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ANALYSIS OF FACTORS AFFECTING HEALTH AND SAFETY BEHAVIOR OF FARMERS (WORK-RELATED COMPLICATIONS) CASE STUDY OF QAZVIN CITY

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RESUMEN: Mantener y desarrollar los recursos humanos en el entorno agrícola de riesgo requiere aprender y observar los principios de seguridad y la higiene agrícola. Con el crecimiento de la mecanización y el uso de dispositivos y equipos agrícolas, el uso de productos químicos y fertilizantes se ha traducido en accidentes y enfermedades profesionales en este sector. Este estudio examina los factores que influyen en el comportamiento de seguridad y salud (complicaciones del trabajo) de los agricultores en la ciudad de Qazvin. Esta investigación es descriptiva. La población del estudio incluyó a todos los agricultores de la ciudad de Qazvin (N = 23526). La muestra del estudio fue de 256 personas que fueron seleccionados aleatoriamente o sistemáticamente utilizando la tabla de Bartlett y colegas. El instrumento principal del estudio es un cuestionario. La variable dependiente en este estudio es el conocimiento y desempeño de los agricultores con respecto a la salud y seguridad agrícola (complicaciones del trabajo). La comparación del conocimiento y el comportamiento de los agricultores relacionados con cuestiones ergonómicas reveló que en algunos casos no había diferencias significativas entre el conocimiento y el comportamiento de los agricultores.

PALABRAS CLAVE: Ergonomía, higiene ocupacional, factores perjudiciales para el trabajo, salud, agricultura

ABSTRACT: Maintaining and developing human resources in the risky agricultural environment requires learning and observing safety principles and agricultural hygiene. With the growth of mechanization and use of agricultural devices and equipments, the use of chemicals and fertilizers has been resulted in accidents and occupational diseases in this sector. This study examines the factors influencing the safety and health behavior (complications from work) of farmers in the city of Qazvin. This research is descriptive. The population of the study included all farmers of Qazvin city (N = 23526). The sample of the study was 256 people who were randomly or systematically selected using the table of Bartlett and colleagues. The main instrument of the study is a questionnaire. The dependent variable in this study is the farmers' knowledge and performance regarding agricultural health and safety (complications from work). The comparison of farmers' knowledge and behavior related to ergonomic issues revealed that there was no significant difference between knowledge and behavior of farmers in some cases.

KEYWORDS: Ergonomics, occupational hygiene, job detrimental factors, health, agriculture

1 INTRODUCTION

Agriculture is one of the oldest and most valuable activities of human; in some cases, it is more than a profession so that all members of a rural family are involved in it and a large part of the economically active workforce are employed in this sector. (1, 2)

Today, the safety issue is one of the most important challenges facing employers and workers in the industry. Unfortunately, most employers consider addressing safety issues as the mere increase in the inventory costs. While by spending minimal costs in the safety area and recognition of risks inherent in working with a variety of tools and machinery in the manufacturing and industrial sectors, the occurrence of human and financial damages can be prevented. Maintaining and developing human resources in the risky agricultural environment requires learning and observing safety principles and agricultural hygiene. Although farmers enjoy the weather and a healthy diet has positive effects on their health, development and use of devices and equipment for agricultural mechanization and the use of agricultural equipments and machinery, the use of chemicals and fertilizers underlie the occurrence of accidents and occupational diseases in this sector. (3 and 4)

In today's industrial world, many workers and employees must comply with unfavorable conditions that the environment and tools impose on them and they must comply with restrictions. The consequence of such a compromise can be very critical and has an unfavorable impact on the quality of a person's life and health (5, 6); so that occupational diseases have been very important in terms of medical, economic, social, individual and productivity in the workplace and its impact on providing useful work (7).

When occupational health and safety was developed to protect the health of industrial workers who were exposed to accidents and occupational diseases, agriculture was considered as a simple and safe profession. Although farmers enjoy the weather and a healthy diet has positive effects on their health, mechanization and the use of agricultural equipments and machinery, and the use of chemicals and fertilizers underlie the occurrence of accidents and occupational diseases in this sector (1, 7). But farmers and agricultural workers are exposed to injuries more than workers and employees in other industries which results in the death and disability of them (8, 2, 10).

