facility on cyberbullying and visiting pornographic sites**

Location of internet facility	Effectuated by cyberbullying				Visited porn sites			
	Yes	No	%	Total	Yes	No	%	Total
Home	46	318	12.64	364	23	346	6.23	369
Mobile	8	57	12.70	65	12	92	11.54	104
Other places	10	30	25.00	40	-	-	-	-
All	64	405	13.70	469	35	438	7.40	473

internet filters that inhibit access to inappropriate sites such as pornographic sites. Parents can teach their children to recognize the telltale behavior of predators on online sites. The computer should be kept in a common area, not in individual bedrooms. Most children use internet at home and parents may restrict internet use to a maximum period of an hour a day, after the studies are over. During this time, one parent or any adult member of the family should be around the child. To prevent unauthorized use of internet, specific password (not known to child) can be used. In school, one or more teachers should be continuously present in the computer lab during internet practical sessions. Adolescent health program started in 2011 Rashtriya Kishor Swastha Karyakram should include possible impact of mass media on adolescent health [21].

Finally, a few suggestions for improving legislative measures: Existing legislations to be made stringent. A new section needs to be added in the existing information technology act to deal exclusively with children and adolescents, victimized by cybercrime. No child to be allowed in cyber café or computer club unless accompanied by an adult.

The pediatricians too have their roles to play. Computer and internet use habits should be made a part of routine history taking during interaction with adolescents. They should be encouraged to learn about the scope of internet related issues to adequately advise parents for anticipatory guidance. In partnership with the parents, the pediatricians can support legislation that encourages more responsible media use. They should consider accepting invitations to talk to parent groups, school boards and other organizations about impact of media on children and adolescents.

## CONCLUSION

Internet has a significant impact on the health of adolescents. Some measures have been recommended by various authors to prevent the same [22-25]. In the study, it was noticed that the following three internet related habits resulted in health problems: (1) High frequency of internet use, (2) getting cyberbullied, and

(3) visiting pornographic sites. The first and the third ones are to be monitored, whereas the second one has to be prevented. Internet, the unmatched archive of information and communication technology, has sometimes been overshadowed by its ill effects on health. By following the above-mentioned measures, the cons might be decreased to a large extent, if not totally eliminated.

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