

ISSUES OF PROFESSIONAL HYGIENIC TRAINING OF CHILD SUPERVISORS AND EDUCATORS

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Professional hygienic training and certification of specialists employed in the fields associated with epidemiological hazards are of great practical importance. The level of sanitary literacy of those exposed to epidemiologically significant factors determines the sanitary and epidemiological conditions in the respective facilities. This study aimed to gauge the said level among those employed in the field of children's education and upbringing. By design, the study was applied, single-center, cross-sectional, and selective. The object of the study was the staff of a facility with inherent epidemiological risks (child educators and supervisors), and the subject of the study was their level of sanitary literacy. The work lasted for 6 calendar months, until the sample reached the required size needed to reliably calculate the level of sanitary literacy of the staff expressed as means based on the test results. The methods of medical statistics were used for the analysis of the study's results. We discovered that the level of sanitary literacy of persons whose professional activities are related to the upbringing and education of children is low (the average amount of correct answers to the test questions was 65%), and identified attributes influencing the educational process: mode of attendance, gender, age, frequency of training, job title groups.

Keywords: hygienic education, hygienic upbringing, professional hygiene training, hygiene of children and adolescents, level of sanitary literacy

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Compliance with ethical standards: the study was approved by the Ethics Committee of the Burdenko Voronezh State Medical University (protocol No. 1 dated February 29, 2024). The respondents were informed about the purpose of the study (the informed consent paper prepared and distributed).

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ВОПРОСЫ ПРОФЕССИОНАЛЬНОЙ ГИГИЕНИЧЕСКОЙ ПОДГОТОВКИ РАБОТНИКОВ, ЗАНЯТЫХ В СФЕРЕ ВОСПИТАНИЯ И ОБУЧЕНИЯ ДЕТЕЙ

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Большое практическое значение имеют профессиональная гигиеническая подготовка и аттестация сотрудников эпидемиологически значимых объектов. От уровня санитарной грамотности лиц, контактирующих с эпидемиологически значимым фактором, зависит санитарно-эпидемиологическая обстановка на объекте, что может быть выявлено при осуществлении контрольно-надзорной деятельности. Целью исследования было определить уровень санитарной грамотности сотрудников, занятых в сфере обучения и воспитания детей. Исследование было прикладным, одноцентровым, поперечным и выборочным. Объектом исследования стал персонал эпидемиологически значимого объекта, чья профессиональная деятельность связана с воспитанием и обучением детей, а предметом исследования — уровень санитарной грамотности персонала. Продолжительность исследования составила 6 календарных месяцев, до получения необходимого размера выборки, позволившего достоверно рассчитать уровень санитарной грамотности персонала, выраженный через средний балл по результатам тестирования. Оценку полученных результатов осуществляли, используя методы медицинской статистики. Согласно результатам исследования, уровень санитарной грамотности лиц, чья профессиональная деятельность связана с воспитанием и обучением детей, может быть охарактеризован как низкий (в среднем 65% верных ответов). Выявлены признаки, влияющие на образовательный процесс: форма обучения, половая принадлежность, возрастная группа, периодичность подготовки, группа должностей по отношению к трудовому процессу.

Ключевые слова: гигиеническое обучение, гигиеническое воспитание, профессиональная гигиеническая подготовка, гигиена детей и подростков, уровень санитарной грамотности

Вклад авторов: И. А. Мызникова — проведение исследования уровня санитарной грамотности сотрудников эпидемиологически значимых объектов, обзор литературы, сбор и анализ литературных источников, написание и редактирование текста статьи; И. И. Механтьев, Ю. И. Степкин — организация сбора первичных данных, редактирование текста статьи; И. Г. Ненахов — редактирование текста статьи. Все авторы подтверждают соответствие своего авторства международным критериям ICMJE (все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией).

Соблюдение этических стандартов: исследование одобрено этическим комитетом ФГБОУ ВО «Воронежский государственный медицинский университет имени Н. Н. Бурденко» (протокол № 1 от 29 февраля 2024 г.). Респонденты были ознакомлены с целью проведения исследования (разработан и оформлен опросник «информированное согласие»).

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Hygienic education of the population, an activity well-known in medicine, is of great practical importance [1–4].

