

## AWARENESS OF AND ADHERENCE TO MEASURES OF INFLUENZA AND ARVI PREVENTION AMONG THE CITIZENS OF YEKATERINBURG

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According to experts, yearly flu rate can constitute 5–20% in adults and 20–30% in children; and in case of development of a pandemic, a number of those suffering from flu-like infection can be increased by 50%. Vaccination against influenza and properly used non-specific prevention can exclude seeking medical aid and hospitalization due to high incidence of COVID-19 and reduce the load to the healthcare system. Research purpose: examine awareness of children, young people and adults about signs of flu, methods of specific and non-specific prevention and their use in life. Materials and methods: the research was performed in three groups based upon online questioning: 270 adults aged 25 to 60, 1,112 students from universities and colleges aged 15 to 24, 101 schoolchildren aged 11 to 17. The questionnaire included sets of questions that reflected awareness of and commitment of population to measures of specific and nonspecific prevention. The students were questioned from January to February 2022. The obtained results show high flu and ARVI morbidity, insufficient hygienic education and commitment of citizens to the measures of specific and non-specific flu and ARVI prevention. To improve the situation, not just hygienic education is required, but also education of medical workers, parents, healthcare workers, journalists and correspondents of mass media regarding flu and ARVI prevention, availability of vaccine prevention centers, and consultations of pediatricians and therapists regarding the issues of specific prevention.

**Keywords:** specific prevention, nonspecific prevention, influenza, ARVI, vaccination, vaccination prevention

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**Compliance with ethical standards:** questioning was organized by specialists from the department of Rospotrebnadzor for the Sverdlovsk region and Department of Education in Yekaterinburg using Google Forms. Prior to the questioning, an informed consent to the study was obtained, including the one from children and their parents.

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## ИНФОРМИРОВАННОСТЬ И ПРИВЕРЖЕННОСТЬ ЖИТЕЛЕЙ ГОРОДА ЕКАТЕРИНБУРГА К МЕРАМ ПРОФИЛАКТИКИ ГРИППА И ОРВИ

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По оценке экспертов, ежегодная заболеваемость гриппом может составлять 5–20% у взрослых и 20–30% у детей, а в случае возникновения пандемий, число заболевших гриппозной инфекцией способно увеличиваться до 50%. Вакцинация против гриппа и грамотное применение неспецифической профилактики может предотвратить обращения за медицинской помощью и госпитализации в условиях высокой заболеваемости COVID-19 и тем самым снизить нагрузку на систему здравоохранения. Цель исследования: изучить информированность детей, молодежи и взрослых о проявлениях гриппа, методах специфической и неспецифической профилактики и их применении в своей жизни. Исследование проводилось на основе онлайн-анкетирования в трех возрастных группах: 270 взрослых от 25 до 60 лет, 1112 студентов вузов и колледжей от 15 до 24 лет, 101 школьник от 11 до 17 лет. Анкета включала в себя блоки вопросов, отражающие информированность и приверженность населения к мерам специфической и неспецифической профилактики. Анкетирование было проведено в период с января по февраль 2022 г. Полученные результаты свидетельствуют о высокой заболеваемости населения гриппом и ОРВИ, недостаточной гигиенической грамотности и приверженности граждан мерам специфической и неспецифической профилактики гриппа и ОРВИ. Для улучшения ситуации необходимо не только гигиеническое воспитание населения, но и обучение медицинских работников, родителей, работников сферы образования, журналистов и корреспондентов средств массовой информации в вопросах профилактики гриппа и ОРВИ, доступность пунктов вакцинопрофилактики, а также консультации у педиатров и терапевтов по вопросам специфической профилактики.

**Ключевые слова:** специфическая профилактика, неспецифическая профилактика, грипп, ОРВИ, вакцинация, вакцинопрофилактика

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In light of the ongoing COVID-19 pandemic, other infectious diseases including flu and ARVI remain relevant, as their danger can't be underestimated [1]. Circulating among people for over 100 years, the flu virus with significantly altered antigenic properties still affects people of all ages, especially preschool age children [2]. According to experts' estimate, yearly flu incidence can constitute 5–20% in adults and 20–30% in children, whereas in case of pandemics a number of those with an influenza infection can be increased by 50% [1]. Vaccination against flu can prevent referral for medical aid and hospitalization due to high incidence of COVID-19 [3] and thus reduce load to the healthcare system [3].