According to the statistics of the National Safety Council, which is obtained by the deaths of workers, agriculture has been recognized as one of the world's most dangerous jobs. People who work in farms, including farm owners, workers and their families and rental workers are exposed to life-threatening dangers five times more than other work forces even miners. In addition to the 1200 fatal

accidents that occurred for agricultural workers in 1992, it is estimated that the actual number of these accidents is more than 140,000. Since agricultural work is in such a way that the work and life environments are together, awareness of safety issues is necessary for farmers and their families (8).

In order to increase production capabilities in future, the sustainable development is explained as a strategy to meet the needs of the world's population, without causing adverse effects on hygiene, health and environment and it does not compromise basic resources of the world. In this process, the central role of human has always been emphasized and, in this regard, occupational health is considered as a basic element of the principles of sustainable development in the communities. Today, the importance of occupational health is evident to every person. To prevent accidents and occupational diseases and thus to prevent the reduction of human and material resources, to reduce stress for optimum use of human resources, to safely use technology, to create motivation, vitality and health of workforce (which leads to increasing product quality, productivity and management process), professional hygiene must be observed in the workplace. On the other hand, the overall state of the environment and the ecosystem of the region directly or indirectly affect the health of workers in different occupations, particularly agriculture. Therefore, there is a mutual relationship between occupational safety and health on the one hand and sustainable development along with a healthy environment on the other hand which is especially true in developing countries where health and family welfare depends on the health and productivity of its work force. In the absence of social security and in case of low levels of hygiene and reduction of working ability of this key member, a severe crisis is provoked in the family that directly affects health, welfare and economics of the society (11, 12). Therefore, to achieve sustainable development in agriculture, personal development and, following it, health-welfare status of farmers should be attended. In order to protect farmers' health against workplace hazards, recognition of hazards and other diseases that threaten the health of farmers is essential.

Moreover, agricultural production mainly depends on the strength and physical power of farmers. Based on the type of activity, the use of agricultural implements and the use of pesticides and pesticides, farmers are subject to certain occupational risks (1). The purpose of implementing the agricultural health initiative is to provide and improve the health level of agricultural workers, to produce healthy agricultural products, to provide consumer and environmental health, and to emphasize the fact that occupational health concentrates on promoting awareness and reducing risks in the workplace. However, little research has been conducted to explore the factors affecting the health and safety of agricultural work or to examine complications of agricultural work in our

country. Thus, since farmers are exposed to covert and overt damages that their effects become evident in long term, the aim of this study is to identify the factors that promote the safety of agricultural activities by recognizing and analyzing the determinants of health and safety in agriculture. In addition, by raising awareness of farmers about workplace hazards and by identifying injuries and occupational diseases, these complications may be reduced to a minimum.

This study examines the factors influencing the health and safety behavior (complications from work) of farmers in the city of Qazvin. In this regard, the following objectives will be considered:

- Exploring the personal and professional characteristics of farmers in the city of Qazvin within the framework of agricultural job's risks.
- Exploring knowledge and attitudes of farmers towards the importance and necessity of observing safety and health tips in agricultural profession.
- Examining the main hazards of agricultural jobs and factors conducive to them for farmers.
- Identifying and prioritizing the issues and problems of farmers in observing the safety and health tips in agriculture.
- Analysis of the factors influencing the behavior of farmers in different areas of health and safety (ergonomics, the use of pesticides, physical injuries and diseases, etc.)

2 RESEARCH METHODOLOGY

Regarding paradigm, this study is quantitative and its purpose is applied. In terms of data collection and analysis, it is descriptive. All farmers of Qazvin city comprise the study population that a total of 256 individuals (N = 23526) were randomly or systematically selected among them based on the Bartlett's table and colleagues. The main instrument of the study is a questionnaire. The dependent variable in this study is the scores of farmers' knowledge and performance regarding agricultural health and safety (complications from work). In the present study, the independent variables include the following cases:

Table 1. The independent variables

Variable name	Variable type
City	Nominal
Farming experience	Relational
Age	Relational
Income	Relational
Level of education	Ordinal

Farming history	Relational
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3 RESULTS

According to education, the results of frequency distribution of farmers showed that 20.4% are illiterate, 25/6% can only read and write, 30.7% are at the elementary level, 8.2% have diploma and the least percentage (6.1%) belongs to those who have associate's degree. In addition, the average age of farmers was 36 years. The majority of farmers (about 90%) were farm owner and 88.7% of farmers were covered by health insurance. The results show that the majority of farmers (about 74% of them) had no first-aid kit in the workplace. In addition, the majority of respondents (about 63%) announced the need to have medical records or health card and they were dissatisfied with not having them. The results of frequency distribution of farmers based on the disease history indicated that about 80 percent of them had no history of disease. Moreover, more than 58 percent of them are exposed to sound and more than 94 percent of respondents are exposed to direct sunlight, about 24 percent of them are exposed to vibration and more than 92 percent of farmers are exposed to cold, 33 percent of them are exposed to heat and more than 27 percent of them are exposed to attacks of domestic animals and more than 94 percent of them are at the risk of snakebite.

