



The Opinion of Dental Technology Students about the Harmful Effects of the Materials Used During Practical Training and Means of Prevention

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ABSTRACT: In the process of training in the special academic disciplines dental technology students are exposed to the harmful effects of various materials, volatile substances and dust particles. All of above can cause allergies, diseases of the respiratory system, neurological diseases, etc. The purpose of the present article is to study whether the students of the "Dental Technician" Educational Sector are familiar with the fact that some of the materials used in their practical training have a harmful effect on the body as well as to give information about means of prevention students can use. A sociological method using a specially designed for the purpose questionnaire was used to achieve the goal of this scientific study. The survey was conducted using Google forms in June 2023 and was distributed among first, second and third year (62.39 % in the study stage) Dental Technology students at the Medical College subordinate to the Medical University of Varna. For the presentation of the results a graphical analysis was used. It was found that a very large number of students know about the harmful effects of some of the materials they work with and more than half of them are worried about their health; not all of the students use protective equipment and there are some who do not use protective equipment at all (12.20 %). The following recommendations have been made to the educational institution and to the respondents based on the results, the conclusions and the students' suggestions: it is recommended that the educational laboratories are equipped with a central and individual aspiration system (for each working space), aspiration above worktops and fireplaces, hoppers for crushing the packaging mass when releasing the cast dental structure; students are also advised to use personal protective equipment – uniforms, protective gloves, glasses, masks, helmets.

KEYWORDS: Education, Harmful Substances, Research, Students.

INTRODUCTION

Harmful substances can have serious effects, such as poisoning, long-term impairments, such as lung diseases (asthma and silicosis), work-related cancers (lung cancer, mesothelioma, leukemia, etc.), allergic, skin diseases, reproductive problems, etc. It is extremely important that these risks are preventable and adequate preventive and prophylactic activities can contribute to improving the health condition of workers and can also save their lives [4].

Some chemical agents can be identified as risk factors mainly in cases of occupation related exposure to hazardous effects [3].

Dental technicians are exposed to the harmful effects of various materials at the early stage of their training in the special academic disciplines. Some examples include acids, ceramic masses, alcohol, wax substances, gypsum, plastics, silicones, sands for sandblasting, hardeners for plaster models, polishing pastes, various metal alloys, etc. Harmful fumes, gases and dust particles are released during the educational work process [5]. Work in educational dental laboratories must be organized in such a way which will prevent or minimize the harmful effects on each student. The above mentioned substances can be the cause of allergies, diseases of the respiratory system, neurological diseases, etc. [6].

The following factors can be mentioned as unfavorable in the work process:

- different types of plaster, ceramic and packing materials, sand for sandblasting, polishing pastes, carborundum separators – dust particles, which can be inhaled and cause various diseases, are released;
- metal alloys used during the manufacture of some removable and non-removable denture structures. They can contain gold, silver, platinum, chromium, nickel, molybdenum, titanium, cobalt, etc. During their melting and processing, air pollution occurs and there is a possibility of inhaling gases and fine dust particles;
- plastics (monomer - methyl methacrylate, polymer - polymethyl methacrylate and polyamides) – they are used in the manufacture of prosthetic structures;



- laboratory A and C silicones consisting of a base and a catalyst which have a carcinogenic effect;
- alcohol, waxes, hardener for gypsum pollute the working environment through harmful vapors which are inhaled.

Methyl methacrylate is a cellular poison. It is irritating for the eyes, skin and upper respiratory tract and should be handled with gloves in the presence of ventilation [1]. It also penetrates through latex gloves in 1 minute, through nitrile gloves in 5 minutes, through butyl gloves in 15 minutes, through three-layer PVP gloves in 20 minutes. The presence of polyethylene outer and inner layers and a middle layer of ethylene vinyl copolymer provides better protection but ultimately no type of gloves is completely impenetrable. Ordinary safety glasses or shields do not protect against the fumes of the polymer products. It is recommended that laboratories be equipped with vacuum suction ventilation or aspirators with negative pressure when working with methacrylate monomers. People working with composite materials should be instructed and trained how to deal with the ways of increasing the frequency and volume of ventilation and the reduction of the exposure. Protective masks filter about 40% of dust particles [3].