Research purpose: study awareness of children, youth and adults about manifestations of flu, methods of specific and non-specific prevention and their use in life.

## MATERIALS AND METHODS

The research was conducted based on online questioning in three age groups: 270 adults aged 25 to 60, 1,112 students of universities and colleges aged 15 to 24, 101 schoolchildren aged 11 to 17. The questionnaire included the following blocks of questions: data related to flu and ARVI, awareness of flu manifestations, measures of specific and non-specific flu vaccination, data related to flu vaccination, motives of vaccination and refusal from it, behavior in case of flu and ARVI (referral for medical aid, administration of medicines, limited contacts), sources of data about flu and ARVI prevention and attitude thereto. Data are analyzed using extensive values and related errors. Extensive coefficients display distribution of the phenomenon into constituents, its internal structure or relation of parts to a whole (specific gravity) and are expressed in percentage or fractions. The extensive index was calculated according to the following formula: part of phenomenon (environment)/whole phenomenon (environment) x 100%.

The indicator error was calculated as per formula:  $m = \sqrt{P \cdot (100 - P) / n - 1}$ , where  $P$  is the value of the extensive indicator, and  $n$  is a sample size.

The statistical significance of differences between the comparison groups was estimated by the Student's criterion for relative indicators:  $t = (P_1 - P_2) / \sqrt{(m_1^2 + m_2^2)}$ .

The statistical significance of differences was estimated at a significance level of  $p \leq 0,05$ .

Microsoft Excel 2010 (developed by Microsoft, USA) was the software package used for the purpose of statistical treatment.

## RESEARCH RESULTS

It has been established that among those who have never suffered from flu and ARVI during a year the largest percentage was recorded in adults ( $37.78 \pm 2.95\%$ ), the smallest one in schoolchildren ( $7.92 \pm 7.22\%$ ) ( $p < 0,05$  for all comparison groups) (fig. 1). The largest group of those surveyed who had this disease 4 times or more frequently was represented by students ( $25.9 \pm 1.31\%$ ) ( $p > 0.05$  for all comparison groups).

The majority of those surveyed believe that flu is a disease transmitted from a sick person to a healthy one by cough and sneeze ( $61.85 \pm 2.96\%$  for adults,  $67.99 \pm 1.4\%$  for students, and  $79.21 \pm 4.04\%$ ) for schoolchildren ( $p < 0.05$  among adults and schoolchildren, students and schoolchildren).  $67.04 \pm 2.86\%$  of adults,  $62.32 \pm 1.45\%$  of students and  $41.58 \pm 1.45\%$  of schoolchildren ( $p < 0,05$  among adults and schoolchildren, students and schoolchildren) are informed of flu complications such as pneumonia, bronchitis, myocarditis, otitis and lethal outcome.  $52.59 \pm 3.04\%$  of adults,  $63.49 \pm 2.08\%$  of students and  $69.31 \pm 1.44\%$  of schoolchildren ( $p < 0.05$  among adults and students, adults and schoolchildren) are aware of flu characteristics as a disease with a rise in temperature, dry cough and headache. A very small percentage of respondents believes that flu is not a dangerous disease and can be treated easily ( $2.96 \pm 1.03\%$ ,  $8.72 \pm 0.72\%$  and  $13.86 \pm 0.85\%$  of population respectively) ( $p < 0.05$  among adults and students, adults and schoolchildren).

Vaccination is the main method of flu specific prevention. The majority of those surveyed believe that a vaccinated person can suffer from flu but this disease will be mild and have no complications ( $84.88 \pm 2.18\%$  for adults,  $75.09 \pm 1.68\%$  for students,  $70.3 \pm 1.3\%$  for schoolchildren).  $61.78 \pm 2.96\%$  of adults,  $51.71 \pm 2.25\%$  of students and  $49.5 \pm 1.5\%$  of schoolchildren are informed that periodic vaccination is important due to annual variability of flu strains.  $59.6 \pm 2.99\%$  of adults,  $43.35 \pm 2.21\%$  of students and  $41.58 \pm 1.49\%$  of schoolchildren know that vaccination done in autumn results in development of specific immunity during an epidemic rise in the incidence of the disease ( $p < 0.05$  for all issues related to the value of vaccination in flu prevention among adults and students, adults and schoolchildren). At the same time, some vaccinated believe that vaccination is not obligatory due to sufficient natural immunity ( $16.65 \pm 2.27\%$ ,  $5.67 \pm 0.48\%$  and  $17.82 \pm 0.69\%$  respectively) ( $p < 0.05$  among adults and schoolchildren, students and schoolchildren).

