



Original Article

Knowledge and Experiences of Risks among Pupils in Vocational Education



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ABSTRACT

Background: Young male and female workers are over-represented in statistics concerning negative outcomes of poor work environment and risky work. Young workers often have low awareness of risk, a lack of safety training, and inadequate introduction to the work. The aim of this study was to identify the knowledge and experiences of pupils of vocational schools concerning potential work environment risks in their future work.

Methods: The study design was a dual one, and included a questionnaire and focus group interviews. The study group consisted of 239 pupils from 10 upper secondary schools, who were graduating pupils in four vocational programs: the Industrial Technology Programme, the Restaurant Management and Food Programme, the Transport Programme, and the Handicraft Programme (in which students specialize in wood products). The upper secondary schools were located in the central region of Sweden.

Results: The pupils had limited knowledge that employers must, by law, conduct risk analyses and prevent risks. Many felt that they themselves are mainly responsible for performing their tasks safely. Pupils in all programs mentioned acute risk as the greatest risk at work. The theoretical education about safety at work was provided in the 1st year of the 3-year vocational programs.

Conclusion: A systematic approach to pupils' training in work environment, which is a basis for a safe and healthy workplace, is lacking. The study findings indicate that pupils are offered knowledge far from that intended by laws and by state-of-the-art occupational health risk research.

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1. Introduction

Young workers as a group are over-represented in the statistics concerning negative outcomes of poor work environment and risky work. In Sweden, 22 youths died because of accidents at work during the years 2009–2013. Every year, 3,500 young employees in Sweden are injured at work, and there has been a yearly increase in these figures post-2009. This fact was the background for the Swedish Work Environment Authority deciding to implement a special campaign to break this trend. Young men aged 16–24 years are especially over-represented compared to the rest of the workforce concerning accidents at work resulting in sick leave [1].

In Europe, young workers' risk of accidents at work is 25–40% higher than those of other age groups [2]. These findings are

supported by other studies examining occupational health and safety among youths [3–5].

In a global literature review, results from 63 nonfatal and 45 fatal studies were analyzed, and it was concluded that young men in particular had higher nonfatal injury rates than older men, but that the opposite was true for fatal accidents at work [6]. In addition, an extensive Canadian literature review based on 189 scientific articles showed similar results [7].

A study published by the Swedish Trade Union Confederation (2011) showed that the demands for professional competence have increased for persons entering the labor market [8]. This has resulted in late entrances into working life, often leading to temporary and precarious employments. Many employment opportunities are characterized by a low freedom of action, high psychosocial demands, low

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social support, and high work intensity. In the workplace, many young people come in contact with dangerous machines and chemical hazards, have strenuous physical workloads, and experience threats and violence, all of which make young workers more vulnerable.

Young people's view of occupational safety is of great importance for their behavior and perception of risk. A Canadian study found that many young workers considered accidents to be a part of their work, simply because work-related accidents are common and normally not very serious. These workers were not aware that they could take certain measures to avoid such accidents to a great extent. Young female workers felt that their complaints concerning the work environment were not taken seriously; by contrast, young men did not complain because they thought that complaining might affect others' view of them as mature workers [9]. Tucker and Turner [10] highlighted that when teenage workers faced potentially harmful work-related hazards and had safety concerns, they were reluctant to call attention to the risks because they felt inexperienced and were new hires. Youngsters are eager to please their superiors and fear to lose the job because of complaints or demands directed to supervisors or more experienced coworkers [8,10,11].

The literature also shows that training in occupational safety and health is crucial and must be included in apprenticeship programs to improve the situation. This applies to the form of teaching as well as the content being taught [3,12–14].

The literature clearly shows that young people entering working life often have a higher incidence of accidents and other negative work effects, compared to the workforce in general. Questions of interest are, therefore, how pupils in vocational schools are prepared to minimize the risks involved in their future work, and what their thoughts about and attitudes to risks are. The aim of this study was therefore to identify the knowledge and experiences that pupils in vocational school gather concerning potential work environment risks in their future work.