The findings of the frequency distribution analysis of respondents based on occupational hazards revealed that more than 41% of farmers are exposed to extreme fatigue and 95.4% of them are exposed to headache and dizziness and 83.6% of them are exposed to burning and irritation of the skin and more than 85 percent of them are at risk of eye irritation and 45.3 percent are at the risk of heart disease and about 28 percent of them are exposed to neurological disorders. Moreover, about 82 percent of them are at risk of muscle problems and 48.3 percent of them are at risk of blurred vision and other diseases.

3.1. Comparison of farmers' knowledge and behavior in relation to ergonomic issues

The results of the study show that there is a significant difference between farmers' knowledge and behavior in relation to ergonomic issues in many cases. Regarding these items: "You should squat and then lift the load"; "Do not bend your back when lifting"; "The load should be lifted from an appropriate height"; "When sitting (weeding, harvesting by hand) you should keep your posture changed"; "Short breaks during tasks that require bending and sitting cross-legged" and "I get help from others to carry the load", there is a significant difference at 99%. These results show that despite the existence of knowledge regarding many ergonomic issues, the behavior of farmers does

not match observing these cases. In other words, this knowledge is ignored at the time of behaving.

Table 2. Comparison of farmers' knowledge and behavior in relation to ergonomic issues

Item	Average ratings		Z	Sig. level
	Knowledge	behavior		
You should squat and then lift the load.	178.73	242.58	-6.063	0.000**
Do not bend your back when lifting.	178.42	244.58	-6.001	0.000**
The load should be lifted from an appropriate height.	173.73	249.27	-6.779	0.000**
When sitting (weeding, harvesting by hand) you should keep your posture changed.	176.23	246.77	-6.437	0.000**
Short breaks during tasks that require bending and sitting cross-legged.	171.07	251.93	-7.336	0.000**
I get help from others to carry the load.	167.46	253.54	-7.941	0.000**

**Significant at 1%

* Significant at 5% error

3.2. Comparison of the knowledge and behavior of farmers in the face of noise

The findings of the study indicate that in relation to exposure to noise, like ergonomic issues

(Table 4), despite the existence of knowledge in all items, there is a significant difference at 99%. And despite the existing knowledge in this domain, farmers do not attempt to fix it.

Table 3. Comparison of the knowledge and behavior of farmers in the face of noise

Item	Average ratings		Z	Sig. level
	Knowledge	behavior		
Using the phone	173.03	249.97	-7.174	0.000**
Repairing or replacing sound generator	166.81	250.99	-7.526	0.000**
Working less in noisy environment	25.148	274.05	-11.120	0.000**

3.3. Comparison of the knowledge and behavior of farmers in the face of the sunlight

The findings reveal that regarding these two items "when the sunlight is high and straight, it is possible to work in shadow" and "use long-sleeved clothing and suitable cover", there is no significant

difference. In other words, their knowledge and behavior is the same and they have observed these cases. But as the farmers expressed, they do not use sunglasses and do not avoid the sunlight between 10-14 hours and do not use a cap. The results also show there is a significant difference between knowledge and behavior of respondents with 99% confidence level in relation to these cases.

Table 4. Comparison of the knowledge and behavior of farmers in the face of the sunlight

Item	Average ratings		Z	Sig. level
	Knowledge	Behavior		
Using the phone	166.58	254.42	-7.788	0.000**
Repairing or replacing sound generator	171.48	251.52	-7.410	0.000**

Working less in noisy environment	169.55	251.06	-7.386	0.000**
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**Significant at 1%

3.4. Comparison of the knowledge and behavior of farmers in relation to the preparation of toxins and safe spraying

The findings in this section show that there is a consistency between knowledge and behavior of respondents in all items: "Eating and drinking during

spraying", "Spraying with safe garbs", "Keeping children and animals away from the place of preparing toxin", "The presence of children during spraying", "Keeping cans of toxins for other purposes", "Keeping toxins in cans for food and beverage" and only there is a significant relationship between knowledge and behavior of respondents in this item: "Using necessary protective equipments". (Table 6)

