

# National survey on identifying vulnerable workers and availability of occupational health services in the Republic of Macedonia

JOVANKA KARADZINSKA-BISLIMOVSKA, J. MINOV, SNEZANA RISTESKA-KUC, S. STOLESKI, D. MIJAKOSKI, S. TODOROV, VERA BASAROVSKA, MARIJA KISMAN-HRISTOVSKA\*, TEUTA AGAI-DEMJAHA\*\*

Institute for Occupational Health of R. Macedonia, Skopje, R. Macedonia - WHO Collaborating Centre for Occupational Health

\* WHO Country Office, Skopje, R. Macedonia

\*\* Ministry of Health of R. Macedonia, Skopje, R. Macedonia

## KEY WORDS

Health risk; safety at work; vulnerable workers

## SUMMARY

**Objective:** *In order to identify vulnerable groups and high risk sectors which are at greater need of basic occupational health services, we performed a questionnaire-based study including, as key informants, different stakeholders and key players in the process of improving health and safety at work.* **Methods:** *The Institute of Occupational Health of Macedonia developed an specially designed questionnaire in collaboration with the WHO Regional Office for Europe. Vulnerable groups/sectors include: unemployed, female workers, workers aged under 18 years, workers aged over 55 years and workers in the informal sector, construction industry, textile industry, agriculture, and the health care workers. the Likert scale method was used to evaluate most of the questions in the questionnaire, and the study subjects were instructed to give their professional opinion in completing the questionnaire.* **Results:** *All examined groups/sectors were judged to have high risk for occupationally related health problems by over 70% of the responders. Aging workers and workers in agriculture and in the construction industry were judged to have the highest risk for such problems, as well as low health status. All examined groups/sectors were judged to have good availability of primary health care services, while agriculture, unemployed, the informal sector and young workers were judged as having poor availability of occupational health services.* **Conclusion:** *The provision of Basic Occupational Health Services (BOHS) incorporated in the framework of primary health care via the public health approach was judged as a good concept for Macedonia.*

## RIASSUNTO

**«Indagine nazionale per l'identificazione di lavoratori vulnerabili e disponibilità dei Servizi di Medicina del Lavoro nella Repubblica di Macedonia».** *Allo scopo di identificare i gruppi di lavoratori vulnerabili e i settori produttivi ad alto rischio, che hanno maggiore necessità di servizi di medicina del lavoro di base, è stato svolto uno studio mediante questionario, coinvolgendo, come informatori chiave, i vari "stakeholders" e attori chiave nel processo di miglioramento delle condizioni di salute e di sicurezza sul lavoro. L'Istituto di Medicina del Lavoro della*

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Corrispondenza: Jordan Minov, MD PhD, Institute of Occupational Health – WHO Collaborating Center and GALEN Collaborating Center, Skopje, R. Macedonia, II Makedonska Brigada 43, 1000 Skopje, R. Macedonia - Tel: + 389 2 2639 637

Fax: + 389 2 2621 428 - E-mail: minovj@hotmail.com

*Macedonia ha elaborato uno speciale questionario in collaborazione con l'Ufficio Regionale dell'OMS per l'Europa. Sono stati selezionati quali gruppi/settori vulnerabili in Macedonia il settore informale, i disoccupati, lavoratrici, lavoratori sotto i 18 anni e lavoratori con più di 55 anni, l'edilizia, l'agricoltura, l'industria tessile, e i lavoratori sanitari. Per la maggior parte dei quesiti è stato utilizzato il metodo della scala Likert, inoltre ai soggetti partecipanti allo studio è stato richiesto di fornire la loro opinione professionale per completare il questionario. Più del 70% dei partecipanti ha valutato che tutti i gruppi/settori erano esposti ad alto rischio per problemi di salute associati al lavoro. E' stato valutato che l'edilizia, i lavoratori anziani e l'agricoltura hanno il maggior rischio per tali problemi, nonché uno stato di salute non buono. E' stato valutato che l'accesso a servizi sanitari primari era buono per tutti i gruppi/settori, mentre è stato giudicato che per l'agricoltura, i disoccupati, il settore informale e i lavoratori giovani l'accesso ai servizi di medicina del lavoro era inadeguato. Il concetto di Servizi di Medicina del Lavoro di Base, integrato nel quadro dei servizi sanitari primari attraverso la struttura della medicina pubblica, è stato giudicato come concetto positivo per la Macedonia.*

## INTRODUCTION

The past decades of increasing globalization have led to dramatic and rapid changes in working life in countries throughout the world, including the Republic of Macedonia.

Global competition and technological development, changes in political systems and socio-economic conditions, effects of the transition process and development of the market economy gave rise to new patterns of employment and work organization. The fragmentation of enterprises with an increased number of small and medium sized enterprises produced a growth of the informal sector and migration, as well as high rates of unemployment, especially in a period of economic recession. In the same time, the global demographic trends are an aging and prolonged life expectancy of the workforce, with higher participation of female workers (55).

All those changes were reflected in living and working conditions, work practices, as well as occupational health and safety of the working population. Employment and working conditions have powerful effects on health and health equality. Their negative impact could cause great differences between various groups of workers in terms of level occupational risk and health status (14).

There are some special problems of vulnerable groups ("susceptible", "at risk" "predisposed") and underserved populations as a specific segment of

the working population: unemployed, informal sector, small enterprises, young workers, aging workers, poor workers, female workers and high risk sectors like mining, construction, agriculture, transport, health care sector, etc. They are susceptible or at higher risk of the specific occupational hazards, with reduced capacity for control of diseases and accidents and decreased possibility for prevention and promotion of health at work. The vulnerable workers and underserved populations are more likely to have occupationally related health problems and thus are in a greater need of occupational health services (22, 23).