2. Materials and methods

2.1. Study group

The Swedish education system is based on 9 years of compulsory schooling. Most children start school when they reach the age of 7 years. After completing the compulsory school, at the age of about 16 years, all youths are entitled to continue with a 3-year voluntary upper secondary school education. The upper secondary school consists of 18 different national programs. Some of the programs focus on the study of science, and others are vocational programs. The vocational programs include workplace-based learning [15].

2.2. Study design

The study design was dual, combining quantitative and qualitative methods. A questionnaire was administered to all participants in the study group. Focus group interviews were also undertaken to gain a deeper understanding of the pupils' perceptions of health and safety issues at work as well as of the training received in these matters.

2.3. Questionnaire study

2.3.1. Participants

The study group consisted of 239 pupils from 10 upper secondary schools who were graduating in the following vocational programs: the Industrial Technology Programme, the Restaurant Management and Food Programme, the Transport Programme, and the Handicraft Programme (in which students specialized in wood products). The upper secondary schools were located in the central region of Sweden.

The schools, which were both private and community schools, were selected from a register of the Swedish National Agency for Education. Of 273 possible pupils, 239 completed the questionnaire. If necessary, the distribution of questionnaire was followed by one reminder. The response rate was 88%. Of the responders, 166 were men and 73 women (Table 1).

2.3.2. Recruitment

The participating classes of each upper secondary school were visited from December 2012 until March 2013. The researchers informed the pupils about the study and asked them to fill in a questionnaire containing questions on risks in work environment. Pupils who were absent received a letter containing information about the study; in these cases, the teacher administered the questionnaire to the students and sent the finished questionnaire back to the researchers.

2.3.3. Questionnaire

The questionnaire contained nine questions covering a few topics that are considered essential by the research group and form the core of the Swedish work environment legislation [16]. One question was about employees' knowledge about risks in work environment, three questions were about employees' responsibility at work and types of actions required to improve the work environment, one question was about laws and provisions steering work environment, two questions were about what kind of actions pupils would take if they encountered problems in the work environment, one question was about the types of introductions pupils had received about risks and safety during their workplace-based learning course, and one was question about pupils' own opinions about risks in work environment in their future professions. The questions correspond partly to a questionnaire used by Tucker and Turner [17].

Each question together with the response alternatives is presented in the Results section.

2.4. Interview study

2.4.1. Participants

Focus group interviews were undertaken with one group at each of the six upper secondary schools. The focus groups consisted of four to seven pupils, with about two pupils from each program in cases where more than one program was offered at the school. At upper secondary schools with only one program, all pupils belonged to that program.

2.4.2. Recruitment

Of all the participating schools, these six upper secondary schools were chosen based on their size, number of programs, and geographical localization. The headmasters at these schools were requested to inform the pupils and ask them to participate in the focus group interviews.

Table 1
Study population number of pupils participating in each program

Vocational program	Distributed questionnaires <i>n</i>	Answered questionnaires <i>n</i> (%)
Industrial technology	67	58 (87)
Restaurant management and food	85	76 (89)
Transport	92	76 (83)
Handicraft, specializing in wood products	29	29 (100)
Total	273	239 (88)

2.4.3. Interview protocol

The interviews, lasting about 40 minutes, were conducted by two of the researchers. The pupils interviewed were first informed about the purpose of the study—to obtain an understanding of their thoughts about potential work environment risks in their future work. The interview guide consisted of opening questions and four main questions. The main questions were as follows: “What is your view on work environment?”; “How do you perceive training in occupational health and safety in your vocational education?”; “How do you perceive work environment at your workplace-based learning?”; and “What is your opinion about risks in work environment in the professions you are being educated for?”. Additional probing questions followed each main question.

