



Assessment of the Farmers' Awareness about Occupational Safety and Health and Factors Affecting it; A Case Study in Mahidasht, Kermanshah Province

ARTICLE INFO

Article Type

Descriptive Study

Authors

Moradhaseli S. ¹ PhD,
Mirakzadeh A.A. ² PhD,
Rostami F. ² PhD,
Ataei P. * PhD

How to cite this article

Moradhaseli S, Mirakzadeh A A, Rostami F, Ataei P. Assessment of the Farmers' Awareness about Occupational Safety and Health and Factors Affecting it; A Case Study in Mahidasht, Kermanshah Province. Health Education and Health Promotion. 2018;6(1):23-29.

*Department of Agricultural Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran

¹Agricultural Extension & Education Department, Agriculture Faculty, Tarbiat Modares University, Tehran, Iran

²Agricultural Extension & Education Department, Agriculture College, Razi University, Kermanshah, Iran

Correspondence

Address: Department of Agricultural Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran. Postal Code: 149/913111
Phone: +98 (21) 44787573
Fax: +98 (21) 48292200
pouria.ataei@modares.ac.ir

Article History

Received: September 15, 2017
Accepted: November 2, 2017
ePublished: February 1, 2018

ABSTRACT

Aims In Iran, safety and health education in agriculture such as the industrial sector has not been taken into account, and most farmers are not covered by professional health. The aim of this study was to assess the farmers' awareness about occupational safety and health and factors affecting it.

Instruments & Methods The population of the present descriptive correlational study included 140 households from farmers based on the simple random sampling method in 2014, in Mahidasht, Kermanshah Province, Iran. A researcher-made questionnaire was used as a research instrument and its validity was confirmed by the panel of experts and its reliability was confirmed by Cronbach's alpha coefficient. The data were analyzed by SPSS 23, using multiple stepwise regression and Pearson correlation test.

Findings Most of the farmers had a negative attitude towards the observance of occupational health issues. The mean awareness had a significant correlation with social status ($r=0.47$; $p=0.001$), satisfaction of the agriculture as an occupation ($r=0.51$; $p=0.0001$), attitude ($r=0.37$; $p=0.012$) and, economic status ($r=0.42$; $p=0.005$). In the first step, the social status and satisfaction of the agriculture as an occupation predicted 66.9% of variance of awareness. In the second step, social status and satisfaction of the agriculture as an occupation as well as attitude predicted 53.3% of variance of awareness, and in the third step, by adding economic status to the previous variables; all variables predicted 51.2% of variance of awareness.

Conclusion The level of farmers' awareness about occupational safety and health is moderate. Social status, attitude, and economic status affect the farmers' awareness about occupational safety and health.

Keywords Occupational Safety; Health; Awareness; Farmers

CITATION LINKS

[1] Safety attitude of the staff in a medical facility, education and healthcare ... [2] The problems of rural women work in tea ... [3] The role of information technology in the prevention of hazards in ... [4] Farm work-related injuries and risk factors in South ... [5] Health and safety in agriculture, forestry and fishing in ... [6] Factors affecting the health and safety behavior of factory ... [7] Knowledge attitude and practice of pesticide use among agricultural ... [8] Analysis of awareness of health knowledge among rural residents in Western ... [9] Occupational Safety and Health on Ghanaian ... [10] Number and rate of fatal occupational ... [11] International comparisons and evaluations ... [12] Summarization of injury and fatality factors involving children ... [13] Zero accident at my farm -The farmers mental ... [14] Farmers' knowledge of occupational poisonings in South ... [15] Agricultural occupational health knowledge and practice ... [16] Greenhouse owners attitude and behavior towards the use of chemical ... [17] Using social-psychology models to understand farmers' conservation ... [18] Risk assessment of pesticide exposure on health of ... [19] Knowledge, attitude, practice, and toxicity symptoms associated with pesticide use among ... [20] Pesticide exposure beliefs among Latino farmworkers ... [21] Farmers' knowledge, attitudes and perceptions of occupational health and safety hazards ... [22] Awareness and need for knowledge of health and safety among ... [23] Determining sample size for research ... [24] Identify factors in car accidents agricultural ... [25] Peasant association member's knowledge, attitudes, and practices towards safe ... [26] Farmers' knowledge, practices and Injuries associated with pesticide ... [27] Occupational health and safety issues among vegetable farmers in trinidad and the ... [28] Occupational safety of farmers in ... [29] Effects of an injury and illness prevention ... [30] Occupational health hazards, stress and ... [31] Association of health symptoms with ...

