

APPLICATIVE RESEARCH CONCERNING RISK IDENTIFICATION AND PREVENTION IN THE INTERNSHIPS OF STUDENTS IN POST-SECONDARY SCHOOLS OF NURSING

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Abstract: The internships of students in post-secondary schools of nursing entail exposure to risks that are specific for working in hospital units and constitute the subject of this research, through which I aimed to identify the frequency of occurrence and impact that these risks can have on the safety and health of the students. The research is comprised of two parts: a pilot study conducted at Cluj County-wide level and a research activity extended throughout the NW region, with a representative sample of respondents. As a result of identifying the risks that the students are exposed to in their internships, I will produce a set of tools that are applicable to the post-secondary schools of nursing and partnered hospital units, tools that focus on prevention and intervention, for the purpose of ensuring a safe learning environment for students.

Keywords: internship, risk factors, questionnaires, occurrence, impact

1 INTRODUCTION

Internships with economic agents ease students' transition from school to an active professional life. They offer employers opportunities to rigorously select future graduates for employment. They reinforce the partnership between school and labor market, aiding in the adaptation of professional training programmes to the latter's requirements. The educational institution and the economic agents are responsible for administering a risk prevention / reduction plan, which can allow

students to play their role, and create a healthy psychosocial workplace. By adopting an approachable and sensitive attitude and promoting a motivating working environment, the management will allow students to raise issues and encourage them to help with the identification of solutions.

The past year has seen a certain tendency taking shape, a tendency to decentralize decisions with major impact on the school environment, which has resulted in the need for the management of educational institutions to adapt to the new situation and make

increasingly more decisions. The constantly changed legislation, the uncertainty of the correctness of the decisions made, based as they are on legal documents that are subject to interpretation, and the increasing workload has forced additional pressure onto educational institutions and the safe conduct of the educational act. Simultaneously, this has raised the level of awareness in what concerns the risks (currently, more in what concerns the epidemiological risks) and their impact on community life, and also raised the amount of effort made to prevent them.

In our current epidemiological context, the organization of internships has become, to a very large degree, the responsibility of educational institutions, which are seeking viable solutions for the development of the students' practical competences, in circumstances where the economic agent is not willing to assume the risk of accepting students into their workplace.

After studying the risks that the students may be subjected to during their internship in hospital units, before and during the SARS-CoV-2 pandemic, I have developed and administered questionnaires for the identification of the most representative risks based on frequency of occurrence and the impact that they can have on the activity and health of the interns. In what concerns the students, the stress generated by the environment where the internship is carried out bears a stronger impact, as it also involves the incapacity to develop their practical competences, which negatively contributes to the failure in securing employment on the labor market in their field of study.

2 USING THE QUESTIONNAIRES IN THE ANALYSIS OF INTERNSHIP ACTIVITY AND INTERPRETING THE RESULTS OBTAINED FROM THEIR ADMINISTRATION

2.1 *Pilot study*

2.1.1 General considerations regarding the development of the questionnaires

Student internships are regulated by the orders of the Minister of Education, but the way that they are organized and conducted is left to the institution's management, the teaching staff and the partnered economic agents, as they involve a very varied array of qualifications and professions. Each party involved in the progress of the internship attempts to ensure the best working conditions, but remain subject to certain risk factors that can be prevented through a conscious attitude, aimed toward prevention first and intervention second.

Student interns are classified as "young workers," who must be supervised and guided permanently (*Securitatea lucrătorilor tineri – ghid pentru îndrumători* (The Safety of Young Workers – A Guide for Tutors)). The students' competences are developing, they commence their internships with a body of theoretical knowledge that must be transformed into an applicative, functional operation and, ultimately, into habit. Practical competences that are still undeveloped / partially developed, depending on the year of study, can generate risks, both for the students and the partnered economic agents.

There is also a psychological approach for risks, centered on the stress generated by the workplace environment and the space where the internship is carried out. Although numerous factors contribute to the mental health and well-being of workers in the workplace, there is proof according to which the working environment

bears a significant contribution in this regard. In a psychosocially adequate environment, the activity can be beneficial for the workers' mental health state, providing them with a structure in life and offering them a more profound feeling of social inclusion, identity and standing, as well as development opportunities and more confidence. On the other hand, a psychosocial environment which is inadequate for the workplace can have important negative effects on workers' health.

For the individual, the negative effects of poorly managed psychosocial risks include workplace stress, poor mental health, overexertion, concentration difficulties and frequent errors, personal issues, drug and alcohol abuse, and poor physical health, especially cardiovascular diseases and musculoskeletal disorders.