2.5. Analytical procedure

The data from the questionnaire study was entered into a spreadsheet and grouped according to investigated study programs. Calculations were made to give a base for the data reported as descriptive statistics, including aggregate and percent calculations. One question, about the biggest risks in their coming professions, was open for free answers and analyzed by categorizing their answers in six groups.

The interviews were audio recorded and transcribed by two of the researchers. The data were analyzed by content analyses [18,19]. The interview findings were analyzed separately by the researchers who conducted these interviews. To ensure trustworthiness, the interview findings were scrutinized independently by a third researcher not involved in the interviews. The results were discussed afterwards to identify similarities and differences in the researchers analyses.

2.6. Ethics

This study was approved by the Regional Ethical Committee in Uppsala, Sweden.

3. Results

3.1. Questionnaire study

The results are reported based on each question in the questionnaire. After each question, the response alternatives are presented.

3.1.1. Who has the primary responsibility of ensuring that you have the right skills to perform your job safely?

The response alternatives were as follows: you yourselves, safety representative, manager, and work environment authority.

Of the 239 pupils, 51% saw themselves as having the responsibility of ensuring that they had the right skills to perform their jobs safely. Furthermore, 40% of students considered the managers, 13% considered the safety representative, and 4% considered the work environment authority to be responsible. Among the pupils in the Industrial Technology Programme, 55% answered that the manager held the responsibility and only 34% considered the workers responsible.

3.1.2. Which of the following laws and regulations do you believe control the work environment at the workplace?

The pupils' knowledge about laws and regulations steering the work environment was investigated.

The response alternatives were as follows: regulations from the work environment authority, holiday laws, provision of work environment management, and the Work Environment Act.

The percentage of pupils answered in favor of the Work Environment Act was 66%, in favor of regulations from the work

environment authority was 43%, in favor of provisions of the work environment management system was 17%, and in favor of holiday laws was 3%. There were no significant differences in answers among the pupils from the four programs.

3.1.3. Which of the following is your employer required to implement?

The pupils were also asked about what actions the employer was required to implement. The response alternatives were as follows: analyze risks, eliminate all risks, inform about risks, and prevent risks.

According to the answers of pupils from all programs, the employer was required to give information about risks (71%), to prevent risks (41%), to conduct risk analyses (25%), and to eliminate risks (10%). The fact that the employer must, by law, conduct risk analyses and prevent risks was not very well known. The Handicraft Programme pupils had even less knowledge about risk prevention (21%).

3.1.4. If you have questions about the work environment in your workplace, who should you turn to first?

Response alternatives were as follows: manager, the union, safety representative, and work mates.

To the question regarding whom they would turn to if they had questions about the work environment in the workplace, most pupils answered “manager” or “safety representatives.” The majority of the pupils in the Industrial Technology Programme selected the safety representative as the primary contact (Table 2).

3.1.5. If the machine you are going to use is not working properly—for example, without protection or otherwise not OK—what do you do?

Response alternatives were the following: continue without any action, warn work mates, talk to supervisor/safety representative, and take a coffee break.

If the pupils had a problem with a machine, their overall dominant response was to talk to the supervisor or safety representative first. Only one-third would warn their workmates that something was wrong. Fewer than 5% of the pupils would continue without any action or take a coffee break.

3.1.6. What long-term action do you think the company should focus on if you have a noisy workplace?

The pupils were asked to rank the following statements: personal protection equipment, quieter machines, enclose the machine, and building a working cab.

The answers to this question indicated that protecting themselves was of the highest priority to the pupils with respect to long-term risk elimination. Personal protecting equipment was ranked by 59% of the pupils as the first alternative to eliminate noise. Half of the pupils mentioned quieter machines as having the lowest priority, after other alternatives.

