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СУБ'ЕКТИВНІ СИМПТОМИ У МОЛОДИХ КОРИСТУВАЧІВ МОБІЛЬНИМИ ТЕЛЕФОНАМИ В УКРАЇНІ

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SUBJECTIVE SYMPTOMS IN YOUNG CELL PHONE USERS IN UKRAINE

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Keywords: cell phone, electromagnetic radiation, physical discomfort, headache, earache.

Wide implementation of wireless communication services over the world during the last decades raised concerns on the risks of excessive radiofrequency radiation (RFR) exposure for human health. The main research interest during the years was concentrated on risks of brain tumors' development in users of cell phones. Indeed, in many studies it was detected a significant increase in tumors' risk due to "heavy" using of cell phones (see, for example, review [1]). The formal result of these studies became a decision of the World Health Organization / International Agency for Research on Cancer to classify RFR as a possible carcinogen to the humans.

Meanwhile, very few of up-to-date studies on assessment of other health risks in cell phone users were published. Earlier we detected a significant percentage of cell phone users with subjective symptoms of headache/earache and physical discomfort during cell phone talks among the Ukrainian youth [2]. It was as much as 63.6% of

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Мета роботи. Вивчення особливостей використання мобільних телефонів студентською молоддю і оцінка суб'єктивних симптомів у користувачів мобільним зв'язком.

Матеріали і методи. Методом анонімного анкетування проведено оцінку особливостей використання мобільних телефонів та суб'єктивних симптомів у користувачів мобільними телефонами — студентів Київського регіону України (n=600).

Результати. Виявлено, що 37,8% опитаних відчувають фізичний дискомфорт, а 40% — біль у голові або в усі під час розмов з мобільного телефону. При цьому серед тих, хто користувався мобільним телефоном не більше одного року, головний біль під час розмов відчували 16,7% опитаних, а серед тих, хто користувався телефоном понад 10 років, — 50% опитаних.

Висновки. Інтенсивне використання мобільних телефонів студентською молоддю викликає відчуття фізичного дискомфорту і біль у голові та/або вусі у значної частини користувачів.

Ключові слова: мобільний телефон, електромагнітне випромінювання, фізичний дискомфорт, головний біль, біль у вусі.

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Кириленко С.Д., Сидорик Є.П. СТАТТЯ, 2015.



СУБЪЕКТИВНЫЕ СИМПТОМЫ У МОЛОДЫХ ПОЛЬЗОВАТЕЛЕЙ МОБИЛЬНЫМИ ТЕЛЕФОНАМИ В УКРАИНЕ

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Цель работы. Изучение особенностей пользования мобильными телефонами студенческой молодежью и оценка субъективных симптомов у пользователей мобильной связью.

Материалы и методы. Методом анонимного анкетирования проведена оценка особенностей использования мобильных телефонов и субъективных симптомов

у пользователей мобильными телефонами — студентов Киевского региона Украины (n=600).

Результаты. Выявлено, что 37,8% опрошенных ощущают физический дискомфорт, а 40% — боль в голове и/или ухе во время разговоров по мобильному телефону. При этом среди тех, кто пользовался мобильным телефоном не более одного года, головную боль во время разговоров ощущали 16,7% опрошенных, а среди тех, кто пользовался телефоном более 10 лет, — 50%.

Выводы. Интенсивное использование мобильных телефонов студенческой молодежью вызывает чувство физического дискомфорта и болей в голове и/или ухе у значительного числа пользователей.

Ключевые слова: мобильный телефон, электромагнитное излучение, физический дискомфорт, головная боль, боль в ухе.

respondents who were feeling pain in a head or an ear during cell phone talks among young "heavy" users in Kyiv region, Ukraine. Recently Polish researchers [3] unveiled that as much as 63.2% of cell phone users in this country had symptoms of headache if they talked often and during a long time. Also, it was detected that 18% of cell phone users among Korean students had persistent headaches during or after cell phone conversations [4].

Our present study aims further analysis of specificity of cell phones' use by Ukrainian student youth and assessment of subjective symptoms in this category of cell phone users.

Materials and methods. The survey was carried out in 2012 among volunteer students of Kyiv region, Ukraine. Total 640 respondents were surveyed, and 600 (93.7%) questionnaires were assessed as being filled in correctly and understandable. The questionnaire consisted of questions on age, gender, period of cell phone use over the life, time of cell phone talks per day, physical discomfort during cell phone use, head or ear pains during cell phone talks.

