

Original Article

Knowledge regarding health hazards on cell phone use among higher secondary level students in a metropolitan city of Nepal

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ABSTRACT

Background and objectives: Due to wide spread use of the Global System for Mobile Communications (GSM) mobile phones they have become indispensable as communication tools and any consequent in biological effects should be important as a high-priority environmental health issue. Their use without any knowledge of their harmful effects is unsafe. The objectives of this study was to findout Knowledge regarding health hazards on cell phone use among Higher Secondary Level Students, Birgunj.

Materials and methods: A descriptive cross sectional research design was used. Sample size was 111 higher secondary level students. Non-probability sampling techniques was used to selected College and class XI and XII. Whereas, 750 students were class XI with 8 section and class run in morning and day shift. Similarly, class XII had 700 students with 6 section and class run in morning and day shift. Out of 1450 students, 61

students from grade XI and 50 students from grade XII, altogether 111 students were selected respectively by using Stratified Sampling technique from proportionate method. Self-Administered Questionnaire was used for data collection. Data entry and analysis was done in SPSS version 17. Data was analyzed by using descriptive (frequency, percentage, mean) and inferential statistics (chi square test) to identify association between level of knowledge with selected variables.

Results: The finding of the study showed that all most (89.2%) respondents had poor level of knowledge and only 12 (10.8%) respondents had average level of knowledge. Almost all (98.2%) respondents had cell phone among them 78 (71.6%) have smart phone. In the inferential statistics there were statistically significant association ($p < 0.05$) between level of knowledge and grade (0.003).

Conclusion: This study concluded that knowledge regarding health hazards on cell phone use is poor among higher secondary level students. Some educational intervention need to organized on this topic by giving different programs on television, radio, newspaper, and internet to discourage unhealthy practice of cell phone.

Keywords: Adolescence, Cell Phone, Health hazards, Knowledge, Smart Phone

INTRODUCTION

Adolescence is the phase of life between childhood and adulthood, from ages 10 to 19. It is a unique stage of human development and an important time for laying the

foundations of good health. Adolescents experience rapid physical, cognitive and psychosocial growth. This affects how they feel, think, make decisions, and interact with the world around them. Despite being thought of as a healthy stage of life, there is significant death, illness and injury in the adolescent year [1].

During this developmental phase higher-cognitive level thinking helps them to think about the future, identify alternatives, and set personal goals and trying to get peer group, this group can test new ideas like they are face pressure to use alcohol, cigarettes or other drugs, and also they are influenced to Using social media on mobile phones like Face book, Instagram and Twitter etc has become part and parcel of modern adolescence [2].

Rapid and continuing growth in the smartphones means they have now become a central gateway to online services and information. In terms of age, smartphone ownership is highest among younger adults aged 18–29 (85%) [3]. Among adolescents, smartphones are the most widely used computing devices (87%), followed by laptops (83%), tablets (51%), and desktop computers (43%). Adolescents often used a smartphone after school (82%), during class recess (74%), while taking transportation (63%), while eating food (57%), and in class (16%) [4].

The use of smartphone, internet and virtual social networks is an integral part of everyday life of many youngsters and students for academic and non-academic activities, whereas it can directly affect all aspects of life including studying and academic performance and even they can be more exposed to the complications and harmful effects of cell phone use [5].

A survey done in Poland among 587 students disclosed that 62.2% were reported headache followed by fatigue 45%. Also, the feeling of warmth around the ear and directly to the auricle was reported significantly more frequently by the intensive mobile phone users, compared with other mobile phone users (47.3%, $p = 0.00004$ vs. 44.6%, $p = 0.00063$, respectively). Most symptoms appeared during or immediately after a call and disappeared within 2 h after the call. Continuous headache, persisting for longer than 6 h since the end of a call, was reported by 26% of the subjects [6].

A study conducted in Sweden to evaluate brain tumor risk among long term users of cell phone showed that acoustic neuroma was found in four studies in the group with at least 10 years' use of a mobile phone. The tumour size was significantly larger among users. Six studies gave results for malignant brain tumors in that latency group [7].

Study on effect of mobile phone radiofrequency on the structure and function of the normal human hemoglobin showed that mobile phone electromagnetic fields altered oxygen affinity and tertiary structure of HbA. Furthermore, a decrease of oxygen affinity of HbA corresponded to the Electromagnetic field intensity and time of exposure [8].