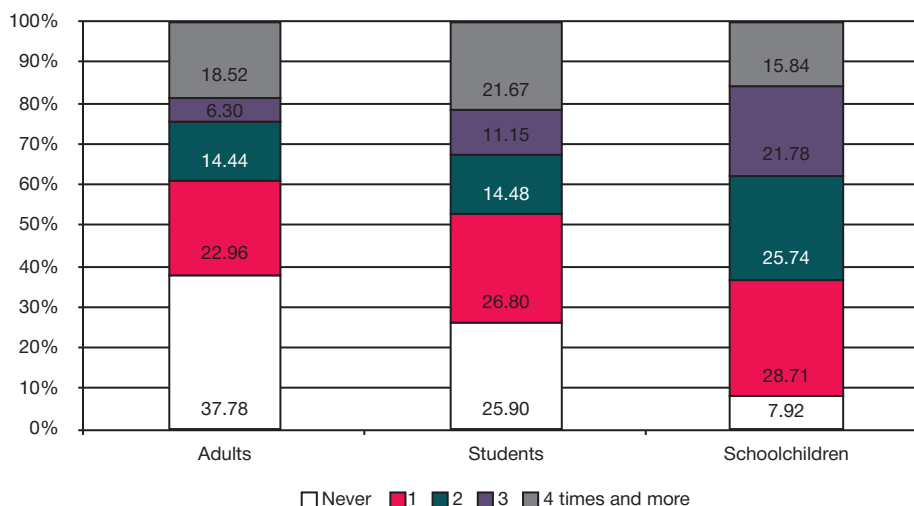


Fig. 1. Distribution of those surveyed by a number of previous flu and ARVI during the last year, %