Introduction

Currently, most of the developed countries emphasize that having advanced management systems and advanced technology is not enough to achieve sustainable development. Promoting the employees' safe behaviors, their values, beliefs, and attitudes towards safety as well as the organization's attitude towards safety are other ways of prevention and sustainable development [1].

There is a mutual relationship between occupational health and safety, on one hand, and sustainable development combined with healthy environment, on the other one. In the developing countries, the health and well-being of the family depends on the health and productivity of its workforce.

A severe crisis is created in the family if the health level of the working capacity of the workforce is decreased [2]. In sustainable development process, the central role of humans has always been emphasized, and in this regard, professional health is considered as a cornerstone of the principles of sustainable development in societies. Health is more important, especially in the agricultural sector, since 1.3 billion workers are busy in the agricultural sector, which is equivalent to half of the total labor force in the world [3]; thus, agriculture is recognized as a high-risk business worldwide [4].

However, the causes of incidents among farmers are low awareness and the inappropriateness of their attitude in the field of occupational safety and health, which also affects their safety behavior.

Based on Health and Safety Executive [5], occupational safety and health are conditions and factors that are effective or can be effective in protecting the workers (including temporary or permanent workers) from visiting the workplace or anyone else. Occupational safety and health conditions can be identified by identifying the work hazards and minimizing them. Risk is a potent or a position of action to cause an accident and damage to a human being or the creation of a disease or a combination of it [6]. So, one of the factors that contributes to prevent accidents is safety awareness and occupational health. Low awareness of farmers and lack of adequate education have caused injuries and diseases in them [7].

On the other hand, one of the most important structural problems in rural areas is the weakness of cognitive abilities (such as health consciousness, health attitude, and self-efficacy) and health behaviors [8]. This is despite the fact that the mortality rate in the agricultural sector has remained steady over the last decade [9]. Annually, about 13,000 workers in agriculture, forestry, and fishing suffer from work-related injuries and illnesses in the UK [5]. According to the US Bureau of Labor Statistics [10], despite interventions, the mortality rate was 20.3 per 100,000 workers in 2013. In Europe, occupational diseases caused by agricultural work are about twice more than industry [11]; nearly 21% of all incidents recorded on farms occur to children and young people, and more than 77% of all recorded incidents have been lethal [12]. In Iran, safety and health education in agriculture such as the industrial sector has not been taken into account, and most farmers are not covered by professional health. The level of communication between occupational health units and the agricultural sector is much lower than the ratio of occupational health to other industries.

The results of a study conducted by Sikkeland [13] showed that many farmers perceive hazards as a natural part of their lives. A study conducted by Hosseini *et al.* [14] demonstrated that there is a significant relationship between the awareness of individuals about precautionary measures and the level of education, age, and place of residence of farmers. Heidari and Razavi Asl [15] showed that farmers' knowledge about occupational health was not sufficient, especially in relation to work-related complications; the lowest level of knowledge (10%) was related to the effects of labor on the occurrence of kidney, lung, and digestive disorders caused by work. Ghasemi and Karamy [16] demonstrated that education indirectly affects the greenhouse owners' protective behavior. Beedell and Rehman [17] stated that factors such as gender, personal characteristics, social status, and race do not directly affect the safety behavior of individuals, but indirectly affect their attitudes, mental norms, and behavioral stability.

A study carried out by Khan *et al.* [18] in Pakistan showed that farmers had a low knowledge and attitude about safety

measures and poor performance in the use of protective equipment during the use of pesticides. Yassin *et al.* [19] reported that farmers have a high awareness about the effect of pesticides on their health (97.9%). According to the findings of Elmore and Arcury's study [20], most farmers know that pesticides are harmful.

The results of a study performed by Baksh *et al.* [21] revealed that farmers had a good level of knowledge, a moderate attitude, and a negative attitude towards occupational safety and health. In addition, knowledge of farmers did not have a significant relationship with age, gender, and role of people in the field of operations. The results of Lunner-Kolstrup and Ssali's study [22] imply that farmers' awareness of agricultural health and safety risks, disease, and injury prevention were low. In general, the literature review suggests that various factors affect farmers' awareness of occupational safety and health. The identification of these factors is important for raising the awareness of farmers; therefore, the aim of this study was to assess the farmers' awareness about occupational safety and health and factors affecting it.