A descriptive cross sectional study conducted in Singapore indicated that those males who carry cell phones near their groin region may have up to a 30% reduction in fertility rates. The result found that there was more DNA damage in the exposed sperm than in sperm in the control group. Among all respondents headache was most prevalent symptoms among headphone users compare to non-users and headache was reduced by more

than 20% among those who used hand-free [9].

A prospective cohort study done to investigate association between psychosocial aspects of mobile phone use and mental health symptoms in a young adults showed that overuse was associated with stress and sleep disturbances for women, and high accessibility stress was associated with stress, sleep disturbances, and symptoms of depression for both men and women [10]. A Study showed that only 2.9% of student have good level of knowledge, 45.7% have average level of knowledge and 51.4% of student have poor level of knowledge regarding harmful effect of cell phone use [11]. Due to wide spread use of the Global System for Mobile Communications (GSM) mobile phones they have become indispensable as communication tools and therefore any consequent biological effects should be considered as a high-priority environmental health issue [12].

Mobile phone usage is so strongly integrated into young people's behavior that symptoms of behavioral addiction, such as cell phone usage interrupting their day-to-day activities [13]. However, to date, there is inadequate knowledge on hazard of cell phone. So, researchers from this study tried to assess the knowledge regarding health hazards on cell phone use among higher secondary level student.

MATERIALS AND METHODS

A descriptive cross sectional research design was used to find out Knowledge regarding Health Hazards of Cell Phone Use among Higher Secondary Level Students. The research setting was Birgunj Public College of Birgunj Metropolitan city ward no. 8, Province no. 2, Birgunj. Total sample size was 111 students. Inclusion criteria for study was

Students currently studying in class 11 and 12 at Birgunj Public College and who will be willing to participate. First, non-probability sampling techniques was used to selected Out of 1450 students, 61 students from class 11 and 50 students from class 12, altogether 111 students were selected respectively by using Stratified Sampling technique from proportionate method. Data was collected by using self-administered questionnaire. Instrument were divided into three distinct parts, Part I: sociodemographic characteristics, Part II: knowledge on cell phone hazards and Part III: practice of cell phone. The content validity of the instrument was established by logical thinking, consulting with research advisor, subject matter expert, statistician, peer and extensive literature review and oral presentation. Modification was done as per need. For clarity and easiness, the English version of questionnaire was used to collect data. Before data collection research proposal was approved from authorities. Data was collected after getting approval letter from Birgunj Nursing Campus. Permission was obtained from the principal of Birgunj Public College by submitting the letter of Birgunj Nursing Campus. Self-introduction and purpose of the study was explained to the class teacher and respondents prior to the data collection. After getting written informed consent from the respondents, researcher herself distribute self-administered pretested structured questionnaire to the respondents. Anonymity and confidentiality of the respondent and data was maintained by giving code number.

All collected data was overviewed, checked and verified for completeness, consistency and accuracy. Editing, categorizing, coding and organization were done by entering the data into computer system. The finding was

analyzed using descriptive and inferential statistics through IBM SPSS Version 17. P-value of <0.05% was considered to indicate statistical significance at level of significance of 5%.

RESULTS

This study concluded that among 111 respondents, about two third 71.2% were 15-17 years, 61.3% were male and 38.7% were female. Likewise, majority (57.7%) of respondents were lived in metropolitan city.

Similarly, 55% had studying in class eleven and 45% were studying in class twelve, 35.1% of the respondent's mother had completed secondary level of education and 24.3% were illiterate and 82.9% were housemaker. Concerning the father's education, 39.6% of the respondent's father had completed secondary level education and 55.0% respondent's father had business man and 7.2% are in abroad. Respondents' Habits of Cell Phone Use are presented in table 1.

Table 2 shows that cent percent respondents' got information on cells phone hazards. Among 111 respondents' majority (66.6%) had got information from internet and 7.2% of respondents' had got information from radio. Likewise, 85.3% of respondents have experienced harmful effect of cell phone use.

Table 3 shows that regarding the health hazards of cells phone in eyes, more than half (64%) know dry eye and 4% know cancer the effects of cell phone. As regards to the effects of cell phone in ear half of the respondent's know hearing loss and 6.3% know swelling. Concerning on skin most of the respondent's 45% know skin allergy 18.0% know pimples.