Professional hygiene training and certification is an integral component of the system of hygiene education in the Russian Federation and some post-Soviet countries [5–10]. The key to professionals hygienic training is the transfer of systemic sanitary and epidemiological knowledge to the specialists working at epidemiologically significant facilities, i.e., those that deal with production, storage, transportation, and sale of food and drinking water, as well as education and training of children and adolescents, provisions of public utility and household services, as given in the Russian Federation Healthcare Ministry Order 229 of June 29, 2000 "On professional hygienic training and certification of officials and employees of organizations" [11].

For an employee, professional hygiene training is several hours of education followed by certification (in the form of testing or a survey) [5], the results of which are necessarily recorded by the organization providing the said training. Using the data collected by the Center of Hygiene and Epidemiology in the Voronezh Oblast, we analyzed the figures of post-training testing of three groups of students (different job profiles) who studied during the period from 2018 through 2023. The analysis revealed the lowest rate of successfully completed certification in the child educators and supervisors group, which justified further research.

This study aimed to assess the level of sanitary literacy among child educators and supervisors, as it is defined and classified in the Russian Federation Healthcare Ministry Order 229 of June 29, 2000, and to identify the dependence of the said level on factors of the learning process (hereinafter referred to as attributes): mode of attendance, gender, age group, frequency of sessions, job title groups.

METHODS

By design, the study was applied, single-centered, cross-sectional, and selective. Under the concept, it did not employ a control group.

The pattern of the research activities included several stages:

- preparatory stage (study design development, preparation of materials);
- pilot study (determination of the preliminary sample size; at this stage, we calculated the share of the specialists that passed the test (the indicator) in order to find out the sample size that would guarantee statistical significance);
- assessment of the level of sanitary literacy of the specialists working at epidemiologically significant facilities (questionnaire survey);
- processing of the results of the study.

The inclusion criteria were employment at facilities with extremely high, high, significant, medium, moderate, and low epidemiological risk (according to Methodological Recommendations 5.1.0116-17 "Risk-oriented model of control and supervisory activities in the field of sanitary and epidemiological welfare. Classification of economic entities, types of activities and objects of supervision by health hazard potential in the context of planned control and supervisory activities" [12]); employment as child educator and/or supervisor; consent to participate in an anonymous survey.

The core Center of Hygiene and Epidemiology in the Voronezh Oblast and its 8 branches in the districts of the region provided data for the study.

The sample can be considered homogeneous in terms of the level of residual knowledge, since private medical organizations rely on the training materials developed

and recommended by the Center of Hygiene and Epidemiology in the Voronezh Oblast when training their staff.

The planned and actual duration of the study, including the stage of results generalization and statistical processing, was from February to July 2023.

Using the methodological base of the Center of Hygiene and Epidemiology in the Voronezh Oblast, we designed questionnaires to gauge the level of sanitary literacy of the respondents (10 questions), and prove/disprove the hypothesis about the influence of the aforementioned attributes on the said indicator. The questionnaire tasks were approved by the Central Methodological Council of the Burdenko Voronezh State Medical University.

Depending on the choice of the respondents, the questionnaire was supplied on paper (with subsequent collection thereof after filling out) or in the digital form, made using the Yandex.Forms service. The maximum time for completing the tasks was 30 minutes, the limitation controlled by the person who collected the primary data.

In this study, the level of sanitary literacy of the specialists working at epidemiologically significant facilities was the key indicator, since it was organized to assess it.

The attributes suggested as influencing the said level (mode of attendance, gender, age group, frequency of sessions, job title group) were acknowledged as additional indicators.

In the course of the study, we formed the following groups of respondents:

- specialists who received professional hygiene training and underwent certification, and specialists trained in the context of the summer health improvement campaign;
- mode of attendance: full-time, mixed, distance;
- male and female specialists;
- age groups: ≤ 20 years old, 21–35 years old, 36–60 years old, 61–75 years old;
- employees attending training sessions once a year and every two years;
- job title groups: support staff, management personnel exposed to an epidemiologically significant factor, immediate doers of the work the facility is designed for.

In case the questionnaire was filled out on paper, we tallied the results using the codifier; questionnaires filled in the Yandex.Forms service returned the total score automatically.