Table 2

Answers to the question, “If you have questions about the work environment in your workplace, who should you turn to in the first place?” divided into the different programs

Study program	Manager n (%)	Union n (%)	Safety representative n (%)	Workmates n (%)
Industrial technology	21 (36)	1 (2)	40 (69)	1 (2)
Restaurant management and food	53 (70)	2 (3)	26 (34)	3 (4)
Transport	47 (62)	3 (4)	34 (45)	3 (4)
Handicraft, specializing in wood products	15 (52)	0 (0)	15 (52)	2 (7)
Total	136 (57)	6 (3)	115 (48)	9 (4)

The pupils could choose more than one alternative.

3.1.7. Which of the following do you consider to be a safety issue?

The response alternatives were as follows: bullying, lack of time for tasks, threats from clients, and salary.

Bullying was the most mentioned safety issue (64%), followed by a lack of time for tasks (36%), threats from clients (27%), and salary (18%). The answers of students specializing in wood products differed from those of other groups on several issues; 79% mentioned bullying and 52% threats from clients as the primary safety issue, whereas only 17% chose lack of time for tasks (17%), compared to pupils from the other programs.

3.1.8. When you came to your practice business the first time, what did you get information about?

Response alternatives were as follows: dangerous machines and tools, evacuation routes, lifting aids, good housekeeping, personal protective equipment, and how to act in an accident.

Good housekeeping and personal protective equipment were the dominating issues in pupils' introductions when they started their practices at the workplaces. Restaurant Management and Food Programme pupils were less informed about personal protective equipment. Pupils of the Industrial Technology Programme and Handicraft Programme mentioned that they obtained information about dangerous machines and tools, but the other pupils mentioned this to a lower extent (Table 3).

3.1.9. What are the five biggest risks in the profession you are being educated for?

The pupils were asked to assess the risks in the work they were being educated for. They were free to answer whatever they thought, and their answers were afterward categorized by the researchers into the following categories: accidents, chemical risks, physical risks, physical workload, and psychosocial risks. The pupils were asked to rank their answers, with the highest risk ranked as number 1. The dominant issue that ranked above other risks at work for all pupil groups was hurting themselves in an accident. In general, risks causing more immediate effects were most prominent in their minds (Table 4).

3.2. Interview study

The categories were drawn from the four main questions: "What is your view on work environment?"; "How do you perceive training in occupational health and safety in your vocational education?"; "How do you perceive work environment at your workplace-based learning?"; and "What is your opinion about risks in work environment in the professions you are being educated for?"

3.2.1. View on work environment

This question included the pupils' overall view on the work environment.

Most of the groups mentioned safety first—that the risks have to be as small as possible and that the workplace should be safe. The different pupil groups pointed to noise, premises, machine safety guards, and good measures to minimize the risk of injury. Two groups mentioned psychosocial factors, such as job satisfaction and bullying. Moreover, the pupils addressed introductions to the machines, having the right working techniques, and having appropriate personal protection equipment.

"It must be safe and secure to work". (A pupil in the Restaurant Management and Food Programme).

3.2.2. Training in health and safety at work in their vocational education

The pupils described how they learned about health and safety at work during their education at school. The pupils, with the exception of those in the Restaurant Management and Food Programme, received their work environment education primarily during their 1st year of the program, prior to entering their first workplace education. The pupils from the Transport Programme said that they received some work environment education every year. In the Industrial Technology and Handicraft Programme, the teacher explained all the machines theoretically and then provided practical teaching prior to allowing the pupils to use them. A less extensive introduction was given in the Restaurant Management and Food Programme.

In addition to an introduction to machines, the theoretical education also included ergonomics, fire safety, and education in electrical safety, cardiopulmonary rescue, and psychosocial work environment. Some pupils stated that job satisfaction was important. In the Restaurant Management and Food Programme, it was addressed that there is specific terminology used in a kitchen that the pupils should be prepared for. Most pupils felt that the hands-on instruction and a variety of teaching methods were the best. They liked it when the teachers gave an example from their own experience or pointed out practical problems encountered in the garage, kitchen, or car. The teaching material used was often a book (as a base); booklets, questions, and tasks were also used. Some of the classes described that they had performed risk assessments at the school. Films and tests were also common.