Table 5. Comparison of the knowledge and behavior of farmers in relation to the preparation of toxins and safe spraying

Item	Average ratings		Z	Sig. level
	Knowledge	behavior		
Eating and drinking during spraying.	150.01	145.81	-0.410	0.681
Using necessary protective equipments.	163.73	258.05	-8.352	0.000**
Spraying with safe garbs.	137.19	151.56	-1.398	0.162
Keeping children and animals away from the place of preparing toxin.	144.08	148.85	-0.475	0.635
The presence of children during spraying.	159.10	142.94	-0.357	0.721
Keeping cans of toxins for other purposes.	144.92	148.51	-0.357	0.721
Keeping toxins in cans for food and beverage	148.96	146.93	-0.198	0.843
Using usual face masks	158.58	264.42	-9.424	0.000**

3.5. Comparison of the knowledge and behavior of farmers in relation to the best way of preparing pesticides, toxins and disinfections

As table 7 indicates, knowledge and behavior of farmers in relation to the best way of preparing

pesticides, toxins and disinfections show that "free market" and "mobile vendors", "rural cooperative", "service companies" and "the pharmacy" are known locations by farmers. But they do not necessarily buy from approved sources because in all cases, whether they buy or not buy, significant differences were found between knowledge and behavior of respondents at the 99% confidence level.

Table 6. Comparison of the knowledge and behavior of farmers in relation to the best way of preparing pesticides, toxins and disinfections

Item	Average ratings		Z	Sig. level
	Knowledge	Behavior		
Using the phone	166.62	256.38	-8.077	0.000**
Repairing or replacing sound generator	153.15	267.12	-9.996	0.000**
Working less in noisy environment	149.09	273.91	-10.815	0.000**
	155.40	266.87	-9.681	0.000**
	161.97	261.03	-8.699	0.000**

**Significant at 1%

4. CONCLUSION AND SUGGESTIONS

The results showed that only 18.6 percent of the farmers had first-aid kit at their disposal in the workplace that this figure is too low and indicates that they do not pay attention to the possible work-related accidents. The results of frequency distribution of farmers based on the need for health cards and medical records showed that the majority (about 63%) of them have felt the need to have these cards and records and their not having these cards is very surprising. Ranking of factors associated with occupational hygiene of farmers indicates the good information of farmers and the importance of these two items for the farmers compared to other items of the research. The results also showed that respondents have high self-confident and have the moderate power to take risk.

Considering the fact that the expansion of training programs requires a lot of human and financial resources, identifying training priorities in different groups is essential. And it is possible to promote the knowledge and awareness of safety of individuals dramatically by designing training programs tailored to the needs of people.

In connection with cases related to ergonomic issues such as exposure to noise, the findings of the study indicates that despite having knowledge in this field, farmers do not do anything to fix it. Based on their need for training, educational planning in these cases can eliminate the gap in this sector.

Unfortunately, the comparison of the knowledge and behavior of farmers in relation to the best way of preparing pesticides, toxins and disinfections revealed that there is a significant difference in this section.

According to the respondents, crop production has reduced due to recent drought and this forces people to increase their activities to offset costs. On the other hand, it makes them not to spend money on matters which are not important in their opinion; occupational health is one of these cases unless a necessity arises. Long working hours is one of the important factors causing accident which has had the highest share in accident. With the increase in working hours, successive fatigue increases errors and the possibility of accidents and diseases among people.

The results showed that the knowledge of the participants about issues of safety and agricultural hygiene was at a medium level. These findings are consistent with the findings of Hosseini and colleagues (2011) who found that South Khorasan farmers' knowledge and attitudes in the field of agricultural hygiene was at a medium level. But it contradicted the findings of Heidari and Razavi Asl who found that the majority of the participants had low knowledge and awareness.

In the end, the emphasis of agriculture is basically on more production. Considering the fact that agricultural production depends mainly on the strength and physical power of farmers, a big vacuum is felt in the duties and functions of agricultural experts which is the lack of an agricultural hygiene unit. This requires the cooperation of office of agriculture and occupational hygiene to consider the important issue of health and safety of farmers by forming cooperation office between units of promoting and training agriculture and health.

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