

## Medical and Social Factors of Pediculosis

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### Abstract

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Pediculosis is a global problem in public health. An important factor in the efficient eradication of lice is ensuring adequate recognition and treatment of the disease by the population. In the present study, awareness of the population about the physiological properties of head lice, the ways of infestation with head lice, and the methods of treatment and prevention were studied. Perception of the disease by the people who had had head pediculosis and other people around them was identified.

## Introduction

Pediculosis is the most wide-spread parasitic disease in the world, regardless of the level of the economic development of the country [1]. According to the World Health Organization, several billion people around the world are susceptible to the permanent risk of infestation with pediculosis. The highest pediculosis incidence rate was observed in developing countries of Central America, Asia, and Africa [2], [3], [4], [5], [6], [7]. However, the growth of population infestation with pediculosis, primarily head pediculosis, has also been noted in prosperous socio-economic countries: the UK, Norway, the USA, and others [8], [9], [10], [11]. In Russia, up to 300 thousand cases of pediculosis are registered every year. According to Rosstat, the number of reported cases of pediculosis in 2010 amounted to 272.8 thousand people, in 2015 — 243.5 thousand, and in 2016 — 212.7 thousand. Pediculosis takes fourth place in the structure of infectious morbidity of children aged 0 – 14 years. In 2010, the number of

reported cases of pediculosis among children aged 0 – 14 years was 52.0 thousand people, in 2015 — 58.2 thousand, and in 2016 — 52.1 thousand [12]. The number of cases of pediculosis is much greater since only the cases reported by the patients to medical institutions, or identified by routine inspections in kindergartens, schools, hostels, orphanages, nursing homes for the elderly, etc. are considered [13]. Because of the aforesaid, analysis of the effect of medical social factors on the pediculosis incidence rate is very relevant and requires both reassessing the effect of these factors and finding ways to optimise the organisation of the preventive measures in the modern conditions.

## Material and Methods

To identify the medical and social factors that affect the spread and prevention of head pediculosis,

a sociological study was performed, for which three questionnaires had been developed: for the population — 20 questions, for pharmaceutical specialists — 18 questions, and for dermatologists — 10 questions.

The questions were presented technically as closed, semi-closed, or open, in terms of the kind as qualitative, where, depending on the question, the respondents were asked to choose one or several variants of the answer, or write their own opinion. The questioning was performed anonymously in writing. The results of the study were processed using the tools of mathematical statistics.

The study involved three groups of the respondents: the first group — 580 inhabitants of Moscow and the Moscow region (23.5% males and 76.5% females) in all age groups: 12% — 18 to 20 years of age; 47% — 21 to 30 years of age; 20% — 31 to 40 years of age; 17% — 41 to 50 years of age; 3% — 51 to 60 years of age; and 1% — older than 61 years; the second group — 115 pharmacists that were members of pharmacy organizations of Moscow and the Moscow region. The competence of the specialists in the topic of the study was determined by two criteria: occupied position — qualified pharmaceutical chemist (51%) and pharmacist (49%); work experience in pharmacy organizations — most respondents (32%) had 5 – 10 years of experience, 27% — 11 to 20 years, 25% — under three years, 16% — over 20 years. The third group were doctors of the dermatovenerologic dispensary that covered 220 thousand people of the population of a city in the Moscow region — eight dermatovenerologists (100% sampling) with the work experience of 10 to 20 years — 25%, over 20 years — 25%, and under 10 years — 50%.

## Results

As a result of the sociological study of the population, it was found that 62% of the respondents had had head pediculosis. Most respondents (44%) were infected with head pediculosis at school, 36.5% — in the kindergarten, 10% — at professional educational institutions (higher educational institution, college, etc.), and 9.5% — on vacation. The immediate circle of 67% of the respondents also had head pediculosis, namely: brother/sister — 29% of the respondents; parents — 18%; children — 22%; and friends — 31%. The information obtained is an evidence of the high epidemicity of the pediculosis disease among minors, which is consistent with the judgment of practicing dermatovenerologists, qualified pharmaceutical chemists, and pharmacists of pharmacies. According to the opinion of 33.5% of the respondent doctors and 46% of the pharmaceutical specialists, patients with head pediculosis are children

up to seven years of age, according to the opinion of 55.5% of the respondent doctors and 27% of the pharmaceutical specialists — children between 7 and 18 years of age, according to the opinion of 11% of the respondent doctors and 25% of the pharmacy specialists — women, according to 2% of the pharmaceutical specialists — men.