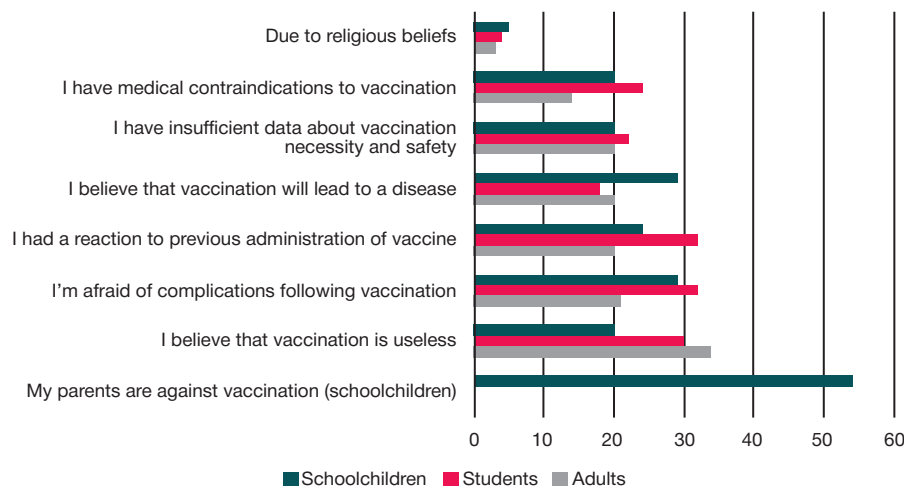


Fig. 2. Reasons for refusal from flu vaccination, %

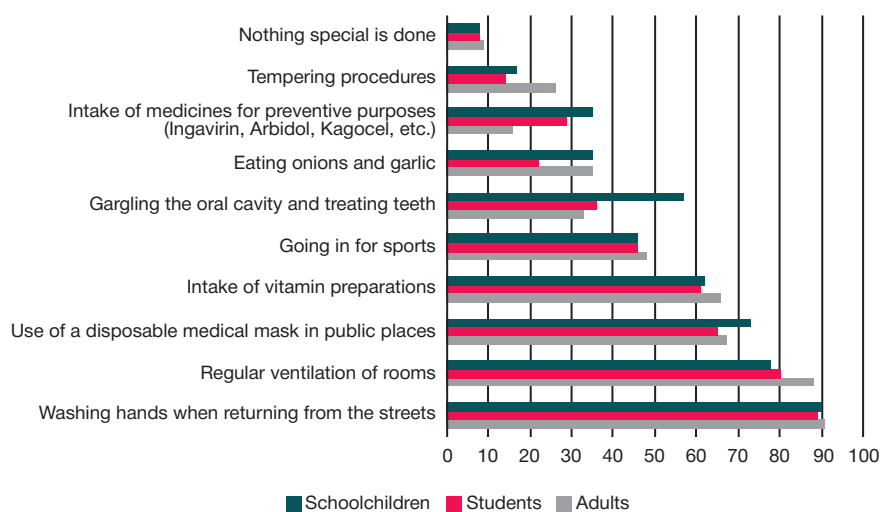


Fig. 3. Methods of non-specific prevention of flu and ARVI used by population, %

The greatest percentage of those requested from three groups had a neutral attitude to the vaccination ( $46.67 \pm 3.04\%$  for adults,  $66.1 \pm 1.42\%$  for students, and  $46.53 \pm 4.96\%$  for schoolchildren). Mainly adults and children ( $35.93 \pm 2.92\%$  and  $36.63 \pm 4.79\%$  respectively) had a positive attitude to vaccination as compared with students ( $21.94\%$ ) ( $p < 0.05$  among adults and students, students and schoolchildren).  $29.63 \pm 2.78\%$  of adults,  $27.16 \pm 1.33\%$  of students and  $45.54 \pm 4.96\%$  of schoolchildren ( $p < 0.05$  for schoolchildren as compared with students and schoolchildren) are vaccinated annually. Students avoid regular vaccination ( $40.65 \pm 1.47\%$ ). Adults constitute the majority of those not vaccinated ( $44.81 \pm 3.03\%$ ). Meanwhile,  $53.7 \pm 3.03\%$  of adults reported that they vaccinate their children against flu every year. The majority of those vaccinated noted that their well-being was the same after vaccination ( $50.6 \pm 3.04\%$  in adults,  $63.48 \pm 1.44\%$  in students,  $53.33 \pm 4.96\%$  in schoolchildren). A third part of those vaccinated had a rise in body temperature and fatigue ( $30.12 \pm 2.79\%$ ,  $30.19 \pm 1.38\%$  and  $31.11 \pm 4.61\%$  respectively). Within a year following vaccination, the majority of those interviewed had flu and ARVI less frequently than usual ( $62.58 \pm 2.95\%$  in adults,  $63.48 \pm 1.44\%$  in students and  $55.84 \pm 4.94\%$  in schoolchildren). The vaccinated included those who had no disease during a year ( $23.93 \pm 2.6\%$ ,  $22.71 \pm 1.26\%$  and  $24.68 \pm 4.29\%$  соответственно) ( $p > 0.05$ ).

A lack of parental consent was the main reason for refusal among schoolchildren who did not undergo vaccination ( $53.66$

$\pm 4.96\%$ ). Schoolchildren also have an opinion that vaccination leads to a disease and complications ( $29.27 \pm 4.53\%$  each). Among those requested,  $34.31 \pm 2.89\%$  of adults and  $30.34 \pm 1.38\%$  of students believe that vaccination is useless ( $p < 0.05$ ). The majority of students are also afraid of complications following vaccination ( $32.13 \pm 1.4\%$ ) and previous reaction to vaccination ( $31.91 \pm 1.4\%$ ) (fig. 2).

Apart from vaccination, there is a large list of methods of flu and ARVI non-specific prevention. According to the survey, those from Yekaterinburg practice the following methods most frequently: washing their hands when they return from the streets ( $90.32\%$ ); regular ventilation of the room ( $82.01\%$ ); using a disposable medical mask in public places ( $68.35\%$ ); intake of vitamins ( $63.06\%$ ); going in for sports ( $46.49\%$ ); gargling of the oral cavity and treating teeth ( $42.24\%$ ) (fig. 3). There are also people who do not carry out preventive activities ( $8.15\%$  in average).