Instruments and Methods

The population of the present descriptive correlational study included 213 households from farmers in Mahidasht, Kermanshah Province, Iran. The sample size was selected as 140 households according to Krejcie and Morgan's table [23], based on the simple random sampling method in 2014.

The data collection tool was a researcher-made questionnaire, including the individual and professional characteristics of the farmers, as well as their social status, economic status, awareness about safety, farmers' occupational health, and attitude towards safety and occupational health. The variables were measured by a 5-level Likert scale. Knowledge section consisted of 57 items, which was scored from 1 to 5. The scores below 50 were considered as weak, scores 50 to 75 as average, and scores above 75 as good.

The research variables included age, education, work record, social status, daily work time, job satisfaction, economic status, the farmers' attitude, and awareness regarding safety and occupational safety. The

face and content validities of the questionnaire were confirmed by the panel of experts, and its reliability was proved through a pilot study, calculating Cronbach's alpha.

One of the conditions for performing regression analysis is to investigate the existence of a coherent relationship between independent variables and dependent variables. For this purpose, the VIF statistic was used; the values exceeding 10 indicate the existence of a coherent relationship between the variables. Cronbach's alpha coefficient of knowledge was 0.77, attitude was 0.77, and social status was 0.71. The ISDM (Interval of Standard Deviation from Mean) was used to measure the farmers' attitude regarding safety and occupational safety. The data were analyzed, using SPSS 23. Multiple stepwise regression was used to determine the factors affecting the farmers' awareness about occupational safety and health. Also, Pearson coefficient was calculated to investigate the correlation between independent variables and farmers' awareness.

Findings

Most of the farmers participating were men (69%). The mean age of the farmers was 42.7 ± 14.90 years old. The majority of farmers had an academic degree below diploma (81%), 13% were illiterate, and 6% had experienced university education; 93% of the farmers did not attend any professional health education, 37% had a low social status, 27% had a moderate social status, and 36% had high social status in the region. The average yield of the crops was 1.38 ± 0.88 tons per year.

Farmers' attitude towards safety and occupational health: A total of 45% of the farmers' attitude towards professional health issues was negative, 15% neutral, and 40% positive. In other words, most of the farmers had a negative attitude towards the observance of occupational health issues.

Farmers' awareness about factors affecting their health: The highest rate of awareness of occupational diseases was in the case of low back pain (82%) and hand palm (81%), with the lowest awareness about the incidence of cancer (25%) and parasitic diseases (20%). Most of the farmers were aware of sunlight (93%) and dust (90%) as detrimental factors, but less susceptibility to vibration and spray as a harmful agent (29%). The farmers could

choose more than 1 option (Tables 1 & 2).

Table 1) Frequency distribution of the participants based on their awareness of signs of occupational hazards

Signs of occupational hazards	Percentage
Excessive fatigue	72
Headache and dizziness	62
Nausea and vomiting	41
Irritation and irritation of the skin	70
Blurred vision	32
Diarrhea	30
Parasitic disease	20
Pneumonia	28
Kidney disease	26
Hand palm	81
Burning eyes	63
Heart disease	42
Neurological disorders	49
Muscular discomfort	71
Abdominal pain and cramping	32
Low Back pain	82
Asthma	46
Cancer	25
Heavy ear	32

Table 2) Frequency distribution of the participants based on their knowledge of harmful factors

Harmful factors	Percentage
Sunlight	93
Dust	90
Heat	36
Sound factor	77
Insects and insidious animals	45
Humidity	41
Domestic animal attacks	29
Snakebite	68
Mist (spray)	29
Cold	78
Inappropriate tool	60
Scorpion bite	55
Nerve agents (psychological)	42
Wild animals	55
Viral, microbial and fungal agents	59

Farmers' occupational safety and health awareness: The level of awareness of farmers was moderate. The mean knowledge score of farmers was 61.59 ± 6.2 out of 100, the lowest level of knowledge belonged to exposure to noise, and the highest knowledge score was related to the observing the principles of protection and sanitation in spraying (Table 3).

