

OCCUPATIONAL HEALTH LITERACY AMONG AGRICULTURAL WORKERS

By

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Abstract

Introduction: Occupational health literacy (OHL) is the degree of worker's capacity to obtain, process, and understand occupational safety, health services and information that he needs to work safely and take good decisions to keep himself safe at work. Occupational health literacy is important to the health and safety of workers. **Aim of Work:** To explore the status of occupational health literacy and the associated risk factors among agricultural workers in Ismailia governorate. **Materials and Method:** This cross-sectional study was carried out among agricultural workers in Ismailia governorate. A sample size of 500 workers was randomly selected through multi-stage sampling technique. Data collection tool was through a questionnaire made by the researchers after reviewing literature then translated into Arabic. **Results:** A total 500 agricultural workers with mean age of 49.67 ± 11.37 years. Ninety percent of the participants were males. Low back pain was reported among 46.2%. Mean of OHL score was 58.64 ± 23.48 . More than half of the participants (57%) had Low, 13.2% had Enough and 29.8% had Good OHL level. Significant positive correlation was reported between OHL score, age, and experience ($r= 0.321, 0.261$ respectively, $p < 0.001$). Also, there is statistically significant association between OHL levels, gender, and educational level ($p < 0.001$). Thirty percent of the participants had occupational injuries/ accidents. **Conclusion and Recommendations:** The occupational health literacy level of most of the agricultural workers is low. The educational level and experience are associated with increasing the occupational health literacy level. We recommended an occupational health and safety training program that is culturally and educationally appropriate for agricultural workers and their employers. **Keywords:** Occupational health literacy, Work experience, Educational level and Agricultural workers.

Introduction

Egypt has very rapidly grown the formal and informal sectors, including 29 million workers which increased in numbers in the last years. The sector of agriculture, hunting, forestry, represent one quarter of all employed persons (CAPMAS, 2019).

International Labor Organization (ILO) reported that a good national system of occupational health and safety is considered a very important for the implementation of safety policies and preventive programs in order to strengthen the prevention of occupational diseases (ILO, 1997). Laws and regulations should also be included as well as training about occupational health and safety (Nguyen et al., 2018).

The definition of health literacy is to what degree the individuals have capacity to obtain, process and understand the health services and data needed to make better health decisions (Yusida et al., 2016). This definition is then adapted to get a parallel one related to occupational safety and health called Occupational Health Literacy (OHL) which is the degree of worker's capacity to obtain, process, and get understand the occupational safety, health services

and information needed to work safely and take good decisions to keep himself safe at work (Rauscher and Myers, 2014).

In one hand health literacy in general is very important to our health. In the other hand occupational health literacy is very important to our health and safety at work (Wang et al., 2014).

Based on the limited literature on the OHL, as there are no tools for agricultural workers with proven validity and reliability, it was not possible to measure OHL until developing a tool using data from the Thai Occupational Health Literacy scale and Health literacy scale for workers.

Aim of Work

To explore the status of occupational health literacy and the associated risk factors among agricultural workers in Ismailia governorate.

Materials and Methods

Study design: This is a cross-sectional study.

Place and duration of the study: The study was conducted in four agricultural societies in Ismailia Governorate during the period from September 2020 to August 2021

Study sample:

The study was conducted among agricultural workers who were the owners of the farms, registered in the owners list, dealing with the agricultural societies and working in agriculture in different rural sites in Ismailia governorate. **Inclusion criteria:** Literate agricultural workers who aged from 18 to 75 years, owners of the farms and listing in the owners list were recruited to this study. Also, they should be working in agriculture by themselves for more than one year. **Exclusion criteria:** Wage agricultural workers not owners of the farm were excluded. The outcome was Occupational Health Literacy score. Factors affecting OHL as level of education, duration of work, gender, and age were also assessed.

Sample Size justification:

According to the following equation, the estimated sample size was 500 subjects.

$$n = \left[\frac{Z_{\alpha/2}}{E} \right]^2 * P(1 - P)$$

(Dawson and Trapp, 2004)

Where, n = required sample size, $Z_{\alpha/2}$ = 1.96 (The critical value

that divides the central 95 of the Z distribution from the 5 in the tail), $p = 44\%$ = The prevalence of low occupational health literacy (Yusida, 2016) and $E = 0.05$ = the margin of error (\cong width of confidence interval).