"The education has been ok. Before they let us do something, they always go through what risks exists. We have to wear protecting clothes to be able to do some things. They are very careful that we have the right equipment when we're working with something." (A pupil in the Industrial Technology Programme).

To sum up, the pupils were satisfied with their occupational health and safety education. Suggestions for improvement were to have two periods of occupational health and safety education, one in the 1st year prior to entering the practice session and one in the 3rd year to repeat it. Within the Restaurant Management and Food Programme, the pupils would have liked to have the occupational health and safety education earlier in the program.

Table 3

Answers to the question, "When you came to your practice business the first time, what did you get information about?" divided into the different programs*

Study program	Dangerous machines and tools n (%)	Evacuation routes n (%)	Lifting aids n (%)	Good housekeeping n (%)	Personal protective equipment n (%)	How you act in an accident n (%)
Industrial technology	38 (66)	41 (71)	27 (47)	35 (60)	44 (76)	38 (66)
Restaurant management and food	19 (25)	13 (17)	6 (8)	44 (58)	21 (28)	17 (22)
Transport	31 (41)	24 (32)	20 (26)	43 (57)	45 (59)	18 (24)
Handicraft, specializing in wood products	19 (66)	10 (34)	9 (31)	10 (34)	17 (59)	9 (31)
Total	107 (45)	88 (37)	62 (26)	132 (55)	127 (53)	82 (34)

* The pupils could choose more than one example.

Table 4

Answers to the question, "What are the five biggest risks in the profession you are being educated for? Rank the greatest risk as number 1"

Study program	Accidents n/n of highest ranked	Chemical n/n of highest ranked	Physical n/n of highest ranked	Physical load n/n of highest ranked	Psychosocial n/n of highest ranked	Other n/n of highest ranked
Industrial technology	74/21	9/3	31/5	11/0	3/2	6/2
Restaurant management and food	122/29	3/0	13/5	49/17	20/5	15/2
Transport	152/61	3/0	11/2	18/2	11/0	20/2
Handicraft, specializing in wood products	76/27	2/0	11/2	9/0	7/0	7/3
Total	424/138	17/3	66/14	87/21	41/5	48/9

* The answers are presented for the different programs.

3.2.3. Work environment at workplace-based learning sites

The pupils were asked to describe how they perceived the work environment where they were placed at the workplace-based learning site. Most of the pupils had the same workplace for all periods of workplace-based learning during 1 school year. In order to experience different practices, they were often placed at another company in the next school year.

Overall, the pupils stated that the work environment in their workplace education sites was good and that they recognized what they had learned in school. Concerning systematic work environment management, some pupils mentioned that they knew that the workplaces made risk assessments and wrote lists with prioritizations.

"Each thing has its place in the enterprise." (A pupil in the Industrial Technology Programme).

After an inspection by the work environment authority, some machines were removed. No major risks would have been encountered by the Restaurant Management and Food Programme pupils who had their workplace education in a café.

Most of the pupils were introduced to workplace education by the supervisor or the safety representative. This introduction could include fire protection, escape routes, a walkthrough, and a review of regulations. In some workplace education programs, there were no introductions; instead, work environment questions were raised continuously.

"It came in a little information retrospect, it's perfectly fine. You do realize yourself how it should work, much is common sense." (A pupil in the Industrial Technology Programme).

Some pupils requested an introduction to the whole production. The pupils mentioned that the supervisors acted differently and that some had closer contact with the school.

With regard to stress, it was pointed out at many workplaces that pupils should not hurry; otherwise, the work could easily become dangerous. The pupils brought protection equipment from their schools. They had the option of borrowing complementary equipment from the workplace. A group of pupils from the Transport Programme described that, on some occasions, helmets and ear protection gears were needed, which neither the school nor the workplace had. This meant that the pupils had to stay in the truck during that specific task.