Table 3) Mean scores of the knowledge and awareness of farmers about safety and occupational health

Awareness of Farmers	Awareness Score
Ergonomic	52.42 ± 10.21
Exposure to noise	51.40 ± 11.36
Exposure to sunlight	60.48 ± 16.77
Exposure to dust	60.06 ± 10.33
Preparation of poisons and spraying	64.47 ± 21.06
Use of personal protective equipment	65.80 ± 11.88
Observing the principles of protection and sanitation in spraying	69.80 ± 12.55
Buying pesticides, toxins and Disinfectants	60.04 ± 22.01
Dispose of empty containers	61.83 ± 14.24
Protection against vermin	62.35 ± 10.21
Individual protection during harvest	62.05 ± 11.25
Individual protection in working with tractors and machinery	59.21 ± 15.25
Rescuing the hurt person	60.32 ± 11.21
Treatment for a person with sunstroke	53.73 ± 10.31
Treatment for a person with frozen organs/tissues	57.40 ± 13.21

Factors affecting the farmers' awareness of occupational health and safety: The mean scores of social status, satisfaction of the agriculture as an occupation, attitude and, economic status were 14.61 ± 3.41 , 10.32 ± 4.62 , 36.11 ± 4.40 , and 9.42 ± 2.42 , respectively. The mean awareness had a significant correlation with social status ($r=0.47$; $p=0.001$), satisfaction of the agriculture as an occupation ($r=0.51$; $p=0.0001$), attitude ($r=0.37$; $p=0.012$) and, economic status ($r=0.42$; $p=0.005$).

In the first step, the social status and satisfaction of the agriculture as an occupation predicted 66.9% of variance of awareness. In the second step, social status and satisfaction of the agriculture as an occupation as well as attitude predicted 53.3% of variance of awareness, and in the third step, by adding economic status to the previous variables; all variables predicted 51.2% of variance of awareness.

Discussion

In this research, the awareness of farmers was thoroughly investigated regarding safety and occupational health in Mahidasht, Kermanshah Province, Iran. About half of the farmers were illiterate or had a basic reading and writing ability. The low level of literacy

can take the opportunity of training through letters from the authorities. Most farmers were in the mid-age range. Their activity is significantly affected by the long-term work-related injuries, so that the age, vision, hearing, physical ability, speed, and reaction of individuals have been decreased. The lack of familiarity with safety and health facilities, on one hand, and the need for technological advancement, on the other one, has challenged the farmers to apply the principles of equipment, and function in a variety of contexts. The average yield was 1.38 tons per hectare. The farmers claimed that the production has declined due to a recent drought. This forces the farmers to increase their activity to compensate for costs. On the other hand, they do not pay for things that they consider to be important, including health work. Farmers usually work 59.5 hours a week; in summer, the working hours are increased. Neamati *et al.* [24] stated that the number of work hours (more than 8 hours a day) is one of the major factors of accidents, because with increasing the work hours, the fatigue increases the number of mistakes as well as the likelihood of accidents and illness among people. The main awareness of farmers about harmful factors was the occupational injuries that occurred by harmful factors. Most of the farmers were aware of the harmful factors associated with sunlight and dust. They claimed to have had burnt skin or exposure to dust and coughing. But, they were unaware of the harmful effects of repeated exposures. In addition, the lowest level of knowledge about occupational diseases was with regard to parasitic diseases and cancers, because cancer is a dangerous occupational hazard, and most farmers are at risk of it. The farmers' knowledge and attitude about agricultural safety and health issues were moderate. This finding is line with the results of a study carried out by Hosseini *et al.* [14]; however, it has contradiction with the findings of the studies conducted by Karunamoorthi *et al.* and Lekei *et al.* [25, 26]. A total of 93% of the farmers had not participated in any occupational safety and health education courses before. It seems that the lack of farmers' participation in such courses and lack of their training are due to the inactivity of the agricultural section, as well as the education and occupational health

sectors. This is a reason that farmers are not so familiar with the risks and dangers of agricultural labour. This is despite the fact that agricultural and education programs can reduce this problem [27-31]. In addition, the following items are suggested:

Informing farmers through media such as radio and television can be effective, because radio and television are considered to be the most appropriate communication channels. On the other hand, considering that most farmers were illiterate, it is suggested that in addition to radio and television programs, experts at health and agricultural sectors inform the farmers through educational posters. It is also proposed that appropriate conditions be established for content training courses (new and functional), and teaching methods and amenities be set up so that older farmers can participate with greater patience and accuracy in the classrooms. In general, the safety and health awareness of most farmers was not at a good level. The first step in changing behaviour is having enough knowledge about the problem, because having enough knowledge is a prerequisite for changing behaviour. On the other hand, a way that can guarantee the full respect of precautionary principles is to raise awareness among farmers. Therefore, recognizing people's awareness of educational programming and designing is necessary.