So, $N_0 = 379$ subjects, we add 30% (\cong 113) to compensate for non-responders, and the sample size was expanded to 500 subjects.

Study Methods:

Sampling Frame:

In Ismailia Governorate, there are 6 Agricultural Administrations which are:

First, Ismailia Administration (responsible for 6 agricultural societies)

Second, Abu-Sweer Administration (responsible for 10 agricultural societies).

Third, Fayed Administration (responsible for 7 agricultural societies).

Fourth, Al Qantara Gharb Administration (responsible for 8 agricultural societies).

Fifth, Al Qasaseen Administration (responsible for 3 agricultural societies).

Finally, Al Tal El kabeir Administration (responsible for 3 agricultural societies).

With a total number of 26545 agricultural workers, according to the statistical data obtained from the Directorate of agriculture in Ismailia governorate.

First, where geographically stratified sampling method by classifying the agricultural administrations into 4 strata; Abu-Sweer, Al Tal El Kabeir and Al Qasaseen at west, Al Qantra Gharb at north, Fayed at south and Ismailia.

Secondly, simple random sampling method by choosing randomly one agricultural society from each stratum.

Last stage was simple random sampling method to choose agricultural workers proportionately from the chosen agricultural societies using the list of their names.

Data collection Tool

A **questionnaire** was developed to describe the Egyptian OHL among agricultural workers using Azizi et al. (2019) and Suthakorn et al. (2020) questionnaires. OHL score was calculated by a Likert scale ranging as NO, To some extent and Sure with total score ranging from 0 to 56. Then the score calculation results of the interpretation given by the criteria used, Good occupational health literacy if

the percentage of between 75%-100% ($\geq 42-56$); Enough if the results obtained percentages between 56%-<75% ($\geq 32- <42$); and Low if the results obtained percentage <56% (< 32) (Baksh et al., 2015).

A pilot study was done to test the questionnaire reliability in Egyptian context. The questionnaire was translated into Arabic and the forward backward method was used.

Consent

An informed written consent was obtained from all participants before getting them involved in the study and after full explanation of the benefits and risks of the study in a clear simple language. Data was kept confidential by maintaining anonymity of the questionnaire.

Ethical Approval

Ethical clearance was taken from Research Ethics Committee of Faculty of Medicine, Suez Canal University, in 6-1-2020 with the number of 4073. Official permission from the workplace authorities was taken.

Data Management

The collected data were computerized and statistical analyzes

using SPSS program (Statistical Package for Social Science) version 26. Pilot study to test internal consistency and reliability was assessed using Cronbach's alpha coefficient. Its value of more than 0.7 indicates good internal consistency. Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) and Fisher exact were used to

calculate difference between qualitative variables as indicated. Quantitative data were expressed as mean and standard deviation. Pearson correlation and Spearman's correlation tests were used for correlating parametric and non-parametric variables.

All statistical tests were two tailed with significance level of p value <0.05 indicates significant while, $p \geq 0.05$ indicates non-significant difference.

Results

Table 1. Socio-demographic data of the participants (No=500).

Variables	(%) No
Age /years Mean \pm SD	11.3 \pm 49.7
Median (Range)	(22-70) 53
20--	(7.6) 38
30--	(22.0) 110
40--	(5.4) 27
50--	(55.2) 276
> 60	(9.8) 49
Gender Male	(90.0) 450
Female	(10.0) 50
Marital status Single	(4.2) 21
Married	(90.8) 454
Divorced	(1.2) 6
Widowed	(3.8) 19
Education Write and read	(14.4) 72
Primary	(7.8) 39
Intermediate	(32.0) 160
University/institute graduate	(45.8) 229
Smoking Non-smoker	(59.6) 298
Current Smoker	(34.8) 174
Ex-smoker	(5.6) 28
Drug abuse Yes	(14.4) 72
NO	(85.6) 428

A total of 500 participants aged from 22 to 70 years; 55.2% aged from 50 to 60 years and the mean of age was 49.7 ± 11.3 years, 91% were married, 45.8% were university or institute graduate and 59.6% of them were non- smokers. Taking drugs were reported among 14.4% of the participants (Table 1).