Table 1: Respondents' Habits of Cell Phone Use

Variables	Frequency	Percent
Use mobile phone(n=111)		
Yes	109	98.2
No	2	1.8
If yes, types of mobile phone used (n=109)*		
Smart phone	78	71.6
Both normal/ smart phone	23	21.1
Normal/basic phone	14	12.8
Number of cell phones used (n=109)		
1	86	78.9
>1	23	21.1
Duration of cell phone use (n=109)		
1 year	28	25.7
2 years	23	21.1
3 years	20	18.3
4 years	38	34.9
Frequency of use cell phone in a day (n=109)		
<5 hours	87	79.8
10 hours	7	6.4
> 10 hours	12	11.0
15 hours	3	2.8
Frequency of checking cell phone in a day (n=109)		
10	52	47.7
20	22	20.2
30	11	10.1
>30	24	22.0
Average call per day (n=109)		
2calls	26	23.9
5calls	45	41.3
10 calls	19	17.4
>10 calls	19	17.4
Feeling inconvenience (n=109)		
Yes	57	52.3
No	52	47.7
Checking mobile phone in between sleep (n=109)		
Yes	67	61.5
No	42	38.5
Frequently used application (n=109)*		
Entertainment	61	56.0
Media	54	49.5
Education	52	47.7
Game	51	46.8
Communication	46	42.2
Photo	36	33.0

*Multiple Response (each response is considered as 100%)

Table 2: Respondents' Information and Experience on Health Hazards of Cell Phone Use, n=111

Variables	Frequency	Percent
Placement of cell phone keeping (n=109)*		
Hand	56	51.4
Hip pocket	44	40.4
Bag	25	22.9
Pouch	16	14.7
Information on Electromagnetic Radiation		
Yes	87	78.4
No	24	21.6
Source of Information *		
Internet	74	66.6
Television	38	34.2
Family members	34	30.6
Magazine	15	13.5
Peers	14	12.6
Radio	8	7.2
Experience of hazards on cell phone		
Yes	95	85.3
No	16	14.7
Types of Hazards experience (n=95)		
Headache	60	63.15
Sleep disturbance	52	54.73
Mobile blast	14	14.73
Anxiety	4	4.2
Necessary to minimize the use of mobile phone(n=111)		
Yes	97	87.4
No	14	12.6

*Multiple Response (each response is considered as 100%)

Table 4: Respondents' Knowledge on Health Hazards on Cell Phone Use in Chest Region, n=111

Hazards in chest region*	Frequency	Percentage
Increase Blood Pressure#	60	54.1
Decrease Heart Rate#	45	40.54
Chest pain	57	51.4
Chest injury	21	18.9
Risk of Breast cancer#	15	13.5

* Multiple response (each response is considered as 100%)

Correct response

Table 4 shows that half of the respondents answered the effects of cell phone in chest region were increase Blood Pressure and

13.5% respondents answered risk of breast cancer.

Table 3: Respondents' Knowledge on Health Hazards of Cell Phone Use in Eye, Ear and Skin, n=111

Variables	Frequency	Percent
Hazards in eyes*		
Dry eye#	64	57.7
Eye strain#	61	55.0
Eye Injury	28	25.2
Glaucoma	22	19.8
Eye Cancer#	4	3.6
Hazards in ears*		
Hearing loss#	65	58.6
Ear damage#	59	53.2
Itching	26	23.4
Warmness in ear#	23	20.7
Discharge from ear#	9	8.1
Swelling from ear	7	6.3
Hazards in skin*		
Skin allergy#	50	45.0
Extraction of protein molecules from skin#	39	35.1
Eczema#	26	23.4
Excessive growth of facial hair	22	19.8
Pimples	20	18.0

* Multiple response (each response is considered as 100%)

Correct response

Table 5: Respondents' Knowledge on Psychological Health Hazards of Cell Phone Use, n=111

	Frequency	Percentage
Hazards in Psychological function*		
Headache	85	76.6
Irritation	41	36.9
Poor memory#	35	31.5
Head injury	13	11.7
Hazards in psychological health*		
Addiction on cell phone#	76	68.5
Sleep disturbance#	64	57.7
Tension#	36	32.4
Memory capacity increases	13	11.7

* Multiple response (each response is considered as 100%)

Correct response

Table 5 reveals that knowledge on health hazards of cell phone use on psychological function two third of the respondent's 35 (31.5%) answered headache and 13(11.7%) respondents' answered head injury. In addition to effect of cell phone in psychological health, 76 (68.5%) respondents answered addiction on cell phone use and 13 (11.7%) respondents answered memory capacity increases respectively.