The next module of questions was dedicated to the progress of the disease in those who had had pediculosis; therefore, analysis of this module did not contain the respondents who stated that neither they nor their immediate circle had had faced this problem.

For timely treatment and reducing the risk of spreading scalp pediculosis, early diagnosis of the disease is of paramount importance. A significant majority of the respondents (41%) found head pediculosis by experiencing one of the symptoms — increased itchy scalp [14]. Public prevention of head pediculosis consists of active identification of patients through preventive medical examinations — using this method, head pediculosis was detected in only 16% of the respondents. Preventive inspection at home identified pediculosis in 27% of the respondents; and in 1% of the respondents, pediculosis was detected by a hairdresser.

Despite the fact that in 15% of the respondents pediculosis was found after obtaining information that people from their inner circle had lice, the survey showed that upon infestation with pediculosis, one third of the respondents had not informed anyone about the disease (28%), which had been one of the reasons for epidemics development. Another third of the respondents informed only their inner circle about the disease: friends — 9%, parents of children from their inner circle — 16%; and classmates — 11%. Only one-third of the respondents informed officials (class teacher/tutor — 16%; health care worker at school/kindergarten/college — 20%) about the disease, timely action of whom might have a significant effect on reducing the epidemic of head pediculosis at a particular school or an educational institution.

The reasons for officials' low awareness about pediculosis and nondisclosure of this information revealed the next set of questions aimed at identifying the psychological state of a patient with pediculosis.

The results of the survey showed that 61% of the respondents bothered whether people around them would learn about their infestation with lice. This circumstance is explained by the reaction of other people to the respondents at the time they were infected with lice. Forty-three percent of the respondents experienced a negative attitude to themselves in the form of contempt (3%), disgust (15%), and apprehension (25%). Twenty-seven percent of the respondents were sympathized with, i.e., were understood and shared their negative emotions with. Only one-third of the people around treated the patients kindly (7%), or neutrally (23%).

Negative feelings and emotions in case of pediculosis were experienced by 86.5% of the respondents: upset state – 25.5%; shyness — 20%; shame — 19.5%; fear of becoming an outcast — 9%; fear of being mocked at — 12.5%, and only 10% of the respondents didn't care, and 3.5 % remained calm (Figure 1).

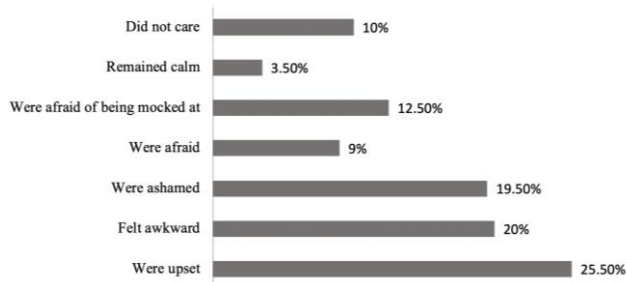


Figure 1: Feelings of the respondents with pediculosis

Questioning the population has shown how the attitude of the respondents to a person with pediculosis changes: 10% will forever cease contacting and communicating with the patient; 45% will reduce communication and contacts for the period of the disease; only 45% of the respondents will not change their attitude to the patient.

The obtained data are consistent with the opinion of the pharmaceutical specialists, 81.5% of whom indicated that pharmacy visitors asking for a pediculicidal product had negative emotions: embarrassment (35%), shame (13.5%), and anxiety (33.5%).

The time for which respondents or their relatives infected with pediculosis ceased attending school/kindergarten/job: one day — 6% of the respondents, 3 – 7 days — 31%, 10 – 14 days — 16%; with that, 35% of the respondents returned to their normal life immediately after the single treatment of the head. 12% of the respondents did not interrupt the educational/work process, which fact speaks of low awareness of the respondents about the epidemiological component of this disease.