John and Kezic (2017), which Lyapina cites, point out that the main problems in terms of practical actions are still few and isolated and prevention programs are insufficiently validated [2,3].

The implementation of adequate preventive measures is often difficult due to the lack of information and awareness among the workers regarding the risk factors for the health and the development of diseases [3].

AIM

The purpose of the present article is to study whether the students of the "Dental Technician" Educational Sector are familiar with the fact that some of the materials used in their practical training have a harmful effect on the body as well as to give information about means of prevention students can use.

MATERIALS AND METHODS

A sociological method using a specially designed for the purpose questionnaire as well as research of literary sources concerning the subject were used in order to achieve the goal of this scientific study. The survey was conducted using Google forms in June 2023 and was distributed among first, second and third year Dental Technology students at the Medical College subordinate to the Medical University of Varna. For the presentation of the results a graphical analysis was used.

RESULTS AND DISCUSSION

The sample includes 62.39% of students in the study stage (first-year students – 34.15%, second-year students – 69.23% and third-year students – 86.49%).

In the process of their practical training dental technology students use various materials, some of which are dangerous for their health. For this reason, at the beginning of each academic year a safety briefing is held in the classrooms. Explanations about the need of personal protective equipment, aspirants, work with electrical appliances and devices as well as about open heat sources are provided.

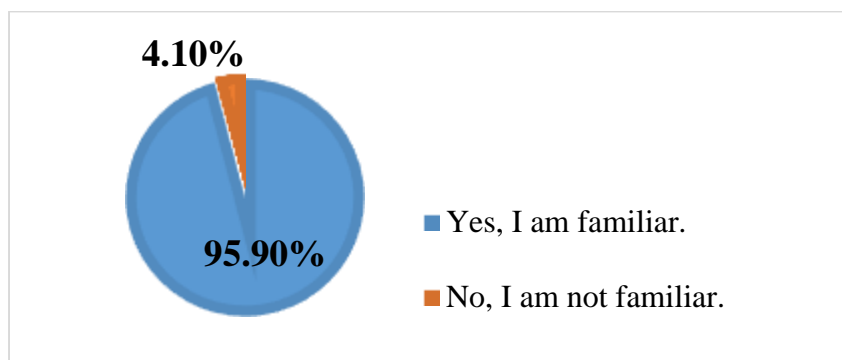


Figure 1. Students' awareness of the harmfulness of the materials they work with.

The survey found that a very large proportion of students know that some of the materials they work with are harmful to their health. It may be considered that the briefings on work safety have contributed to the good awareness of the students.



In order to investigate and check whether the students actually know what substances are harmful to their health, the researchers offered possible answers to choose from. Results exceed 100% because respondents had the opportunity to indicate more than one answer. The data are presented in Figure 2.