The statistic analysis was carried out using a computer program (Pris, Russia). Significance between groups was assessed by means of the odds ratio approach.

Results and discussion. Most of the students surveyed were about 17-18 years old, of

whom 57.2% were females and 42.8% were males. The average cell phone use period over the life was 4-6 years (fig. 1). As for

the time of cell phone daily conversations, it varied from less than 15 min to more than 2 h. Importantly, about 37% of the

Figure 1
Percentage of respondents in subgroups according to the periods of cell phone use over the life

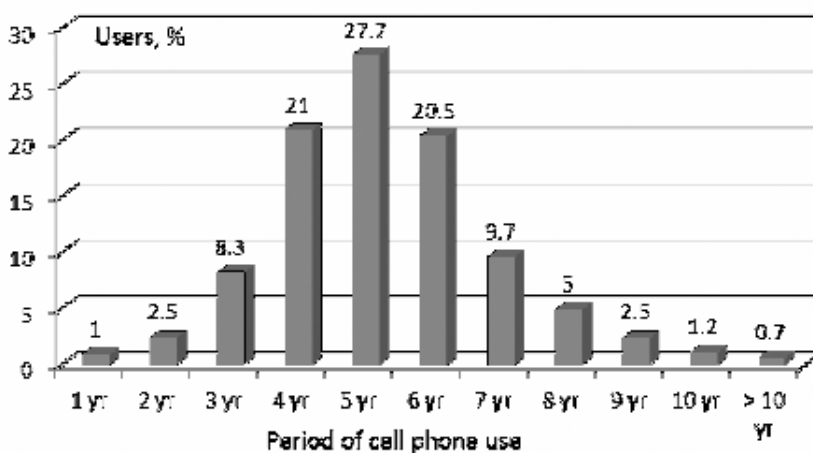
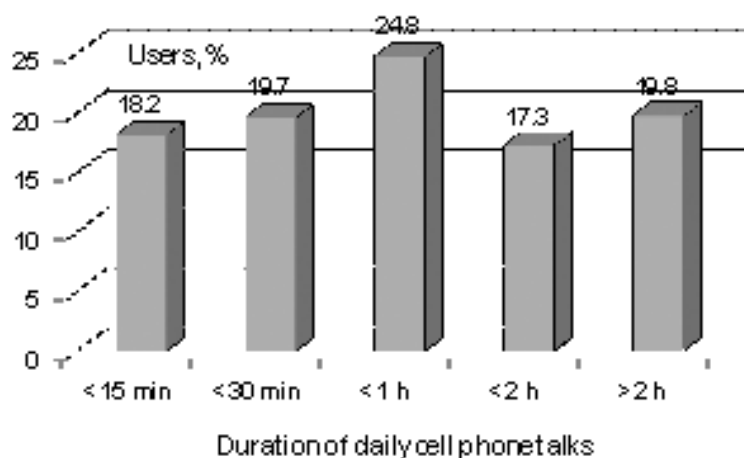


Figure 2
Subgroups of respondents according to a duration of daily cell phone talks





students surveyed talked on cell phones more than 1h per day (fig. 2). Females used cell phones much more intensively than males (fig. 3). And, for example, the subgroup of females who talked more than 2 h/day was statistically significantly bigger than the subgroup of females who talked up to 15 min/day (OR=4.95, CI 95%, 2.26-9.14). On the other hand, male sub-

group included much more subjects, which talked up to 15 min per day, than that, which talked more than 2 h per day (OR=3.98, CI 95%, 1.68-9.4).

Total 37.8% of the students surveyed experienced physical discomfort (heat, heaviness in the head) while talking on cell phones. And 40% of the students felt headaches and/or earaches while talking on cell phones. The percentage of respondents feeling a pain during cell phone conversation slightly depended on total duration of cell phone conversations per day (fig. 4). Feeling of pain in the head and/or ear depended on total period of cell phone usage over the life (fig. 5). While after 1 years of cell phone usage headaches/earaches were felt by 16.7% of respondents, after 2 years of cell phone usage the percent of such respondents tripled, and after 10

years there were 50% of respondents with feeling of pain in the head or ear. Although differences between the subgroups are statistically non-significant (due to small number of respondents in both subgroups) these data need to be treated carefully.