For the organization, the negative effects include generally meager economic results, increased absenteeism, increased presenteeism (coming to work when sick and being unable to function efficiently) and higher rates of accidents and injury. The periods of lack tend to be longer than those determined by other causes, and workplace stress can contribute to the increase in early retirement rates, especially among clerks.

In what concerns the students, the stress generated by the environment where the internship is carried out bears a stronger impact, as it also involves the incapacity to develop their practical competences, which negatively contributes to the failure in securing employment on the labor market in their field of study.

Thus, the risk factor categories analyzed within the proposed questionnaires are as follows:

- Risk factors related to working materials: the wear and tear of working devices and instruments; contact with toxic / flammable substances; direct contact with sharp, puncturing, slippery or contaminated surfaces;

contact with faulty electrical sources; fires; allergic and irritant responses to the protective gear;

- Risk factors related to the working environment: high levels of noise; the air temperature in the area where the activity is conducted (too high / too low); toxic gases, vapors and aerosols, microbes, viruses, bacteria; exposure to biological products; exposure to radiation;

- Risk factors related to the work task: the lack of training for emergency situations; constant need for sustained attention during work; physical (musculoskeletal) overexertion; poor communication with clients; inadequate transmission of work tasks to students (by barking them, with no explanations or details, no feedback);

- Risk factors related to the worker: giving workplace protection training reduced importance; failure to comply with the internship distribution carried out according to the competences gained; improper handling of devices and instruments; improper utilization of the protective gear; errors when enacting incident reporting procedures;

- Psychosocial risk factors: inordinate workload; excessively fast working pace; negative social behavior, such as violence, harassment, threats; monotony at work; insufficiently used competences.

2.1.2 Sample

For the pilot study, I have taken into consideration the administration of the questionnaires within Cluj County post-secondary schools of nursing and hospital units. The questionnaires were administered to 101 second- and third-year students from 3 Cluj County post-secondary schools of nursing, 16 internship coordinators from 4 Cluj County schools of nursing, and 20 internship tutors from 7 Cluj County healthcare facilities.

I believe that the sample can offer sufficient information for the development of the

extended research, being 42.97% relevant for the total of second- and third-year students, respectively, 76.19% relevant for the total of internship coordinators from the schools involved in the study.

2.1.3 Interpretation of the results

The statistical analysis and interpretation of the results has been carried out with the aid of the IBM SPSS Statistics 20 program.

The independent variable taken into consideration in this research was the category of respondents, with 2 modalities: students and internship coordinators / tutors

The t-test was used in order to pinpoint the differences between the ratings of the 2 groups. The result of the t-test is considered statistically significant when it exceeds the t-critical value, calculated with the aid of the SPSS program for $df=135$ (degrees of freedom) and significance level $p<.05$. The differences between the two groups were significant in what concerns the scores obtained for the following risk factors:

- Contact with toxic / flammable substances - frequency ($t= 2.051$; $p < .042$)
- Direct contact with sharp, puncturing, slippery or contaminated surfaces - frequency ($t= 2,141$; $p < .034$)
- Toxic gases, vapors and aerosols, microbes, viruses, bacteria - frequency ($t= 3,343$; $p < .001$)
- Exposure to biological products - frequency ($t= 3,592$; $p < .000$)
- Exposure to biological products - impact ($t = 2.438$, $p < .016$)
- Exposure to radiation - frequency ($t= 4,278$; $p < .000$)
- Exposure to radiation - impact ($t= 2.374$; $p < .019$)
- Inadequate transmission of work tasks to students (by barking them, with no explanations or details, no feedback) - frequency ($t= 2.844$; $p < .005$)
- Inadequate transmission of work tasks to students (by barking them, with no explanations

or details, no feedback) - impact ($t= 2.263$; $p < .025$)

- Failure to comply with the internship distribution carried out according to the competences gained - frequency ($t= -2.094$; $p < .038$)
- Improper handling of devices and instruments - frequency ($t= -3.024$; $p < .003$)
- Improper utilization of the protective gear - frequency ($t= -3.863$; $p < .000$)
- Inordinate workload - frequency ($t = - 3.127$; $p < .002$)
- Inordinate workload - impact ($t= -2.796$; $p < .006$)
- Excessively fast working pace - frequency ($t= -3.334$; $p < .001$).