Table 6: Respondents' Knowledge on Health Hazards After Light Out, n=111

Hazards after light out*	Frequency	Percentage
Headache	86	75.5
Tiredness#	62	55.9
Fever	10	9.0
Common cold	6	5.4

* **Multiple response** (each response is considered as 100%)

Correct response

As regards to the effects of cell phone after light out 77.5% know headache and 5.4% know common cold (Table 6).

Table 7 showed that out of 111 respondents, 89.2% had poor level of knowledge and 10.8% had average knowledge. Furthermore, there was a significant association between level of knowledge and grade of respondents (0.003).

Table 7: Level of Knowledge on Health Hazards of Cell Phone Use, n=111

Level of Knowledge	Frequency	Percent
Poor =<60%	99	89.2
Average=60-79%	12	10.8

Poor knowledge=<60%, Average Knowledge = 60-79%, Good knowledge = 80-100% (Gautam & Shakya, 2016).

DISCUSSION

The finding of this study found that the mean age of the respondents was 16.8years. In this study most of the respondents were male (61.3%) and 38.7% were female. In this study

most of the respondents were from class eleven (55%) and 45% were from class twelve. This finding was consistent to study done in Chitwan revealed that out of 70 respondents, 34.3% respondents were in age 17 years, likewise, 64.3% were male and 35.7% were female [11]. These findings were also supported by study done by Pendse and Zagade where sample size were 120, which revealed that 38% of the students belongs to the age of 17 years and majority of the students were male [10]. Finding of this study showed that majority of respondents residing in metropolitan city (57.7%) and least were residing in village body 4.5%.

In this study less than half (35.1%)of the respondent's mother were literate and 24.3% were illiterate whereas concerning the father's education 39.6% of the respondent's father were literate and 10.9% were illiterate. Two third (82.9%) of the respondent's mother were house maker and 0.9% were in abroad. This finding were supported by the study of Mamathaet.al., 2014 concluded that 38% of respondents' mother were housewife. Majority of the respondent's father (55%) was business man and 7.2% were in abroad. In addition to high percentage (68.5%) respondent's family income sufficient for less than six month and 8.1% income sufficient for six month to one year.

Cell phone regarding habits showed that 98.2% of respondents use mobile phone. High percentage of mobile phone practice is due to influence of India as Birgunj is near to India border and it is reported that the India's telecommunication market is the second largest in the world [14].

Similarly, 71.6% of respondents used Smartphone and 78.9% of them have at least one mobile which is similar to study done on smart phone use and increased the risk of

addiction revealed that 95% of study participant uses smart phone with with 81.7% of them having at least one mobile phone [15]. This present study showed that 34.9% of respondents were using cell phone since four years which is supported by study done on awareness on phone hazards among 200 university students revealed that one subjects was using mobile phone for 15 years and most subjects have been using mobile phone for 5 years [16]. This findings were also supported by the study done by Parasuraman et al., showed that most of the study participants used mobile phone for more than 5 years [15]. Regarding frequency of cell phone use, 79.8% respondents used for more than five hours and 2.8% used for fifteen hours. This finding was contrast to other study which showed that around 64.3% of the study participants use mobile phone for an hour (approximately) and remaining use it for more than an hour [15]. Likewise, average call per day, 43.3% of respondents made 5 calls and 23.9% of respondents made 2 calls per day. This finding was supported by study, out of 200 samples, average call per day including incoming and outgoing, most of subjects made 5 call per day (20.1%) and 2 calls per day (19.5%). the average of incoming and outgoing calls is 4.93 calls per day per person [16]. Similarly, 61% of respondents have habit of checking mobile phone in between sleep. This finding was contrast to study concluded that nearly 36.7% of the study participants have the habit of checking mobile phones in between sleep [15]. In this study more than half of respondents were using mobile for entertainment (56.0%), educational/academic purpose (47.7%), Game (46.8%), Communication (42.6%) and photo shooting (33.0%) which is contradictory to study on smart phone usage and increased risk of

mobile phone addiction finding showed that Majority of the respondents were using mobile phone for communication purposes (87.8%), photo shooting (59.7%), entertainment (58.2%), and educational/academic purposes (43.8%) [15].

In this present study disclosed that 78.4% of respondents were aware about electromagnetic radiation health hazards produced by cell phone usages. Finding was supported by study on awareness on cell phone hazards among university students disclosed 62% of students population are aware of the electromagnetic field health hazards produced by mobile phone usage. Cent percent of the respondents heard about cell phone hazards. There was contrary to the finding of this study conducted in Saptagandaki Multiple College, 61.4% were not heard about cell phone hazards and only 38.6% heard about cell phone hazards [11]. This present study found that common source of information were internet 66.6% and radio 7.2%. Similar findings were reported by the study conducted in Saptagandaki Multiple College, Bharatpur where internet was the first informant [11].