The results of questioning show that most (78.0%) of the respondents preferred self-treatment of pediculosis, and did not seek qualified medical aid in case of infestation. The respondents only sought medical advice in case they failed to solve the problem themselves: in case of repeated infestation with lice (9%) and chronic nature of pediculosis (11.5%). Questioning of dermatovenerologists confirmed the low rate of seeking skilled medical care by patients with pediculosis [15], [16]. Fifty percent of the responding doctors noted that patients with this disease came to the clinic once a month, 37.5% — not more than twice a year.

Due to the high level of pediculosis self-treatment, it was important to find out whose recommendations the patients followed when buying

pediculicidal products. According to the results of questioning, 31% of the respondents based their choice on the advice of friends and acquaintances, 29% — on recommendations of pharmacists at pharmacies, 12% — on the information from Internet sources, and 8% — on the information from the literature. 20% of the respondents bought the preparation on prescription, which coincides with the number of visits to doctors on this issue.

According to pharmaceutical specialists, the most important criteria for the consumers choosing pediculicidal product are speed and reliability of the therapeutic effect, dosage form, age limitations, and price.

Seventy three percent of the respondents infected with pediculosis used nonpharmacological methods of getting rid of pediculosis, namely, shortening or shaving off the hair — 13%; scalp treatment: with kerosene or turpentine — 18%, with salt/vinegar/alcohol solution — 11%, with cranberry or pomegranate juice — 6%; with essential oil (cranesbill, etc.) — 6%, with an infusion or a decoction of herbs — 6%, and with coal-tar soap — 13%. The inefficiency of these methods was indicated by 13% of the respondents, efficiency — by 29%, but if the method of shaving the hair off the head (which was used by 13% of the respondents) is considered, pediculosis will definitely be defeated. 18 % of the respondents noted the efficiency of the comprehensive use of the traditional medicine and pediculicidal products, which prevents characterizing the real efficiency of each method.

## Discussion

The survey revealed that only 67% of the respondents were cured after a single application of a single pediculicidal product; at the same time, 20% received a prolonged treatment, with a change of the preparation; repeated infection was observed in 13% of the respondents. The obtained results may be associated with the development of resistance in lice to certain groups of pediculicidal products [4], [16].

To exclude the possibility of repeated infection and spread of pediculosis, it is important to promptly and correctly use the methods of treating clothes and household items of a patient with pediculosis [17], [18], [11]. The analysis revealed low awareness of the respondents of this issue: 13 % of the respondents did not process clothes and household items of the patient, and continued using them for other purposes; 22% thrown them away or destroyed, which was economically not sound, considering the existing treatment methods; 38% washed them normally (at 30 – 40 degrees), which was not an efficient method, since lice and nits were

killed at the temperatures above 50 degrees Celsius [19]; 14.5% put items into a refrigerator or kept them outside in the winter, this method may be used if items are placed in a freezer of a refrigerator with the temperature below 20 degrees; 8% packed items into plastic bags for two weeks, 4.5% treated the items with an iron.

Given the entirety of the respondents, pediculosis is dangerous due to the following factors: prevalence rate — 32%, epidemicity — 18%; social and psychological isolation of patients — 17%, repeated infection rate — 17%; and being the carrier of typhoid fever pathogen — 17%. Comparison of the results of questioning the doctors and population on this issue revealed unanimity of opinion (in percent) on such factors as prevalence rate, emerging socio-psychological isolation, the risk of infection with typhoid fever, but there was also a difference: the doctors interviewed did not specify the factor of epidemicity, which fact confirmed the small number of patients seeking medical help in case of pediculosis.

Stereotype "pediculosis is the disease of the poor" exists in the society, i.e., only the lowest social groups may have pediculosis; respondents were asked how true this statement was in their opinion. 84% of the respondents did not agree with this statement, moreover, a tendency to the dependence of the choice of the positive response to this assertion on the presence of pediculosis in the anamnesis of the respondent was discovered. The questioning does not prove the relevance of this stereotype in the modern circumstances either [20]: 58% of the respondents have higher professional education, 31% have secondary specialized education, the average family income of 43% respondents is 30 to 50 thousand rubles per month, the income of 25% is 50 to 100 thousand rubles per month.