Table 2. Occupational data of the participants (No=500).

Variables	(%) No
Type of work: Farm work only	126 (25.2)
Pesticides only Applying	15 (3.0)
Both	359 (71.8)
Agricultural experience / years	
1--	130 (26.0)
20--	142 (28.4)
40 ≤	228 (45.6)
Mean ± SD	31.2 ± 16.2
Working hours /day	
Mean ± SD	6.2± 2.3
Range	(2- 10)
Working days / week	
Mean ± SD	4.8 ± 2.5
Range	(1- 7)
Getting help in agricultural work	
NO one	56 (11.2)
Family members only	226 (45.2)
Employee only	106 (21.2)
Both	112 (22.4)
injuries/Occupational accidents	150 (30)
Extra work characteristics	No = 300 (60%)
Duration/ years	
Mean± SD	22.4± 11.9
Range	(4- 37)
Days / week	
Mean± SD	5.6± 1.3
Range	(3- 7)
Regular PPE use	
Yes No (%)	69 (23)
NO No (%)	231 (77)

PPE: Personnel protective equipment.

Most of the study participants (71.8%) , were working in farms and used pesticides; 45.6% of them had agricultural experience more than 40 years. The mean working hours per day was 6.2±2.3 and mean days /week was 4.8 ± 2.5. About 45.2% was getting help from family members only. Sixty percent of the participants had extra work beside agricultural work with mean duration/ years was of 22.4± 11.9 years. The mean of working hours per day was 6.1± 1.2 hours and mean days per week was 5.6± 1.3 days. Only 23% of them used PPE (Table 2).

Table 3. Association between occupational health literacy (OHL) levels and socio-demographic data among participants (No=500).

OHL levels	Low (No= 285)	Enough (No = 66)	Good (No = 149)	χ^2	p-value Chi-square test
Age 20--	38 (13.3)	0 (0.0)	0 (0.0)	168.471	<0.001*
30--	80 (28.1)	30 (45.5)	0 (0.0)		
40--	20 (7.1)	7 (10.6)	0 (0.0)		
50--	91 (31.9)	20 (30.3)	138 (92.6)		
60≥	56 (19.6)	9 (13.6)	11 (7.4)		
Gender: Male	236 (82.8)	66 (100.0)	149 (100.0)	40.981	<0.001*
Female	49 (17.2)	0 (0.0)	0 (0.0)		
Educational level				160.811	<0.001*
Write &read	68 (23.9)	4 (6.1)	0 (0.0)		
Primary	39 (13.7)	0 (0.0)	0 (0.0)		
Intermediate	108 (37.9)	27 (40.9)	25 (16.8)		
institute/University	70 (24.5)	35 (54.0)	124 (83.2)		

*: Significant at p <0.05

Table 3 showed that 57% of participants had Low level of occupational health literacy (OHL) only 13.2% of participants had enough level and 29.8% of participants had Good level of OHL. There was statistically significant difference between levels of OHL regarding age, gender, and educational level.

Table 4. Correlation between occupational health literacy (OHL) score, experience, and age among the participants (No=500).

Variables	OHL score	
	r	p-value
Experience /years	.261	<0.001*
Age /years	.321	<0.001*

*: Significant at p <0.05

Table 4 showed that there is statistically significant positive weak correlation between OHL score ; experience (r= 0.261) and age (r= 0.321).

Discussion

Agriculture workers are considered as a major risk group that receives the greatest exposure of occupational hazards. Various types of exposure during work activities may affect the health conditions of workers during agricultural practices (Dhananjayan and Ravichandran, 2018).

The current study aimed of assessing the level of occupational health literacy (OHL) among agricultural workers in Ismailia governorate. About 14.4% of the studied agricultural workers could read and write, 7.8% of them were primary school graduates, 32% were high school graduates and 45.8% were university or institute graduates (Table 1). The studied agricultural workers were highly educated when compared to other studies done by Baksh, 2015 in Trinidad, West Indies; who detected that no one of their studied group were university or institute graduates, 58% were high school graduates, 35% completed primary education, 2% attained tertiary education and 1% had no formal level of education. These results may be due to exclusion of the illiterate agricultural workers.

