



Knowledge, attitude and performance of wood painter about harmful effects of solvents and dyes on human health

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Abstract

Background: Solvents, which are widely used in industry, are able to dissolve another substance for creating a solution. Solvents have various effects on human health based on their type and chemical composition.

Methods: This was a cross-sectional study to investigate the harmful effects of solvents on wood painters in Yazd city. To achieve information, a census questionnaire was prepared and distributed among wood painters. The studied parameters include the mean score of knowledge, attitude, and practice of wood painters about harmful effects of dyes and solvents on body according to age, work experience, education, hours worked per day, and smoking. The data of survey were analyzed by Chi-square test and T-test in SPSS.

Results: The average age and work experience of wood painters were 29 and 7.5 years, and the age of 25 years and work experience of 5 years had the highest frequency among them. Analysis of data indicated that 71.8% of people had middle school and lower education level, 68.3% was married, 31.7% was single, and 37.5% was smoking. Average working hours were 8 hours in day.

Conclusion: Results show that attitudes had significant correlation with education level and different age groups. None of the studied parameters were not significant correlation with performance. Also, there was significant correlation between knowledge with experience.

Keywords: Solvent effects, Knowledge, Attitude, Practice, Wood painter

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Introduction

Solvent refers to a substance that dissolves another substance to create a homogenous solution. Liquid solvents are classified into two groups: organic and inorganic solvents. The main groups of organic solvents are saturated hydrocarbons, unsaturated hydrocarbons, aromatic hydrocarbons, halogenated ethers, alcohols, amines, and carbonyl (1). Solvents are extensively used in construction works and chemical industries, so the workers are exposed to solvents in coloring and painting industry, refineries, and many other jobs (2).

Solvents have a variety of health effects, depending on their type and chemical composition. Some of solvents have short-term effects, such as eyes irritation, effects on lungs and skin, nausea, dizziness, and headache (3). Also solvents and dyes have long-term effects, such as skin diseases and cancers. They can cause loss of con-

sciousness and death at high concentrations or long-term contact (4). On the other hand, we have more traumatic effects when we are dealing with chemical solvents. All organic solvents are irritants to skin and cause dermatitis that occurs by degreasing or fat-dissolving properties of skin, also due to their effect on the nervous system and reduction in performance, they can cause problems, such as headache, nausea, dizziness, and drowsiness (5). Organic solvents have the potential to cause injuries and diseases in many organs, including the nervous system, heart, kidneys, skin, and liver (2,6). People were exposed to a mixture of solvents in this job (7). Solvents are used for ductility of the color and are components of dye. One of the solvents is thinner that has plenty of use to dilute colors in painting industry and contains a mixture of toxic organic solvents (2).

Most ingredients of dyes are somewhat toxic and con-



taminated. All dyes are flammable than water-based dyes. Some solvents are quite toxic and others have some damage to organisms. However, all these problems can be solved with precisizing control and safety compliances (8). In this study, we analyzed some information of wood painters about the solvents, harmful effects.

Methods

This was a cross-sectional study that was done on wood painters in Yazd city. The information was taken through distributing the census questionnaire among 120 wood painters (wood painter selected by census method). Validity and reliability have also been approved by experts and Cronbach's alpha test.

Twenty questionnaires were distributed among the target population to obtain Cronbach's alpha. Cronbach's alpha was achieved 72.68% after completing questionnaires. The scoring method of questionnaires was one score for each correct answer and zero score for the wrong option. In attitude questionnaires we have the best possible choice of 5 score, and it gets lower on the next level to one. The performance questions were contractually scored from 1 to 4.

The studied parameters include the mean score of knowledge, attitude and practice of wood painters about dyes and solvents effects on body according to age, work experience, education, hours worked per day, and smoking. The data from the survey were analyzed with SPSS statistical software by Chi-square test and T-test. In this study, questionnaire were completed by satisfaction of individuals so there was no ethical limitation.

Results

The average age was 29 years and work experience was 7.5 years. Having 25 years age and 5 years work experience had the highest frequency among the participants. In terms of education, more than 71.8% of people have middle school and lower education levels. The results are shown in Table 1.

Also, data showed that 68.3% were married, 31.7% were single, and 37.5% of people were smoking. Average working hours were 8 hours per day.

According to the obtained scores by wood painters from questionnaires and use of T-test ($P=0.05$), the mean scores of attitude, knowledge, and performance were correlated based on their age group, experience, education, and smoking. The correlation coefficients are listed in Table 2.