These differences show that, in what concerns the abovementioned risk factor categories, the respondents from the 2 groups rate the questionnaire items differently, such that students believe that the following risk factors: contact with toxic / flammable substances; direct contact with sharp, puncturing, slippery or contaminated surfaces; toxic gases, vapors and aerosols, microbes, viruses, bacteria; exposure to biological products; exposure to radiation; inadequate transmission of work tasks to students (by barking them, with no explanations or details, no feedback) - occur more frequently than the internship coordinators and tutors consider. In what concerns the impact, the answers are different from the standpoint of statistical significance when it comes to the following risk factors: exposure to biological products; exposure to radiation; inadequate transmission of work tasks to students (by barking them, with no explanations or details, no feedback) - the students claim that these factors have a larger impact than the internship coordinators and tutors believe they do.

The internship coordinators and tutors, in comparison with the students, believe that the following risk factors have a higher frequency of occurrence: failure to comply with the internship

distribution carried out according to the competences gained; improper handling of devices and instruments; improper utilization of the protective gear; inordinate workload; excessively fast working pace; while, in what concerns the impact that they have, statistically significant differences appear between the 2 groups when rating the inordinate workload risk factor, which internship coordinators and tutors believe has a larger impact, in comparison with the students.

Through the analysis conducted on the questionnaire results, I have identified the risk factors with the highest frequency of occurrence and the largest impact on students during their internship activity. We can see that not all factors initially considered have an impact on the students' activity. In the Risk Factors Related to the Working Materials category, out of the six factors initially considered, four are relevant: The wear and tear of working devices and instruments; Contact with toxic / flammable substances; Direct contact with sharp, puncturing, slippery or contaminated surfaces; Allergic and irritant responses to the protective gear. In the Risk Factors Related to the Working Environment category, out of the five factors initially considered, two are relevant: Toxic gases, vapors and aerosols, microbes, viruses, bacteria; Exposure to biological products. In the Risk Factors Related to the Work Task category, out of the five factors initially considered, three are relevant: The lack of training for emergency situations; Constant need for sustained attention during work; Physical (musculoskeletal) overexertion. In the Risk Factors Related to the Worker category, all factors initially considered are relevant: Giving workplace protection training reduced importance; Improper handling of devices and instruments; Failure to comply with the internship distribution carried out according to the competences gained; Improper utilization of the protective gear; Errors when enacting incident reporting procedures. In the Psychosocial Risk Factors category, out of the five

factors initially considered, four are relevant: Inordinate workload; Excessively fast working pace; Negative social behavior, such as violence, harassment, threats; Insufficiently used competences.

2.1.4 Conclusions for the pilot study

Following the analysis and interpretation of the answers to the questionnaires, I have established the risk factors for each category, with an emphasis on the risk factors related to the worker. This choice is based on the ascertainment that students do not consider these risk factors to be of elevated frequency of occurrence or to bear an impact on them, while, on the other hand, the internship coordinators and tutors consider them to be risk generators. Psychosocial risk factors can also affect the mental health of the students, as well as the continuation of their studies, such that they require increased attention and coherent prevention strategies.

The results obtained in the pilot study allow the extension of the research to post-secondary schools of nursing throughout the NW region.

2.2 *Extended research*

2.2.1 Considerations regarding the modification of the questionnaires due to the conclusions of the pilot study

Following the analysis and interpretation of the answers to the questionnaires administered in the pilot study, I have established the risk factors for each category, with an emphasis on the risk factors related to the worker, because the students do not consider these risk factors to be of elevated frequency of occurrence or bear an impact on them, while, on the other hand, the internship coordinators and tutors consider them to be risk generators. Psychosocial risk factors can also affect the mental health of the students, as well as the continuation of their

studies, such that they require increased attention and coherent prevention strategies.

Thus, the questionnaire utilized in the pilot study has been modified in order to highlight the abovementioned categories.

2.2.2 Objectives, hypotheses and variables:

Objectives:

- The identification of the most important risks that may appear during internships, from the perspective of the possibility of occurrence and the impact that they have on students;
- The identification of measures to ensure the students' health and safety during their internship, at the level of educational institutions and partnered economic agents.

Hypotheses:

- The null hypothesis: The categories of risk factors identified by the two groups of respondents do not differ.
- The alternative hypothesis: The categories of risk factors identified by the two groups differ.

Variables:

- The independent variable: the category of respondents, with two modalities: students and internship coordinators / tutors.
- The dependent variable: the identified categories of risk factors, with five modalities: risk factors related to the working materials, risk factors related to the working environment, risk factors related to the work task, risk factors related to the worker, and psychosocial risk factors.

2.2.3 Sample

The questionnaires were administered to 404 third-year students training for the qualification of general nurse, 27 internship

coordinators from post-secondary schools of nursing in the NW area (the counties of Cluj, Zalău, Bihor, Bistrița-Năsăud, Maramureș, Satu Mare) and 21 internship tutors – nurses working in the hospitals where the students conducted their clinical internship. The sample is representative for the NW region, reflecting 34% of all third-year students in post-secondary schools of nursing, respectively 58% of all internship coordinators.