The symptoms of physical discomfort and pain were more expressive in females than in males (fig. 6), obviously, due to more intensive cell phone usage by females, and/or presumably, due to physiological gender differences. For example, headaches during cell phone conversations were felt by 20% of females and only by 9% of males (OR=2.18, CI 95%, 1.20-3.98). Earlier more sensitive symptomatic reactions of females on RFR exposure from cellular base transceiver stations had been reported in France [5].

On the whole, our findings somewhat confirm the results of our previous study [2]. We showed herein that a high percentage of young people in Ukraine use cell phone excessively, as well as have subjective symptoms of physical discomfort and headaches/earaches during cell phone talks. But compared to our previous survey carried out in the same region in 2010, in this survey we did not reveal a strong dependence of the percentages of people having headaches/earaches in the subgroups on the duration of their daily cell phone talks. Possibly, in this survey the subgroups with shorter duration of daily cell phone conversations "are formed" due to forced migration of more sensitive persons from the other subgroups. They just could not use cell phones longer during a day any more due to their new physical conditions. On the other hand, we revealed here a threefold difference in headache manifestation between the subjects who used cell phones up to 1 year and those who used them more than 10 years during the life. While the difference is statistically non-significant it needs to be checked in future.

A significant gender-related difference in the percentage of people having headaches during cell phone talks was unveiled. Females had headaches during cell phone conversations more than twice as often as males. It could be related to a more intensive usage of cell phone by females.

We could not assert that the subjective symptoms revealed

Distribution of females and males in the subgroups depending on a duration of daily cell phone talks

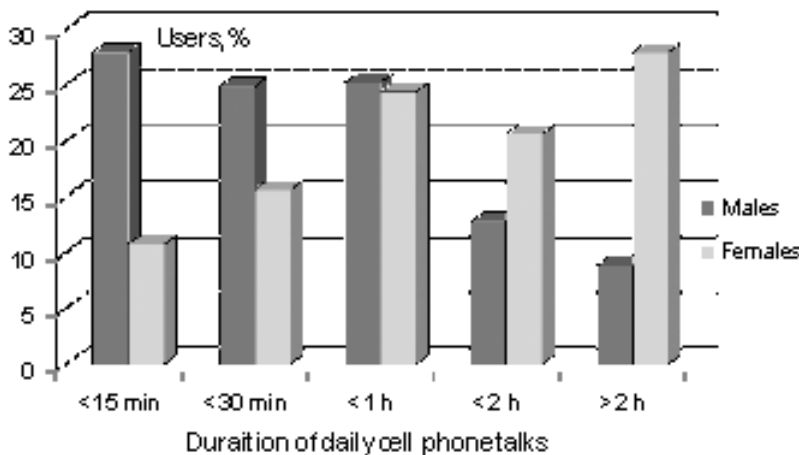
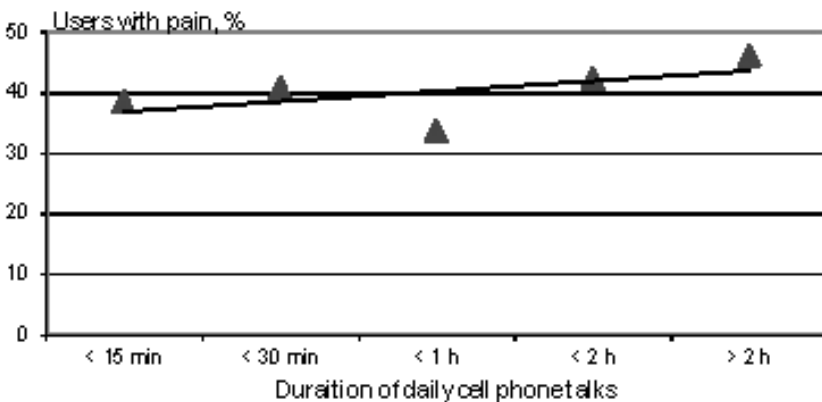


Figure 4

Dependence a number of respondents with feeling of headaches/earaches on the duration of daily cell phone talks



were solely contributed by RFR exposure of the respondents' heads and ears from cell phones, but not, for example, due to long-term irritation of acoustic analyzer and correspondent parts of brain of cell phone users. But we could not exclude that RFR exposure is particularly important in these effects. For example, recently a bulk of research was published on expressive oxidative stress and mutagenic effects in living cells, both in model systems and human organism, due to long-term low intensity RFR exposure [6, 7]. On the other hand it is important to realize that modern international safety limits on RFR exposure don't take into account such subtle biological effects and base solely on thermal effects of radiation [8].