Also, wood painters were classified into categories in terms of work experience (below and above 10 years) and smoking (smokers and non-smokers). There was no significant correlation in the attitude scores in different age groups based on their work experience ($P=0.059$). There was no significant correlation between/with knowledge scores in different age groups based on their work experience ($P=0.852$). The relation of performance scores in

Table 1. Distribution of educational status of Yazd wood painters

Education	Number	Percent
Illiterate	16	13.3
Elementary school	36	30
Middle school	23	27.5
High school	32	18.3
Associate and Bachelor degree	8	6.7
Master's degree or higher	5	4.2
Sum	120	100

Table 2. The correlation coefficients of studied parameters

Variables	Age	Experience	Education	Smoking
Knowledge	0.103	0.020	0.058	0.723
Attitude	0.000	0.523	0.000	0.825
Performance	0.162	0.438	0.059	0.050

different age groups based on their work experience is dubious ($P=0.05$), and it can make a significant correlation if the number of samples is increased. There was no significant correlation between/with the mean attitude score in both groups of smokers and non-smokers ($P=0.686$). There was significant correlation between/with the mean knowledge score in both groups of smokers and non-smokers ($P=0.001$), and there was a significant correlation between/with the mean performance scores in both groups of smokers and non-smokers ($P=0.003$).

Discussion

To achieve a comprehensive view of behavior about the health effects of solvents and dyes on the painters, we conduct a study on comparison of individual characteristics including work experience, education level, and individual age on people with an average age of 29 years and the average work experience of 7.5 years; this is consistent with the study done by Ghasemi and Karami; They conducted a study on the attitudes and behaviors of Fars greenhouse owners with the median age of 31 years and 1-3 years of experience about using chemical pesticides in greenhouses (8).

The effect of age

According to study's findings we can say that there was a difference between individual attitudes with various work experience and there was no significant correlation, but, there was a significant correlation between individual attitudes with their education and different age groups. In Ghasemi and Karami study (8), younger workers with less education and work experience had a poor attitude in using pesticides. Dadgari *et al* (9) studied the nurses' attitudes regarding sex, age, education and work experience. In this study, none of the variables had significant correlation with attitude that confirms the relationship between experience and attitude in our research, but it is

unlike in other parameters that was obtained in the present study. These differences may be resulted from differences in the studied population (9). This result can be seen in Fung's study as well (10).

The effect of performance

Additionally, we studied wood painters' performance that work with dyes and solvents in terms of parameters such as age, education, and work experience. The results show that there was no significant correlation between/with the individual performance with work experience, age, and education that confirms the results of Dadgari *et al* study (9). In another study conducted in India, this conclusion was obtained that education alone does not affect performance (11).

The effect of knowledge

Knowledge about the effects of solvents and dyes on body among wood painters has been studied with different education levels, age groups, and experience. The results show that painters' knowledge has no relation with age and level of education, but there was a significant correlation between individual knowledge and work experience that confirms Jahangiri *et al*'s result of study (12). In addition, they reported a significant correlation between worker's knowledge of hearing protection in petrochemical industry and their experience (12).

The results of Hosseini *et al* (13) showed that there was a significant correlation between farmers, who works with pesticides, knowledge of safety precautions and protective equipments and their age and experience. Whereas, the results of our study are not correlated with age, but are correlated with work experience. In a study conducted among Qom farmers, no correlation has been reported between farmers' knowledge and experience and their age (14). The knowledge and experience of older workers increased when workers received specialized training in their workplace.

The effect of smoking

The correlation between the attitudes of two groups of smokers and non-smokers was not significant, so the attitude in two groups did not differ, while knowledge and performance had a significant correlation in both groups. This result is similar to Abedzadeh *et al*'s conclusion about knowledge, attitude, and performance of women referring to health care centers in Kashan for breast cancer (15).

Conclusion

Results showed that painter's attitude had significant correlation with education level. It is evident, all of the solvents that are used to dilute the dyes are harmful to human health and exposure of solvents and dyes increase the health risk. Tacking to account all the above, give information and awareness of solvents harmful, it can help

to reduce its effects. It is recommended that it will be important to survey the concentration of these compounds in various tissues of painting body and his workplace air.

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Ethical issues

We certify that all data collected during the study is presented in this manuscript and no data from the study has been or will be published separately.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MHS and MM participated in the design of the study and draft the manuscript. MHE helped to design and draft the manuscript. MM and MHF carried out the studies and performed statistical analysis of the collected data. All authors read and approved the final manuscript.

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