Also, this study faced with various limitations. Some of the limitations were included high distribution of farmers in the region, inappropriate weather conditions, weakness in the number of farmers' population and low collaboration of health center and organization of agriculture Jihad with researcher.

Conclusion

The level of farmers' awareness about occupational safety and health is moderate. Social status, attitude, and economic status affect the farmers' awareness about occupational safety and health.

Acknowledgements: We would like to thank farmers' Mahidasht County for its valuable participation.

Ethical permissions: Not reported by the authors.

Conflict of Interests: The authors declare

that they have no competing interests.

Authors' Contribution: Moradhaseli S. (First author), Introduction author/ Original researcher (40%); Mirakzadeh A.A. (Second author), Methodologist/ Assistant (25%); Rostami F. (Third author), Assistant/ Statistical analyst (15%); Ataei P. (Fourth author), Assistant/ Discussion author (10%)

Funding: The research has not funding source.

References

- 1- Tabibi J, NasiriPor AA, Maleki MR, Raisi P, Mahmodi M, Azimi L. Safety attitude of the staff in a medical facility, education and healthcare Center- Tehran 2010. *Iran Occup Health J.* 2011;7(4):25-31. [Persian]
- 2- Alipour N. The problems of rural women work in tea plantations [Internet]. Iran Tea Organization[updated 2010 Dec; cited 2017 May]. Available from: <http://irantea.org/fa/?p=812>. [Persian]
- 3- Hedayati H, Sahrai A. The role of information technology in the prevention of hazards in agriculture (Safety and Health in Agriculture). National Conference of passive defense in the agricultural sector. Qeshm Island: Cooperative Promoting Science Leading Iranians; 2013. [Persian]
- 4- Kim H, Räsänen K, Chae H, Kim K, Kim K, Lee K. Farm work-related injuries and risk factors in South Korean agriculture. *J Agromedicine.* 2016;21(4):345-52.
- 5- Health and Safety Executive. Health and safety in agriculture, forestry and fishing in Great Britain [Internet]. Liverpool: Health and Safety Executive; 2017 [updated 2017; cited 2017] Available from: <http://www.hse.gov.uk/statistics/industry/agriculture/agriculture.pdf>.
- 6- Idirimanna ISAD, Jayawardena LNAC. Factors affecting the health and safety behavior of factory workers. 11th Global Conference on Business and Economics. United Kingdom: Manchester Metropolitan University; 2011.
- 7- Mohanty MK, Behera BK, Jena SK, Srikanth S, Mogane C, Samal S, et al. Knowledge attitude and practice of pesticide use among agricultural workers in Puducherry, South India. *J Forensic Legal Med.* 2013;20(8):1028-31.
- 8- Yuan F, Qian D, Huang C, Tian M, Xiang Y, He Z, et al. Analysis of awareness of health knowledge among rural residents in Western China. *BMC Public Health.* 2015;15:55.
- 9- Muilerman S. Occupational Safety and Health on Ghanaian cocoa farms [Internet]. Accra: Sustainable Tree Crops Program, International Institute of Tropical Agriculture (IITA) [updated 2013; cited 2017]. Available from: <http://www.cgiar.org/244466/occupational-safety-and-health-on-ghanaian-cocoa-farms/>.
- 10- Bureau of Labor Statistics. Number and rate of fatal occupational injuries [Internet]. United States: Bureau of Labor Statistics, Department of Labor; 2011 [cited 2011 May; update 2011]. Available from: <https://www.bls.gov/iif/oshwc/foi/cfch0010.pdf>.
- 11- Rautiainen R. International comparisons and evaluations in OHS [Internet]. Ireland: Irish Meeting 2011 on Agricultural Occupational Health and Safety [updated 2011; cited 2017]. Available from: <https://www.teagasc.ie/media/website/publications/2011/IrishOHSproceedings.pdf>.