The principles behind the sample size: since the general totality, i.e., the number of employees of epidemiologically significant facilities engaged in child education and supervision, is remains unknown, the sample size was set at 400 people, as yielded by the methods developed by K.A.Otdelnova and V.I. Paniotto, and as per the calculation (with statistical error at 5%, the calculation suggests the sample size of 236 respondents, which makes 400 a more reliable figure) [13].

The results were processed with the help of MyOffice software (New Cloud Technologies; Russia), using the Pearson's chi-squared test (χ^2), with $p < 0.01$.

RESULTS

The sample consisted of 477 people [13] working in organizations rendering services "education and training of children and adolescents." Inviting the participants, we took into account their direct contact with the epidemiologically significant factor.

Thus, the analysis of the sample following distribution of the respondents into groups, yields the following ratios:

- specialists who received professional hygiene training and underwent certification — 385 individuals (80.7%,

Table 1. Testing results by mode of attendance

Mode of attendance	Average score	Respondents in the group, people, total	Respondents who passed the initial test, people	Respondents who passed the initial test, %
Full-time	6.2	122	57	46.7
Mixed	7.2	196	130	66.3
Distance	6	159	52	32.7

and specialists trained in the context of the summer health improvement campaign — 92 individuals (19.3%);

– specialists that studied full-time — 122 persons (25.6%), practiced mixed mode of attendance — 196 people (41.1%), took part in distance courses 159 individuals (33.3%);

– number of male specialists — 47 persons (9.9%), female 430 persons (90.1%);

– number of people in the ≤ 20 years age group — 78 (16.4%), in the 21–35 years age group — 2116 (4.4%), in the 36–60 years age group — 271 (56.8%), in the 61–75 years age group — 12 (2.5%);

– employees attending training sessions once a year — 92 individuals (19.3%), every two years — 385 persons (80.7%);

– number of support staff representatives — 77 (16.1%), management personnel exposed to an epidemiologically significant factor — 17 persons (3.6%), immediate doers of the designated job — 383 people (80.3%).

The study has shown that the average level of sanitary literacy among specialists involved professionally in education and supervision of children was 6.5 points out of 10.0 possible (65% of correct answers). A parallel study investigated the level of sanitary literacy among those whose job is associated with the production, storage, transportation and sale of food, drinking water, as well as public utilities and household services; they have shown the average scores of 7.9 out of 10.0 (79% correct answers) and 6.6 out of 10.0 (66% correct answers). Thus, those charged with educating and supervising children scored the lowest.

Table 1 presents the calculated values of indicators "percentage of respondents who passed the initial test, %" and "average score" for each group, depending on the mode of attendance. A participant that scored 7.0 out of 10.0 was considered to have passed the test.

To identify significant differences between the groups for the "respondents who passed the initial test, people" indicator, we applied the χ^2 test ($\chi^2_{\text{calc}} = 40.446$, $\chi^2_{\text{table}} = 9.21$, the relationship between factorial and effective attributes considered significant at $p < 0.01$, with 2 degrees of freedom).

Table 2 presents the calculated values of indicators "percentage of respondents who passed the initial test, %" and "average score" for each group, depending on the age.

To identify significant differences between the groups for the "respondents who passed the initial test, people" indicator, we applied the χ^2 test ($\chi^2_{\text{calc}} = 48.032$, $\chi^2_{\text{table}} = 11.345$, the relationship between factorial and effective attributes considered significant at $p < 0.01$, with 3 degrees of freedom).

Table 3 presents the calculated values of indicators "percentage of respondents who passed the initial test, %" and "average score" for each group, depending on the frequency

of sessions. It should be noted that for child educators and supervisors, the frequency of training is determined by the character of their job: those engaged in the summer health improvement campaign are actually trained once a year, while professional hygiene training for them is organized every two years.

To identify significant differences between the groups for the "respondents who passed the initial test, people" indicator, we applied the χ^2 test ($\chi^2_{\text{calc}} = 13.957$, $\chi^2_{\text{table}} = 6.635$, the relationship between factorial and effective attributes considered significant at $p < 0.01$, with 1 degree of freedom).

Table 4 presents the calculated values of indicators "percentage of respondents who passed the initial test, %" and "average score" for each group, depending on the job title (as per OK 016-94. Russian national classifier of professions and tariff categories).