2.2.4 Interpretation of the results

The interpretation of the results was carried out with the aid of the SPSS program – the Box Plot diagram. Following the administration of the questionnaires to the students and the interpretation of the results, I have identified the most important risk factors, depending on the frequency of occurrence and the impact that they have on the students' activity, based on the Box Plot diagram.

I have compared each risk factor category, analyzed from the point of view of frequency of occurrence and impact according to the two modalities of the independent variable. I have identified the risk factors with an increased frequency of occurrence and impact on students, while taking into account the median, the upper quartile (Q3) and the interquartile range (IQR). This diagram is useful in showing the manner in which the values of the selection are dispersed around the median. This type of representation is used when the volume of the selection is large or when comparing two or more datasets.

The elements of the Box Plot diagram are:

- Vmin – the minimum value, the lowest value observed within the range of values, with the exception of aberrant values;
- Q1 – The lower quartile that delimits 25% of the values observed;
- Med – The median delimits 50% of the values (it is precisely in the middle of the interval between the minimum and maximum value);

- Q3 – The upper quartile delimits the largest 25% of the values observed;
- Vmax – The maximum value is the highest observed value, with the exception of aberrant values; IQR – The interquartile range – is the interval between Q3 and Q1. The IQR interval is graphically represented as a rectangle (cutie-box).

The aberrant values (outliers) are considered to be the values that are higher than $Q3 + 1.5 IQR$ or values lower than $Q1 - 1.5 IQR$.

In order to exemplify the utilization of the Box Plot diagram, I will present the situation for the Risk Factors Related to Working Materials Category.

Students:

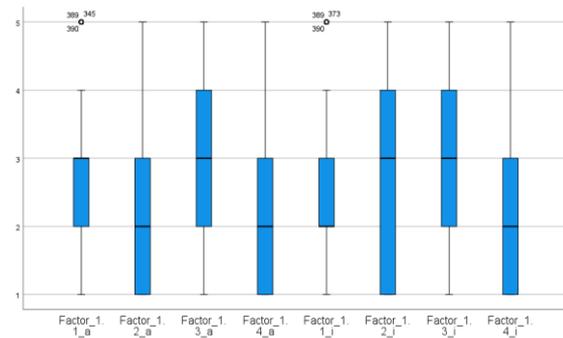


Figure 1. Risk Factors Related to Working Materials Category – students' answers

Internship coordinators and tutors:

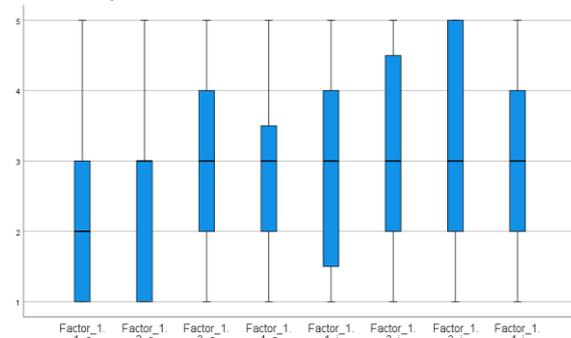


Figure 2. Risk Factors Related to Working Materials Category – Internship coordinators' and tutors' answers

Risk factor 1.3. "Direct contact with sharp, puncturing, slippery or contaminated surfaces" is considered to have a higher frequency and a larger impact on students by both categories of respondents.

Risk factor 1.4. "Allergic and irritant responses to the protective gear" is considered to have a large impact by the internship coordinators and tutors.

The Risk Factors Related to the Working Environment Category. Both risk factor 2.1. "Toxic gases, vapors and aerosols, microbes, viruses, bacteria" and risk factor 2.2. "Exposure to biological products" are considered to have a large impact on students in case that they occur, from the perspective of the internship coordinators and tutors.

The Risk Factors Related to the Work Task Category. Factor 3.1. "The lack of training for emergency situations" is considered to have a large impact on students in case that it occurs, from the point of view of the internship coordinators and tutors. Factor 3.2. "Constant need for sustained attention during work" is considered to have a high frequency of occurrence and a large impact on students by both categories of respondents. Factor 3.3. "Physical (musculoskeletal) overexertion" has a large impact on students, from the point of view of the internship coordinators and tutors.

The Risk Factors Related to the Worker Category. From the point of view of the gravity of the impact, all factors from this category: "Giving workplace protection training reduced importance," "Failure to comply with the internship distribution carried out according to the competences gained," "Improper handling of devices and instruments," "Improper utilization of the protective gear," and "Errors when enacting incident reporting procedures" are mentioned by both categories of respondents as bearing consequences upon the students during their internship activity, underlining, however, that the internship coordinators and tutors

consider the impact to be higher than do the students.