- 12- Issa SF, Field WE, Hamm KE, Cheng YH, Roberts MJ, Riedel SM. Summarization of injury and fatality factors involving children and youth in grain storage and handling incidents. *J Agric Saf Health.* 2016;22(1):13-32.
- 13- Sikkeland IJ. Zero accident at my farm -The farmers mental HES-challenge?. Nordic Meeting on Agricultural Occupational Health & Safety; Conference. Ystad, Sweden: Finnish Institute of Occupational Health (FIOH) & Farmers' Social Insurance Institution (Mela); 2014.
- 14- Hosseini MH, Ramezani A, Hanafie Bojd M, Hamidi H, Samimi K, Mohsenzadeh MA, et al. Farmers' knowledge of occupational poisonings in South Khorasan, 2009. *J Birjand Univ Med Sci.* 2011;18(1):47-54. [Persian]
- 15- Heidari A, Razavi Asl SMH. Agricultural occupational health knowledge and practice of farmers in 2007 in Qom province. *Qom Univ Med Sci.* 2007;1(3):51-8. [Persian]
- 16- Ghasemi S, Karamy A. Greenhouse owners attitude and behavior towards the use of chemical pesticides in greenhouses case of Fars province. *J Dev Agri Economics.* 2009;23(1):28-40. [Persian]
- 17- Beedell J, Rehman T. Using social-psychology models to understand farmers' conservation behaviour. *J Rural Stud J.* 2000;16:117-27.
- 18- Khan DA, Shabbir S, Majid M, Ahad K, Naqvi TA, Khan FA. Risk assessment of pesticide exposure on health of Pakistani tobacco farmers. *J Expo Sci Environ Epidemiol.* 2010;20(2):196-204.
- 19- Yassin MM, AbuMourad TA, Safi JM. Knowledge, attitude, practice, and toxicity symptoms associated with pesticide use among farm workers in the Gaza Strip. *Occup Environ Med.* 2002;59:387-93.
- 20- Elmore RC, Arcury TA. Pesticide exposure beliefs among Latino farmworkers in North Carolina's christmas tree industry. *Am J Indust Med.* 2001;40(2):153-60.
- 21- Baksh K, Ganpat W, Narine L. Farmers' knowledge, attitudes and perceptions of occupational health and safety hazards in Trinidad. West Indies and implications for the agriculture sector. *J Agri Ext Rural Dev.* 2015;7(7):221-8.
- 22- Lunner-Kolstrup C, Ssali TK. Awareness and need for knowledge of health and safety among dairy farmers interviewed in Uganda. *Front Public Health.* 2016;4:137.
- 23- Krejcie RV, Morgan DW. Determining sample size for research activities. *Educ Psychol Meas.* 1970;30(3):607-10.
- 24- Neamati Y, Baradaran M, Asoudar MA, Ghanyan M. Identify factors in car accidents agricultural province. First National Conference of Agricultural Extension and Education. Shiraz: Shiraz University; 2008. [Persian]
- 25- Karunamoorthi K, Mohammed A, Jemal Z. Peasant association member's knowledge, attitudes, and practices towards safe use of pesticide management. *Am J Ind Med.* 2011;54(12):965-70.
- 26- Lekei EE, Ngowi AV, London L. Farmers' knowledge, practices and Injuries associated with pesticide exposure in rural farming villages in Tanzania. *BMC Public Health.* 2014;14:389.
- 27- Baksh KS, Ganpat W, Narine LK. Occupational health and safety issues among vegetable farmers in trinidad and the implications for extension. *J Agric Saf Health.* 2015;21(3):159-71.

28- Lu JLDP. Occupational safety of farmers in the vegetable industry. *Int J Occup Saf Ergon*. 2011;17(4):445-53.

29- Santaweek S, Chapman RS, Siriwong W. Effects of an injury and illness prevention program on occupational safety behaviors among rice farmers in Nakhon Nayok province, Thailand. *Risk Manag Health Policy*. 2014;7:51-60.

30- Oyekale AS, Oyekale TO. Occupational health hazards, stress and self-reported hypertension among food crop farmers in south western Nigeria. *Occup Med Health Aff*. 2015;3(4):96.

31- Hongsibsong S, Sittitoo N, Sapbamrer R. Association of health symptoms with low-level exposure to organophosphates, DNA damage, AChE activity, and occupational knowledge and practice among rice, corn, and double-crop farmers. *J Occup Health*. 2017;59(2):165-76.