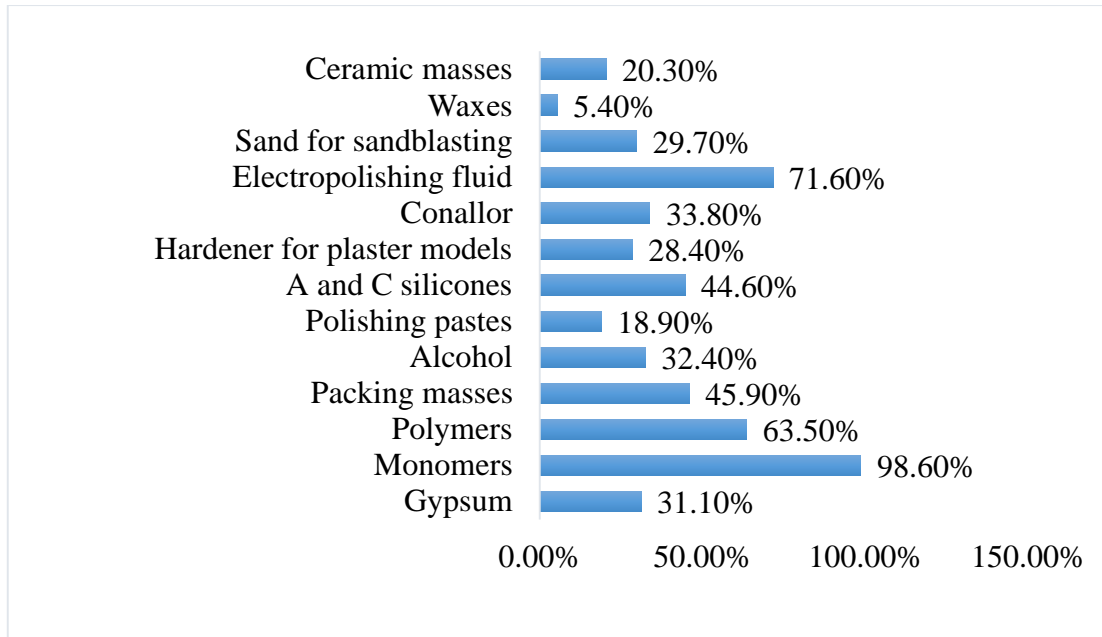


Figure 2. Students' opinion about substances harmful to health, which are used during practical activities.

A very large proportion of students rated monomers as the most harmful, followed by polymers, electropolishing fluid, packing compounds and silicones. The opinion expressed by the respondents shows a relatively good awareness of a larger part of the sample about the harmful materials that are used in the practical training of the special academic disciplines.

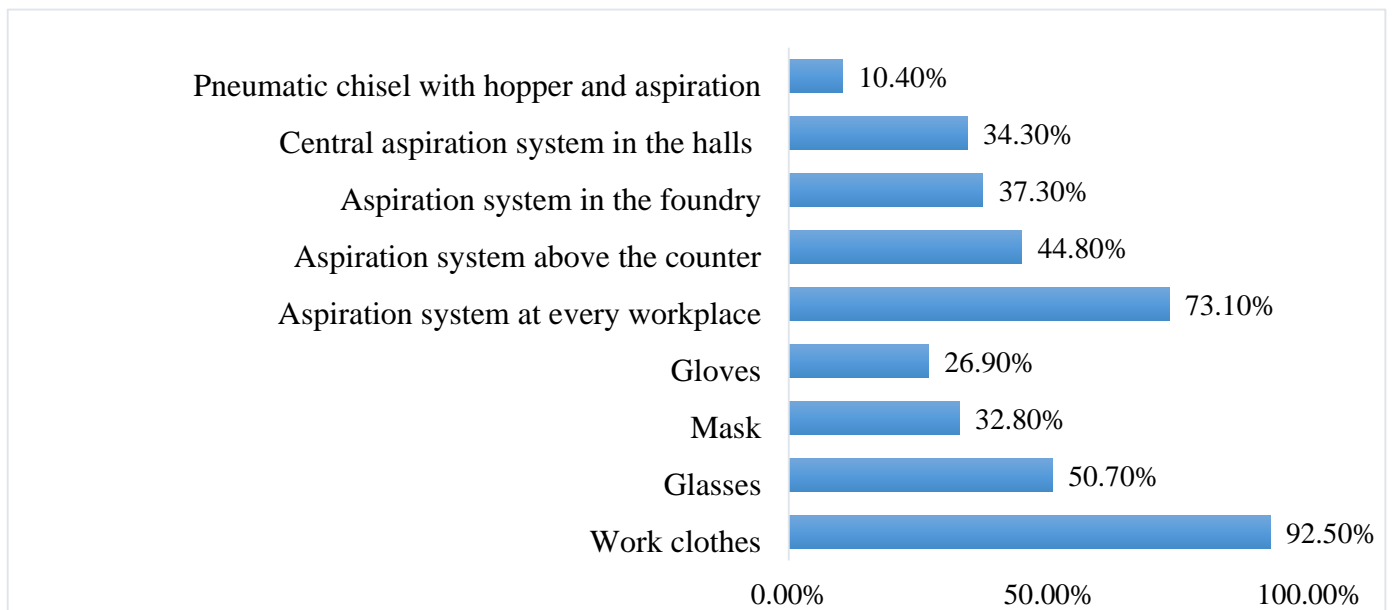


Figure 3. Means of prevention used by students.



The research found that all students agreed that it is necessary to take preventive measures to protect health during the practical activities. Despite their unanimous opinion, it turned out that not everyone uses protective equipment. The majority of respondents (87.80%) use protective equipment. The respondents who indicated "No" are a small part (12.20%) of first-year students. Perhaps these students are still unaware of the problem due to the initial stage of their study process.