Also, the Statistical Center of Iran found that 34.3% of Iranian agricultural

workers had no education (Nasab et al., 2009).

More than half (58%) of workers were older than 50 years (Table 1). Among all the studied workers, there are only one third had work-related accidents or injuries (Table 2). This is in coincidence with the study done by American National Institute of Health which reported that half of work-related accidents occur among workers who were below 25 years old (Guner and Ekmekci, 2019) employment status, education level, and race or ethnicity. Lower levels of HL may contribute to low uptake or less adherence to occupational health and safety (OHS. Also, 42% of deaths at the workplace occurred among age group of 25-44 years old. Old-age workers are at low risk, this may be due to variant reasons as having more years of experience (Nguyen, 2018) and more work and safety training (Wekoye et al., 2019).

As regards personal protective equipment (PPE); only 23% of the participated agricultural workers were regularly used them (Table 2), which is in agreement with Yarpuz-Bozdogan, (2018) in her study about the importance of personal protective equipment in pesticide applications in

agriculture in Turkey; who found that agricultural workers are not interested to wear personal protective equipment such as face masks, goggles, special boots, gloves.

Also 89.2% of the participants had equal or more than five years of agricultural experience. The agricultural workers who participated in the current study had been engaged in farming for a mean duration /years 31.16 ± 16.24 (Table 2). This is was higher than the study done by Oztas et al., (2018) to assess the farm workers' perceptions and practices toward pesticides, they detected that the farm workers had been working in farming for a mean period of 18.5 ± 10.6 years.

OHL score was Low among 57%, Enough among 13.2% and Good among 29.8% of the participants (Table 3). In contrast, Baksh et al. (2015) conducted a study among one hundred agricultural participants working on farms in north Trinidad and detected that Good knowledge was reported among their studied group as the highest level of the hazards of the agricultural work

The studied agricultural workers who had higher educational levels had also higher levels of occupational health literacy (Table 3). Previous studies

found that awareness of the agricultural workers about hazards is connected to their educational level. Educated workers who can read publications and access internet information thus increase their knowledge toward occupational health (Lekei et al., 2014; Paul et al., 2019).

Sapbamrer (2018) in his study on pesticide use, poisoning, and knowledge and unsafe occupational practices in Thailand demonstrated that illiterate agricultural workers and workers with low educational status do not understand or follow the instructions that present on pesticide container and machines labels, and often took less precautions in handling, mixing or applying pesticides and their attitudes toward seeking medical assistance was low.

Similarly, other studies showed that the safety knowledge of individuals had positive correlation with their educational status (Damalas and Koutroubas, 2017; Jallow et al., 2017).

There was a statistically positive correlation between experience duration and occupational health literacy score among the studied group (Table 4). Experience in agriculture work is a valued factor because it had

an important participation in gaining skills. Experience leads to increase production, input use effectively, higher levels of output quality and decline costs. It is thought that experience had a positive relation with the management capability of a farm workers (Baksh et al., 2015).

Conclusion: The occupational health literacy level of most of the agricultural workers is low. The educational level and experience were associated with increasing the occupational health literacy level.

Recommendations:

Ministry of Agriculture: We recommended that Ministry of Agriculture should develop an occupational health and safety training program that is culturally and educationally appropriate for agricultural workers and their employers. Training courses should take place by agricultural guidance in agricultural societies. Also, education about occupational hazards related to agriculture and how to do their work safely specially pesticides application and to avoid occupational accidents and injuries. Educational equipment and materials about occupational safety and health should be available at the agricultural societies.

Ministry of Education: We recommended that Ministry of Education should include occupational safety as a part of agricultural education. Provide training about occupational safety and health before graduation from agricultural education.

Ministry of Health and Population: We recommended that Ministry of Health and Population should develop healthcare services specific to agricultural workers. Also, they should develop health education program and periodic medical examination for them.

Agricultural Guidance: We recommended that agricultural guidance should provide the agricultural workers with personal protective equipment. They also should develop training program about occupational safety including using personal protective equipment and its importance.

Ministry of Manpower and Immigration: A surveillance system for occupational injuries and illnesses among agricultural workers should be documented by Ministry of Manpower and Immigration so we can know the extent of the problem and to address the suitable solution.

Conflict of interest

None

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