The teachers visited most of the groups during their workplace education experiences. Pupils in the Transport Programme and the Restaurant Management and Food Programme sometimes had their workplace education at a faraway place, so they were contacted over telephones.

3.2.4. Risks in the work environment in the professions for which they were being educated

The pupils were asked about their opinion regarding risks in their future work.

The greatest risks that the pupils identified varied depending on which program they were enrolled into. The workplace-related

risks mentioned by the pupils in the Industry and Handicraft Programme were burn injuries, crushing, welding fumes, hearing damage, vibration injuries, dust exposure, heavy lifting, and monotonous work. The pupils in the Transport Programme mentioned the risks of driving off the road, getting something heavy falling on them, heavy lifting, bad posture, stress, vibration, crushing, and so on. Pupils in the Restaurant Management and Food Programme mentioned about the issues of ergonomics, burns, cuts, and slipping. Pupils felt that the most positive aspect of their future work was having interesting tasks and good workmates.

"Welding fume is the biggest risk. The exhaust does not capture everything" (A pupil in the Industrial Technology Programme).

"One of the biggest risks is long work shifts including sedentary work, but also heavy lifting is a risk" (A pupil in the Transport Programme).

4. Discussion

The results of the questionnaire study indicated that the pupils felt that they themselves were primarily responsible for ensuring that they had the skills to perform their tasks safely. The provisions of the work environment management system were not very well known to the pupils. Even when students believed that the employer had to inform employees about risks at work, the fact that the employer must, by law, conduct risk analyses and prevent risks was not very well known. The pupils' knowledge about long-term actions to improve work environment was also limited. The pupils focused more on self-protection than on eliminating risks. When assessing the risks in the work they were being educated for, the pupils gave priority to risks that caused accidents compared with chemical, physical, and psychosocial risks. There were no big differences between the programs in this regard.

In the interview study, the pupils pointed out the importance of working safely and without accidents. The theoretical education on safety at work was mostly provided in the 1st year of the 3-year vocational program. However, this differed among programs and schools. Teaching materials included textbooks, films, and tasks with questions. At some schools, the pupils performed risk analyses. In the Industrial Technology Programme and the Handicraft Programme, the teachers always had practical supervision of a machine in the school workshop prior to when the pupils were permitted to use the machine.

In the workplace-based learning experiences, most of the pupils received introductions on fire protection and were told about related rules by the supervisor or safety representative. All pupils brought their own personal protection equipment from the school to the workplace-based learning site.

The pupils stated that the biggest risks they encountered varied, depending on the profession they were being educated for. Pupils in the Industrial Technology Programme and the Handicraft Programme mentioned both acute risks and exposure, which can cause long-term injuries, whereas pupils in the Transport Programme

and the Restaurant Management and Food Programme referred only to acute risks.

The most positive aspect of the future work of the students was having good workmates and interesting tasks.

Pupils' expectations of their employers included that the employer should provide information about risks, and the pupils pointed out that they themselves had the main responsibility for having the right skills to perform the job safely. The Systematic Work Environment Management regulation came into force in Sweden in 1991 and is based on the European Union Framework Directive 89/391. The provision "Systematic Work Environment Management" contains a strategy for strengthening the management of safety and health at work and is in force for all enterprises [16]. According to that provision, the first step should be risk analysis and elimination or substitution of the hazard. The results of the questionnaire implied that the pupils were not familiar with this way of planning improvements to work environment. It was obvious that the pupils were told in their occupational health and safety education programs that protecting themselves is the first measure to avoid injuries. As an example, it could be mentioned that many of the pupils gave the highest priority to personal protection equipment prior to making improvements to the workplace. This attitude is in line with the study of Tucker and Turner [10], which found that young people feel inexperienced and new to their positions. The pupils also felt anxious about making demands on the work environment for fear of losing their jobs. Young people's work can be characterized by high demands, low control, and low support. This combination makes it more difficult for young people to complain about their work environment [8]. In addition, Schulte et al [20] have concluded that young workers face limitation in their ability to put into practice what they have learned.