To identify significant differences between the groups for the "percentage of respondents who passed the initial test, %" indicator, we applied the χ^2 test ($\chi^2_{\text{calc}} = 39.913$, $\chi^2_{\text{table}} = 9.21$, the relationship between factorial and effective attributes considered significant at $p < 0.01$, with 1 degree of freedom).

Application of the χ^2 test to the gender data of the respondents revealed that it had no effect in their level of sanitary literacy.

Among the undesirable events, we considered erroneous filling out of questionnaires intended for the mentioned parallel study that involved other professional groups (production, storage, transportation and sale of food products, drinking water; public utilities and household services). There were 43 such forms in total, they were discarded from the processed batch.

DISCUSSION

The overall level of sanitary literacy of the specialists engaged in child education and supervision was 65%, i.e., on average, the respondents answered correctly to 6.5 questions out of 10.0.

Findings based on the attributes:

– the number of specialists that have passed the test was the highest in the mixed mode of attendance group, same as the average score;

– the fewest number of respondents who have passed the test was in the 61–75 years old age group;

– the largest number of respondents who have passed the test was in the group that was trained hygiene every two years;

– the largest number of respondents who have passed the test was in the "support staff" group, the smallest — in the "immediate doers of the job" group.

The most practically significant indicator was the level of sanitary literacy, expressed in terms of the average test score.

Table 2. Testing results by age group

Age group	Average score	Respondents in the group, people, total	Respondents who passed the initial test, people	Respondents who passed the initial test, %
≥ 20 years old	7.3	30	30	100
21–35 years old	6.8	116	58	50
36–60 years old	7.9	271	149	54.9
61–75 years old	4.5	54	2	3.7

Table 3. Testing results by frequency of training sessions

Frequency of sessions	Average score	Respondents in the group, people, total	Respondents who passed the initial test, people	Respondents who passed the initial test, %
Once a year	5.9	92	30	32.6
Every two years	6.7	385	209	54.3

Table 4. Testing results by job title group

Job title group	Average score	Respondents in the group, people, total	Respondents who passed the initial test, people	Respondents who passed the initial test, %
Support staff	7.7	77	58	75.3
Management personnel exposed to an epidemiologically significant factor	6.5	17	6	35.3
Immediate doers of the work the facility is designed for	6.3	383	175	45.7

The registered value of 6.5 out of 10.0 is below the successful passing threshold of 7.0.

The data yielded by the statistical processing of the study results cannot be considered as random, since they are backed by a sufficient sample size calculated using three methods, and by the following judgments:

- the mixed mode of attendance has proven to be the most effective, since, in the context of a professional hygiene training, the student can not only to consult with the teacher in person, but also study independently using the materials provided; distance learning has proven to be the least effective [14–16];

- specialists belonging to the 61–75 years old age group form the most vulnerable cohort in terms of professional hygiene training;

- the highest average score was registered for the specialists that are trained hygiene every two years, probably because those tested once a year participate in distance learning courses primarily, which was also discovered by the study;

- the "immediate doers of the job" group scored the lowest in the test, which may be due to the higher complexity of the educational program compared to other groups, since each job title receives an individual program.

One of the limitations of this study is the lack of data (both in official sources and medical literature) on the number

of people working at epidemiologically significant facilities in the country in general and Voronezh Oblast in particular [7, 8].

In addition, the developed methodology for determining the level of sanitary literacy of employees of epidemiologically significant facilities stems from the data provided by the Center of Hygiene and Epidemiology in the Voronezh Oblast (including test tasks), however, there have been set up no studies to confirm the validity of test tasks used to certify the results of professional hygiene training.

CONCLUSIONS

This study allowed assessing the level of sanitary literacy of child educators and supervisors as low, and helped identify and analyze the main factors (attributes) affecting the educational process and the ultimate residual level of knowledge. Thus, in the context of professional hygiene training, people belonging to the 61–75 years old age group form the most vulnerable cohort, same as the "immediate doers of the job" group, and the most effective mode of attendance is mixed.

The developed and tested study model and the data obtained can be used for optimization of the process of professional hygienic training and certification of employees of epidemiologically significant facilities.

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