When signs of flu and (or) ARVI occur, over half of adult population do not go to work ( $54.07 \pm 3.03\%$ ), about  $41.11 \pm 2.99\%$  do not work always depending on the severity of their condition.  $83.33 \pm 2.27\%$  of parents do not send their children to schools, kindergartens, clubs and groups when signs of ARVI occur. Over half of students and schoolchildren ( $74.91 \pm 1.3\%$  and  $60.4 \pm 4.87\%$  respectively) attend an educational institution depending on their well-being, results of examinations and tests ( $p < 0.05$ ). In case of flu and ARVI, over half of all respondents refer to a doctor depending on severity

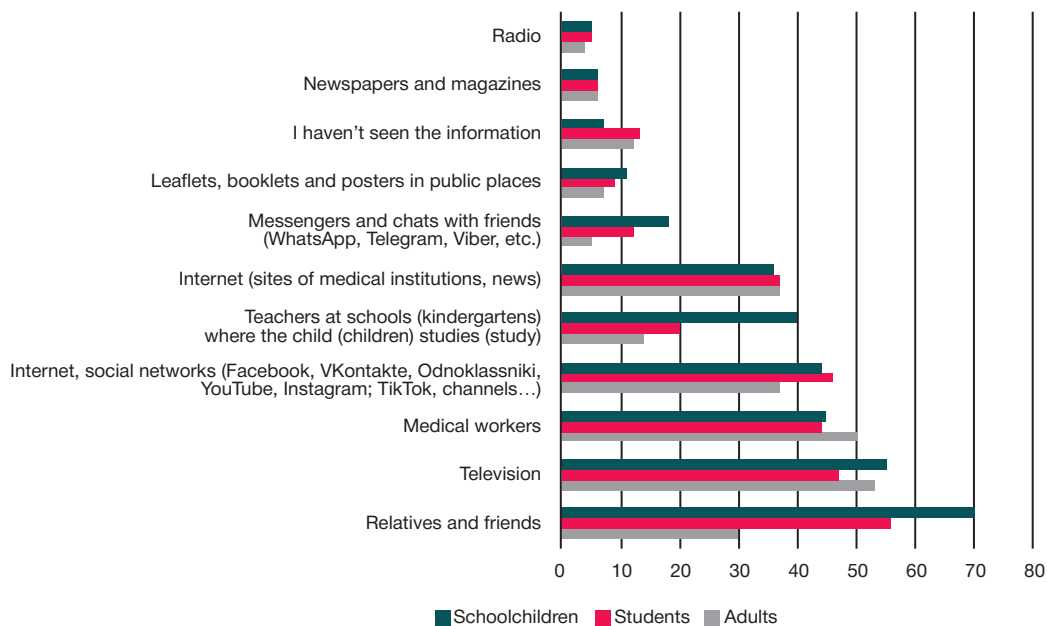


Fig. 4. Sources of useful information related to prevention of flu and ARVI, %

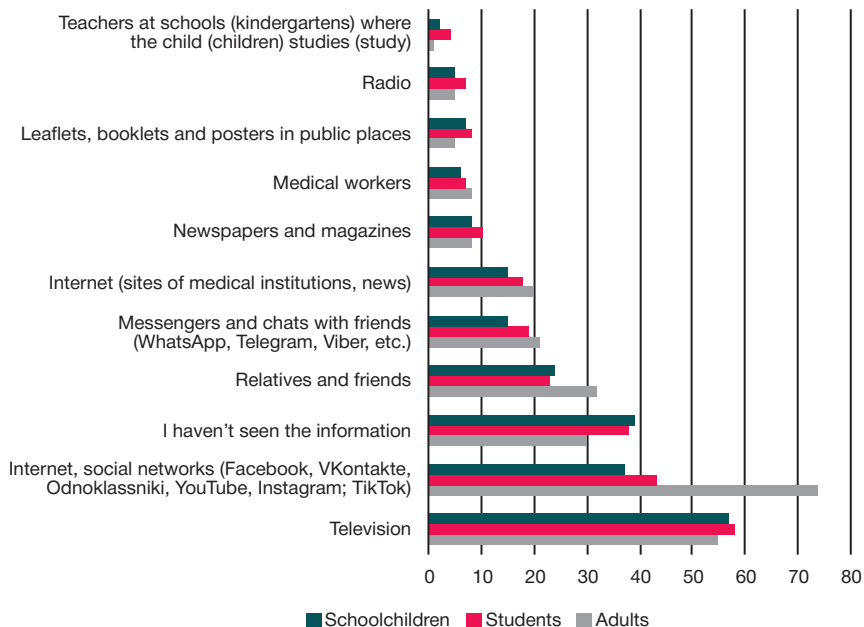


Fig. 5. Sources of negative information about flu and ARVI vaccine prevention, %

of their condition ( $61.48 \pm 2.96\%$  of adults,  $65.38 \pm 1.43\%$  of students and  $54.46 \pm 4.96\%$  of schoolchildren) ( $p < 0.05$  among students and schoolchildren). About  $34.65 \pm 4.76\%$  of schoolchildren always ask for medical assistance, whereas  $23.33 \pm 2.57\%$  of adults never do the same.

Regarding sufficiency of reliable information about methods of flu and ARVI prevention, a positive response was provided by  $65.56 \pm 2.89\%$  of adults,  $59.26 \pm 1.47\%$  of students and  $40.59 \pm 4.89\%$  of schoolchildren ( $p < 0.05$  for schoolchildren as compared with adults and students),  $8.96\%$  in every group gave a negative response, whereas all the others found it difficult to answer. In all three groups, useful information is obtained mainly through TV ( $52.96 \pm 3.04\%$  for adults,  $47.21 \pm 1.5\%$  for students,  $55.45 \pm 4.95\%$  for schoolchildren) (fig. 4). The next source is represented by medical workers ( $50.0 \pm 3.04\%$ ,  $43.53 \pm 1.49\%$  and  $44.55 \pm 4.95\%$  respectively), social networks ( $37.41 \pm 2.94\%$ ,  $45.68 \pm 1.49\%$  and  $43.56 \pm 4.93\%$  respectively), sites of medical institutes