The pupils described different kinds of training techniques. They discussed that different techniques that suit the learning skills of all students are needed to increase their knowledge. For some pupils, knowledge from practical teaching was easier to remember. Suggestions for improvements from the pupils included re-examination of the work environment course from Study Year 1 until prior to the practical period in Study Year 3. The results of the questionnaire, which was given to pupils in Year 3, pointed out a lack of knowledge about work environments among the pupils, which might be rectified with a rehearsal. This is in line with what Rohlman et al [21] have concluded.

In Breslin et al's [9] study, one result was that young workers did not regard accidents in their daily work as a serious issue. This is not in accordance with the answers from the Swedish pupils in this study. Pupils enrolled into this study stated that the biggest risks depended on the profession for which they were being educated. Pupils in the Industrial Technology Programme and the Handicraft Programme mentioned about risks of crushing, burns, welding fumes, hearing loss, dust exposure, and monotonous work. Pupils in the Transport Programme referred to severe accidents, such as crushing or having something heavy falling on them, but also to stress. The pupils in the Restaurant Management and Food Programme mentioned ergonomics, burns, cuts, slipping hazards, and stress as the risk factors. Some global studies have stated that young male and female workers are over-represented in nonfatal and fatal accidents, even if the rate is higher for young men. In the interviews, "common sense" was often referred to when careful behavior was discussed. This fact has also been highlighted by Zierold et al [22].

Personal protective equipment and good housekeeping were mentioned as the most common information issues in the pupils' introduction to their workplace-based learning experiences. This was also underlined in the interview study. The pupils had been told not to hurry at work because of the risks for workplace accidents.

The companies where the pupils had their practical training related to their studied professions varied from micro to medium size. The introductions were usually provided by a supervisor or safety representative. Later when pupils had any questions about their work environment, most of them turned to the manager or safety representative. They would also turn to the supervisor or safety representative if their machine was not in order. The work environment knowledge of the person who provides the introduction is very important for the content and quality of the introduction. Similarly, the company's safety culture, which may depend on its size, is also very important to the introduction quality. A Norwegian study concluded that bigger companies have better routines for training young people. This study also explained that these routines were set based on stricter legislative demands [12]. Providing introductions to people not skilled in a profession is also one important point in the Swedish provision of Systematic Work Environment Management [16]. In a large literature review from Canada, the authors summarized that young people need a safe integration into the working life with respect to their age and health and safety at work [7]. A later study showed similar results [13].

The pupils participating in this study were from both private and community schools, which were selected from a register of the Swedish National Agency for Education. The schools were located in the middle part of Sweden, either in towns or in rural areas, and thus can be considered to provide a spread in the study material. The vocational programs were chosen after discussion with employers and employee organizations. The response rate of 88% reflects pupils' interests in participating in the study. However, the study is cross-sectional and reflects the pupils' knowledge and experiences at the time of the survey.

The study's complementary design, which includes both quantitative and qualitative data, could be considered the strength of the study. The interviews were conducted with groups of pupils representing different vocational programs who participated in the study. The data were considered trustworthy, because the researchers first analyzed the interviews separately, and then discussed the results to identify similarities and differences in the analyses. They also discussed how well the data and analyses addressed the aim of the study.

In conclusion, a systematic approach to pupils' training in work environment, which is a basis for a safe and healthy workplace, is lacking. Pupils are taught in school to focus on personal responsibility and to protect themselves against risks. The introduction in the workplace is somewhat more focused on procedural issues than on safety. The study findings indicate that pupils are offered knowledge on a level far below of that intended by laws and by state-of-the-art occupational health risk research.

Conflicts of interest

No potential conflicts of interest related to this article were reported.

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