This present study showed that 85.3% experienced harmful effect of cell phone, which is contradictory to study conducted on knowledge regarding harmful effect of cell phone use among higher secondary level students which concluded 41.4% experienced harmful effect and 56.6% didn't experienced any effects [11]. Regarding health hazards on cell phone use showed that more than half respondents answered eye strain (55%) and eye cancer (3.6%). In the contrast to these findings, out of 70, 70.0% respondents answered eye strain and 27.1% respondents answered glaucoma [11]. Furthermore,

harmful effect on ear showed that 58.6% respondents answered gradual hearing loss and 6.3% respondents answered swelling. This finding was almost similar to study concluded that 71.1% of respondent answered gradual hearing loss [11]. Likewise, it was shown in this study that 45.0% of respondents answered skin allergy & 18.0% respondents answered pimples, this finding was similar to study done by Gautam & Shakya, had shown that 71.4% known about skin allergy [11].

Finding of this present study showed that 54.1% respondents answered increase BP about the effects of cell phone in chest region and 13.5% respondents answered breast cancer. There was contrary to the finding of study conducted in Saptagandaki Multiple College Bharatpur, revealed that 75.7% respondents answered breast cancer [11].

In the present study, regarding knowledge on health hazards of cell phone use on psychological function 31.5% of respondents give correct answered on poor memory and 11.7% respondents' answered head injury which is similar to finding of study done in Bharatpur, Chitwan in which knowledge on harmful effect of cell phone use on psychological function, 36 (54.4%) of respondents answered poor memory and 6 (8.6%) of respondents answered head injury [11]. Likewise, 68.5% answered addiction on cell phone and 11.7% answered memory capacity increases. This Findings was supported by the study of Gautam and Shakya revealed that 90.0% respondents answered addiction on cell phone [11]. This finding was also supported by finding of cross sectional study done among medical students showed that the mean score of Internet addiction was 40.05 ± 20.69 while 19.6% of students did not have Internet addiction. The mild, moderate

and severe Internet addictions were 48.6%, 24.6% and 7.2% respectively. Overuse of cellphone was determined 51.96 ± 18.55 [5].

In this present study 55.9% of respondents give correct response regarding effects of cell phone after light out which is contradictory to the results of study findings in Bhratpur, Chitwan which revealed that 27.1% of respondents gave correct answer regarding effects of cell phone after light out [11].

In this study findings revealed that the level of knowledge regarding health hazards of cell phone use among higher secondary level students discloses that only 10.8% of respondents had average knowledge and 89.2% of respondents had poor knowledge regarding cell phone hazards. Similar finding was noted in the study conducted by Gautam & Shakya showed that 51.4% had poor knowledge, 45.7% had average knowledge and 2.9% had good knowledge about cell phone hazards [11]. These finding was contradictory to study done in India on Knowledge and attitude on Health Hazards of cell phone use among 120 higher secondary level students, 11 (9%) are having poor knowledge, 86 (72%) are having average knowledge and 23 (19%) are having good knowledge [11].

There is significant between level of knowledge and grade where p value is 0.036. In this study there is no any significant association of knowledge with age, gender, place of residence, educational status of mother, educational status of father, occupation of mother and occupation of father. Finding was contradicted to the study conducted by Gautam & Shakya, showed that level of knowledge is not statistically significant with age, sex, faculty, and grade [11].

CONCLUSION

On the basis of study findings, it is concluded that practice of mobile phone among higher secondary level student tend to be high. Respondents level of knowledge regarding tend to be poor as increase in the grade of respondents. There tend to be statistical significance between level of knowledge with grade and no statistical significance with age, gender, education level of mother, education level of father and occupation of father.

Thus to decrease the practice of cell phone and increase the knowledge about cell phone hazards it is essential to conduct awareness program regarding cell phone hazards. This study finding might help to develop counseling package regarding cell phone hazards in an institution. The finding of the study will help the curriculum planners for develop curriculum and program related to cell phone hazards. The research was conducted in small area so cannot be generalized to others and only one school were included. Practice of cell phone was assessed in term of questionnaire. Similar studies can be conducted with larger sample in different setting to generalize finding.

Further interventional study should be imitated to measure level of knowledge and practice regarding cell phone hazards. Curriculum should include topic related to cell phone hazards.

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