To identify the level of public awareness about the physiological properties of head lice and the ways of infestation with pediculosis, respondents were asked to choose the statements that were correct in their opinion. The result showed weak awareness of the population on this topic: 46% of the respondents believed that head lice jump on to the head; 6.5% were sure that head lice could fly; 42% believed that one could catch head lice swimming in a pond, or dealing with animals; 12% were sure that only untidy people got infected; and 28% believed that people with long hair got infected more frequently. The research has shown that public awareness in the issues of pediculosis is not associated with the level of the respondents' education.

Measures were determined, which, according to the respondents, would help reduce the prevalence rate of pediculosis in the community. Seventy three percent of the respondents believed that the most efficient measure was preventive checkups in kindergartens and at schools; but as mentioned above, pediculosis was detected this way in only 16%

of the respondents, which shows low efficiency and insufficient timeliness of scheduled inspections in kindergartens and in educational institutions. 39% of the respondents recommended detective combing at home in order to not only rely on preventive examinations. 56% of the respondents mentioned personal hygiene, 43% of the respondents believed that an important measure of prevention was early informing the people around about possible infection, but given the negative socio-psychological perception of the disease, it would be possible to change the situation only by modifying the stereotype of perception of pediculosis; the same measure was mentioned by 16% of the respondents. 5% of the respondents supported the opportunity of obtaining a free pediculicidal product.

Given the high prevalence rate of pediculosis and high percentage of self-treatment of this disease by the population, it was paramount to determine the level of pharmaceutical advice upon the sales of pediculicidal products.

Unfortunately, the level of pharmacists' competence in the issues of pediculosis proved to be inefficient.

In case of recommending a pediculicidal product, the age of the patient is not considered by 34% of the respondents, sensitivity to the components of the product — by 53%, presence of an asthmatic component or bronchial asthma in the diagnosis — by 29%, repeated infection — by 73%, and previously used pediculicidal products — by 81% of the respondents.

In order to reduce the resistance to pediculicidal products, the Federal Budget Institution of Science Research Institute of Disinfectology of Rospotrebnadzor recommends certain sequences of using various products for treating pediculosis; only 7% of the pharmaceutical specialists chose the correct sequence of treatment, 38% did not choose the correct sequence, and 55% believed that the sequence was unimportant.

Instructions for the medical use of some pediculicidal products contain an indication that it is necessary to address a medical specialist about the rules of performing detection combing; questioning of the pharmaceutical specialists also showed that 25% of pharmacy visitors had asked to be advised about detection combing. The results of questioning showed low level of knowledge about the rules of detection combing by the respondents, a significant percentage of errors was about the frequency of combing and the combing procedure.

Ethics of pharmaceutical workers identified the need for consulting the patients not only about treatment but also about prevention of the disease. To reduce repeated infection and avoid the spread of pediculosis, it is crucial to inform the population about the appropriateness of treating clothes and household

items of a patient with pediculosis. Only 35% of the pharmacists reported the need for and methods of processing items of the patient upon every purchase of a pediculicidal product, 51% revealed this information only to the questions of consumers, the remaining 14% did not speak on the subject, either because they were not aware of it (7%), or believed that this issue was outside their competence (7%).

In the opinion of 88% of the pharmaceutical specialists, the most important measure to help reduce the prevalence rate of pediculosis is preventive examination in kindergartens and at schools; 56% stand for early informing of people about the possibility of infection; 52% stand for handing out an information factsheet with proper actions of the infected; and 30% believe in changing the attitude of the population to pediculosis.

In order to reduce the incidence rate of pediculosis, it is necessary to change the stereotype existing in society about this disease as a disease of socially disadvantaged people with poor personal hygiene. In the modern world, children from any social environment may have pediculosis, with that, most of them experience negative psychological state and have no desire to inform the people around about the disease. The study has shown that even a long time after the disease in childhood, adult people retain a negative impression about the disease for the entire life. Insufficient awareness about the physiological properties of head lice, the methods of infestation with pediculosis, methods of treatment and prevention, and the high degree of ignorant self-treatment are the result of the perception of this disease by the society.

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