In what concerns the frequency of occurrence, only the internship coordinators and tutors have mentioned factor 4.3. "Improper handling of devices and instruments."

The Psychosocial Risk Factors Category. The internship coordinators and tutors consider factors 5.1. "Inordinate workload" and 5.2. "Excessively fast working pace" to occur frequently during students' internships and may have a large impact on them. The 2 categories of respondents consider that the impact of factor 5.3. "Negative social behavior, such as violence, harassment, threats" is large, while factor 5.4. "Insufficiently used competences" is only mentioned by the internship coordinators and tutors.

2.2.5 Conclusions for the extended study

Through the analysis of the questionnaire results, I have identified differences between the two categories of respondents in rating the risk factors with the highest frequency of occurrence and largest impact on students' internship activity as follows:

- From the Risk Factors Related to the Working Materials category, the factor of Allergic and irritant responses to protective gear is rated differently in what concerns impact, as the internship coordinators and tutors believe the impact to be higher.

- From the Risk Factors Related to the Working Environment category, both factors of Toxic gases, vapors and aerosols, microbes, viruses, bacteria and Exposure to biological products are rated differently by the internship coordinators and tutors, as they believe the impact to be higher.

- From the Risk Factors Related to the Work Task category, the factors of Lack of training for emergency situations and Physical (musculoskeletal) overexertion are considered to be of larger impact by the internship coordinators and tutors.

- From the Risk Factors Related to the Worker category, all of the five factors (Giving workplace protection training reduced importance, Improper handling of devices and instruments, Failure to comply with the internship distribution carried out according to the competences gained, Improper utilization of the protective gear, Errors when enacting incident reporting procedures) are rated as having a larger impact on students by the internship coordinators and tutors, while the factor of Improper handling of devices and instruments is considered to have a higher frequency of occurrence by this same category of respondents.

- From the Psychosocial Risk Factors category, a higher frequency of occurrence and larger impact, from the perspective of internship coordinators and tutors, can be related to the factors of Inordinate workload and Excessively fast working pace, while the factor of Insufficiently used competences is considered to have a larger impact.

Thus, the null hypothesis is invalidated, because the two categories of respondents have rated the risk factors differently, from the point of view of frequency of occurrence and impact that they may have on students.

The risk factors identified as having a higher frequency of occurrence and a larger impact are the following:

The Risk Factors Related to the Working Materials category: Contact with toxic / flammable substances; Direct contact with sharp, puncturing, slippery or contaminated surfaces; Allergic and irritant responses to the protective gear.

The Risk Factors Related to the Working Environment category: Toxic gases, vapors and aerosols, microbes, viruses, bacteria; Exposure to biological products.

The Risk Factors Related to the Work Task category: The lack of training for emergency situations; Constant need for sustained attention during work; Physical (musculoskeletal) overexertion.

The Risk Factors Related to the Worker category: Giving workplace protection training reduced importance; Improper handling of devices and instruments; Failure to comply with the internship distribution carried out according to the competences gained; Improper utilization of the protective gear; Errors when enacting incident reporting procedures.

The Psychosocial Risk Factors category: Inordinate workload; Excessively fast working pace; Negative social behavior, such as violence, harassment, threats; Insufficiently used competences.

A part of these factors are inherent in the profession of nurse that the students in post-secondary schools of nursing are training for, and cannot be prevented – for example: Constant need for sustained attention during work, Physical (musculoskeletal) overexertion, Workload and Working pace – but the others can be addressed through efficient prevention methods.

2.3. Conclusions

The results of the research reveal the risk factors that students can be subjected to during their internship. The identification of these factors is important in order for the students to safely conduct their internship activity. On the basis of the identified risks, I will be able to establish prevention measures at the level of the educational establishment and at the level of the partnered economic agents. The measures must be established at procedure and protocol level by the educational establishments and partnered economic agents, but also at the level of students' behavior and attitude through giving them information constantly and openly communicating with them.

Consequently, post-secondary schools of nursing must assume the adoption of coherent measures, within the boundaries of the legislation in force, and attempt to ensure the practical training of these students by using all of the resources available to them: hospital units

where access is permitted, school laboratories, and the identification of any other possible, willing internship partner: the practices of family physicians, palliative care centers, elderly care centers, etc. The goal of this research was to mend the deficiencies of the competent ministries and make available a set of instruments necessary for the conduct of practical training activities to post-secondary schools of nursing.

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