( $37.41 \pm 2.94\%$ ,  $36.6 \pm 1.44\%$  and  $35.64 \pm 4.77\%$  respectively) ( $p > 0.05$ ). Students ( $55.67 \pm 1.49\%$ ) and schoolchildren ( $70.3 \pm 4.55\%$ ) obtain the most significant part of prevention-related data from relatives and friends as compared with adults ( $29.63\%$ ,  $p < 0.05$ ). Those requested also include persons who didn't obtain prevention-related data:  $12.22 \pm 1.99\%$  for adults,  $12.68 \pm 1.0\%$  for students, and  $6.93 \pm 2.53\%$  for schoolchildren.

As far as all information sources go, population has the most trust in medical workers ( $69.26 \pm 2.81\%$  of adults,  $63.13 \pm 1.45\%$  of students,  $59.41 \pm 4.89\%$  of schoolchildren) ( $p > 0.05$ ), relatives and friends ( $23.7 \pm 2.59\%$ ,  $46.4 \pm 1.5\%$  and  $53.47 \pm 4.96\%$  respectively) ( $p < 0.05$  for adults as compared to students and schoolchildren).

According to the results of questioning, the leading sources of negative information about vaccine prevention include television, social networks, and data obtained from relatives and friends (fig. 5). The leading positions regarding provision of

negative information are occupied by television: the fact was noted by  $54.81 \pm 3.03\%$  of adults,  $58.36 \pm 1.48\%$  of students and  $57.43 \pm 4.92\%$  of schoolchildren. All three groups obtained negative data through the social networks: adults ( $74.44 \pm 2.65\%$ ), students ( $43.17 \pm 1.49\%$ ) and schoolchildren ( $36.63 \pm 4.79\%$ ) ( $p < 0.05$  for adults as compared with students and schoolchildren). The next source of information is presented by relatives and friends who provided negative data noted by  $31.85 \pm 2.84\%$  adults,  $22.75 \pm 1.26\%$  students and  $23.76 \pm 4.24\%$  schoolchildren. At the same time, those surveyed include persons who did not come across negative data about vaccine prevention:  $30.37 \pm 2.8\%$  in adults,  $37.77 \pm 1.45\%$  in students,  $38.61 \pm 4.84\%$  in schoolchildren ( $p < 0.05$  among adults and students).