The limitation of this study is an absence of measurement on level of RFR exposure of users' heads due to cell phone talks. The

only parameter of RFR exposure assessed was duration of cell phone talks/use (per day and during the life). Previously we analyzed the intensity of RFR from cell phones of Kyiv region users [2]. All cell phones analyzed corresponded to the ICNIRP safety limit (450 $\mu\text{W}/\text{cm}^2$), but 60% of them exceeded the Ukrainian safety limit (2.5 $\mu\text{W}/\text{cm}^2$). It would be indicative to assess a dependence of subjective symptoms of cellphone users on their cell phones' RFR intensity.

Conclusions. Student youth in Ukraine use cell phones intensively, and 37% of them talk on cell phones more than 1h daily. The feelings of physical discomfort and headache/earache during cell phone talks were experienced by 37.8% and 40% of students surveyed. Young people who used cell phones over 10 years experienced headaches/earaches during cell phone talks

Dependence a numbers of respondents with feeling of headaches/earaches on a period of cell phone use over the life

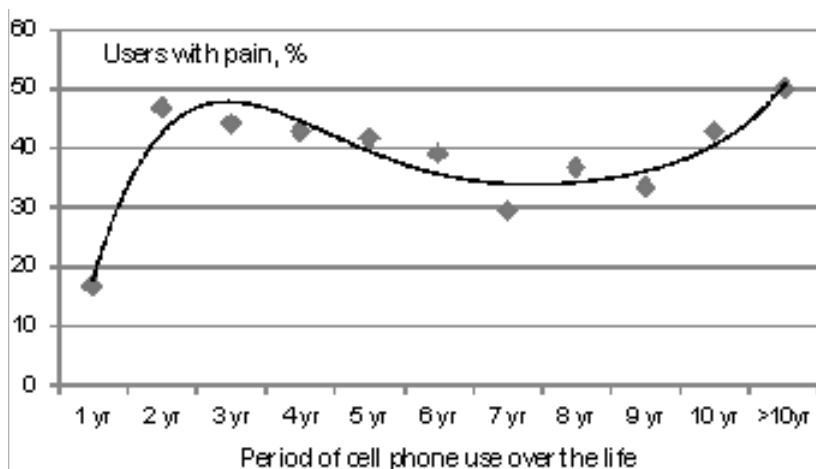


Figure 5

Comparison of females' and males' subjective feelings of physical discomfort and pain during cell phone talks

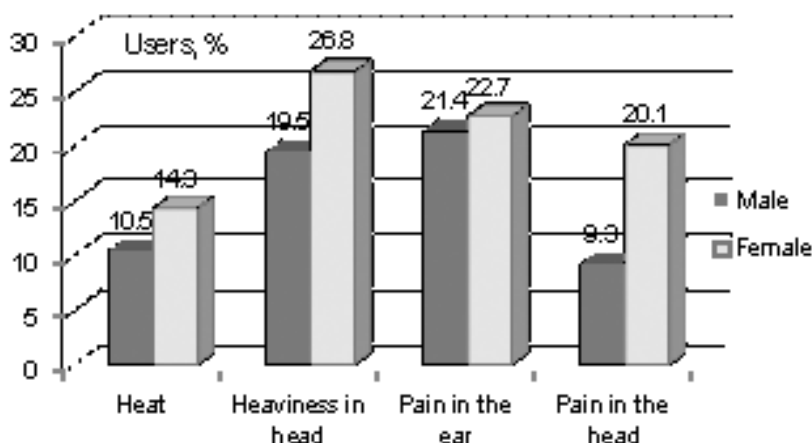


Figure 6

three times more often than those who used cell phones no more than 1 year during the life. Females used cell phones significantly more intensively than males and showed a significantly higher percentage of those having headaches during cell phone talks.

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