The next question aims to find out the opinion of the respondents (87.80%) who answered positively about the prevention methods they use. The analysis is presented in Figure 3. Work clothing is mandatory, and therefore, most of the respondents indicate it as a means of prevention. Glasses are used by almost half of the respondents, and masks about one third of the respondents. Currently, work clothes, goggles, gloves and masks are purchased by the students themselves.

It is interesting to mention the opinion of some of the respondents, who indicate a central aspiration system in the halls and a pneumatic chisel with a hopper and aspiration, which are not available in the medical college. There are also no individual aspiration systems suited to each workplace as some of the students have pointed out. This shows that a large part of the respondents are not well informed. In general, the means of prevention used are at a relatively good level, but they are not sufficient.

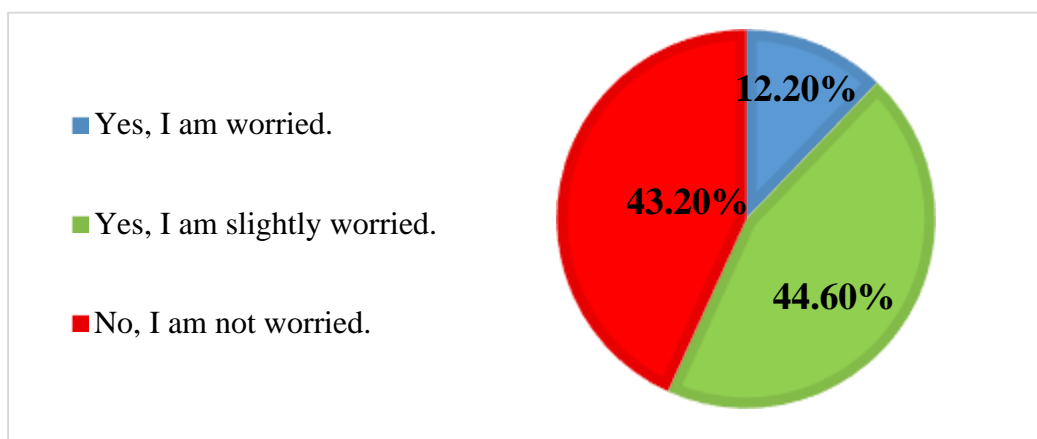


Figure 4. Students' concerns regarding their health.

It was found that more than half of students are worried about their health, which shows that they are informed about the dangers of harmful substances, but not all of them use sufficient means of personal protective equipment. The rest of the respondents, which are not a small part, are not worried about their health (44.60%). It is likely that they use protective equipment to the greatest extent or do not feel that they are exposed long enough to the harmful effects of the materials used during their practical training related to the special academic disciplines.

Respondents were asked to make recommendations for improving the prevention at the workspace areas in the college practice rooms. A small number have made recommendations that can be systematized:

1. To provide aspiration systems for each workplace and a central ventilation system for all spaces used for practical training of students in dental technology.
2. Safety glasses, masks and gloves should be mandatory, not recommendable.
3. Gloves and masks to be provided by the university.
4. To explain in more detail the possible harmful effects caused to health by materials used.

Despite the instruction on safety at work at the beginning of each academic year, Recommendation 4 shows that students need additional information about the possible diseases caused by the harmful effects of some of the materials.

CONCLUSIONS

The conducted research and its analysis led to the following conclusions:

1. A very large part of the respondents know about the harmful effects of the materials they work with.
2. Work clothes, an aspiration system and glasses are mainly used as means of prevention.



3. More than half of the students are worried about their health, but not all of them use sufficient means of protective equipment and there are some students who do not use protective equipment.

RECOMMENDATIONS

Based on the conclusions of the survey and the recommendations of the respondents, the following recommendations can be made to the educational institution and dental technology students:

1. To protect the health of students (when working in training laboratories) from vapors, gases and dust particles, it is recommended the training areas to be equipped with: central and individual aspiration systems (at each workplace); hoods above worktops or fireplaces; hoppers for crushing packaging mass when releasing the cast structure.
2. Masks and gloves to be purchased and provided by the university.
3. When working, students should use personal protective equipment: work uniform, protective gloves, glasses, masks, helmets.

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