## DISCUSSION OF RESULTS

The most frequently used methods of non-specific prevention for citizens of Yekaterinburg include as follows: washing hands when returning from the streets, regular ventilation, use of a disposable medical mask in public places, intake of vitamins. As compared with literature data from studies of Rakhmanova OV, Podkopaeva DS, Barteneva AA and Churilova MO 'Adherence of students from the Kursk State Medical University to flu and ARVI prevention', frequency of these activities against pandemic of novel coronaviral infection significantly increased (by 20–25% in average) [4].

## CONCLUSIONS

Thus, according to the survey, those from Yekaterinburg had a high incidence of flu and ARVI, especially students and schoolchildren. The majority of those surveyed believe that flu is a disease spread with cough and sneeze from sick to healthy

persons. Possible complications make it dangerous. Many respondents believe that periodic vaccination is important as those vaccinated will have a mild disease without complications.

About half of population have a neutral position to vaccination with a positive attitude being greater in adults and children. Adults are vaccinated less commonly, but over half of them vaccinate their children. The majority of those surveyed felt no changes in well-being after vaccination and suffered from flu and ARVI less frequently.

The schoolchildren who did not undergo vaccination refused to do so due to a lack of parental consent and fear of manifestations of diseases and complications. A significant number of adults and students believe that vaccination is useless if used for preventive purposes.

If signs of flu and ARVI are available, over the half of adults do not go to work and ask for medical assistance irrespective of their condition. Schoolchildren and students go to an educational institution depending on their well-being, tests and examinations.

The majority of respondents from every group believe they are well aware of preventive methods and obtain such information mainly via TV, social networks and medical workers, whereas students do the same through their relatives. At the same time, the majority of them come across negative data about vaccine prevention of flu and obtain the info through television, social networks, relatives and friends.

These results are illustrative of insufficient hygienic literacy and adherence of population to the measures of specific and non-specific prevention of flu and ARVI. To improve the situation, not just hygienic education of population is required, but also education of medical workers, parents, educators, journalists and mass media correspondents regarding prevention of flu and ARVI, accessibility of vaccine prevention centers, and consultations by pediatricians and therapists on the issues of specific prevention.

## References

1. Shahtahinskaja FCh, Namazova-Baranova LS, Fedoseenko MV, Kaljuzhnaja TA. Aktual'nye voprosy vakcinoprofilaktiki gripa. Voprosy sovremennoj pediatrii. 2021; (20–4): 333–337. Russian.
2. Alimov AV, Jurovskih AI, Slobodenjuk AV, Markarjan AJu, Prokopeva JeR, Koltunov SV, et al. Jepidemicheskij process gripa v Ekaterinburge (2016–2017 gg.). Ural'skij medicinskij zhurnal. 2017; (07): 54–57. Russian.
3. Kostinova MP, Chuchalina AG. Prioritetnaja vakcinacija respiratornyh infekcij v period pandemii SARS-CoV-2 i posle ee zavershenija. Moskva, 2020. Russian.
4. Rahmanova OV, Podkopaeva DS, Barteneva AA, Churilova M. O. Privержennost' studentov Kurskogo gosudarstvennogo medicinskogo universiteta k profilaktike gripa i ORVI. Vnutrennie bolezni. 2020; (2): 44–50. Russian.

## Литература

1. Шахтаhtинская Ф. Ч., Намазова-Баранова Л. С., Федосеев М. В., Калюжная Т. А. Актуальные вопросы вакцинопрофилактики гриппа. Вопросы современной педиатрии. 2021; (20–4): 333–337.
2. Алимов А. В., Юровских А. И., Слободенюк А. В., Маркарян А. Ю., Прокопьева Э. Р., Колтунов С. В. и др. Эпидемический процесс гриппа в Екатеринбургe (2016–2017 гг.). Уральский медицинский журнал. 2017; (07): 54–57.
3. Костинова М. П., Чучалина А. Г. Приоритетная вакцинация респираторных инфекций в период пандемии SARS-CoV-2 и после ее завершения. Москва, 2020.
4. Рахманова О. В., Подкопаева Д. С., Бартенева А. А., Чурилова М. О. Приверженность студентов Курского государственного медицинского университета к профилактике гриппа и ОРВИ. Внутренние болезни. 2020; (2): 44–50.