Identification of vulnerable groups as a priority in the national health policy according to one of the main objectives of the WHO Global Plan of Actions on Workers Health 2008-2017 (GPA) and the Biennial Collaborative Agreement, signed between the Ministry of Health of the RM and the WHO Regional Office for Europe for 2008-2009 is a very important step for occupational health development in the country as well as overall societal development (5, 57, 58).

According to the national policy, to achieve occupational health development in the Republic of Macedonia, the vulnerable groups should be identified and given priority by provision of at least the basic occupational health services.

The aim and objectives of this survey, carried out by the Institute of Occupational Health, WHO Collaborating Centre, were to identify high

risk sectors, vulnerable groups and underserved populations in the country, and availability of Basic Occupational Health Services (13, 44, 52). The outcomes of the survey will help to draft policy recommendations for improvement of the quality of and access to those Services in order to improve the health and safety of the specific target groups of workers thus identified.

Fulfillment of the survey outcomes will increase knowledge, raise awareness and reinforce the national policy in the occupational health care sector for the benefit of the populations in greatest need (38).

## SUBJECTS AND METHODS

### Subjects

The study subjects (N=200) were selected according to their involvement and direct participation as different stakeholders and key players in the process of identifying vulnerable workers/sectors and their official responsibilities in improving health and safety at work of the identified target groups of workers. In this process of selection, the key informant approach was implemented (24).

This approach requires careful identification of a selected group of formal and informal leaders, influential leaders or experts. It provides structured contact with these informants, usually through direct interviews and questionnaires. Gathering together key informants or experts to provide the input for a situation analysis is one method for identifying issues.

A list of key informants-responders was made of the representatives of the Ministry of Health, Ministry of Labour, State Labour Inspectorate, Health and Safety Inspectorate, University Medical Faculty, School of Public Health, Trade Unions, Confederation of Employers of the Republic of Macedonia, Institute for Health Protection, Institute of Occupational Health of the Republic of Macedonia, WHO CC and the Society of Occupational Medicine Specialists and the Macedonian Association for Safety at Work.

## Questionnaire

### *Developing the questionnaire*

The questionnaire was drafted after review of the scientific literature (14, 23-24) and WHO and other international documents on vulnerable workers, underserved populations and high-risk sectors (5, 13, 44, 52, 57, 58), as well as consultation with stakeholders on the public policies targeting vulnerable groups. On 15 June a consultation meeting by the key stakeholders was held. The Ministry of Health sent the draft version of the Questionnaire to 20 key partners (different sectors of Ministry of Health, Ministry of Labour, State Labour Inspectorate, Trade Unions, Confederation of Employers, Society of Occupational Medicine Specialists, etc.). Suggestions by the key stakeholders were reconsidered and incorporated in the questionnaire. The first draft version was revised according to the feedback from the WHO Regional Office for Europe, and the final version was ready on 10 September. The WHO Country Office, Skopje, provided technical support for all these activities.

### *Composition of the questionnaire*

The Questionnaire was composed of 9 main sections. The first section was related to general information of the responders (age, gender, sector of employment, job position etc), sections 2-7 were aimed at selected groups of vulnerable workers/sectors (informal sector, unemployed, female workers, workers aged under 18 years, workers aged over 55 years, construction, agriculture, textile industry, and the health care sector), section 8 was focused on the concept of the Basic Occupational Health services (BOHS), and the last section 9 included the responders' suggestions, concerning vulnerable workers/sectors in the country.

The main question in all targeted groups of workers or sectors concerned the possible high risk of having occupationally related health problems (accidents at work, premature death, work disability, occupational diseases, work-related diseases) compared to workers in other sectors and the main reasons for the possible differences. Other ques-

tions were aimed at health status, availability of primary health services and availability of occupational health services in the specific target groups of workers.

Vulnerable groups/sectors selected in the final version of the questionnaire were recognized via the following criteria: current research data (14, 22, 23) and available statistical indicators at national and international level specific for this issue (21, 28, 50); relevant WHO, ILO and EU documents (5, 13, 26, 27, 44, 45, 52, 57, 58) and the national policy documents in the field of occupational health and safety (33, 39).

In this study, the following groups/sectors were selected: underserved populations, (i.e. informal workers, unemployed), vulnerable groups (female workers, young workers aged under 18, aging workers aged over 55) and high risk sectors (construction, agriculture, textile industry and the health care sector).

#### *Completion of the questionnaire*

In order to achieve the objectives, the study subjects were instructed to use their professional opinion in completing the questionnaire.

As is usual in such type of studies, for most of the questions the Likert scale method was used, i.e. the study subjects had to decide for one out of five choices (Likert items):

1. Strongly disagree,
2. Disagree,
3. Neither agree nor disagree,
4. Agree,
5. Strongly agree.

The questionnaire was sent to the study subjects on 15 September. The completed questionnaires were received up to 20 October, and analysis of the results of the survey was carried out by 5 November. The draft report was prepared and submitted to the WHO Regional Office for Europe for comments on 14 November. On 24 November, the results of the survey were analyzed and reported at the National Workshop with participation of the SEE Network of Workers' Health members. The suggestions of the key stakeholders discussed at the workshop were integrated in the policy recommen-

dations for improvement of health and safety at work of vulnerable groups, high risk sectors and underserved populations in the country.

#### **Statistical analysis**

Statistical analyses were performed using SPSS version 11.0. Continuous variables were expressed as mean values with standard deviation (SD), whereas the nominal variables were expressed as numbers and percentages. Statistical analysis was performed according to the current recommendations for analysis of the Likert scale (12). Likert responses were collated into bar charts, central tendency was summarised by the median and the mode, and dispersion was summarised by the range across quartiles.

#### **RESULTS**

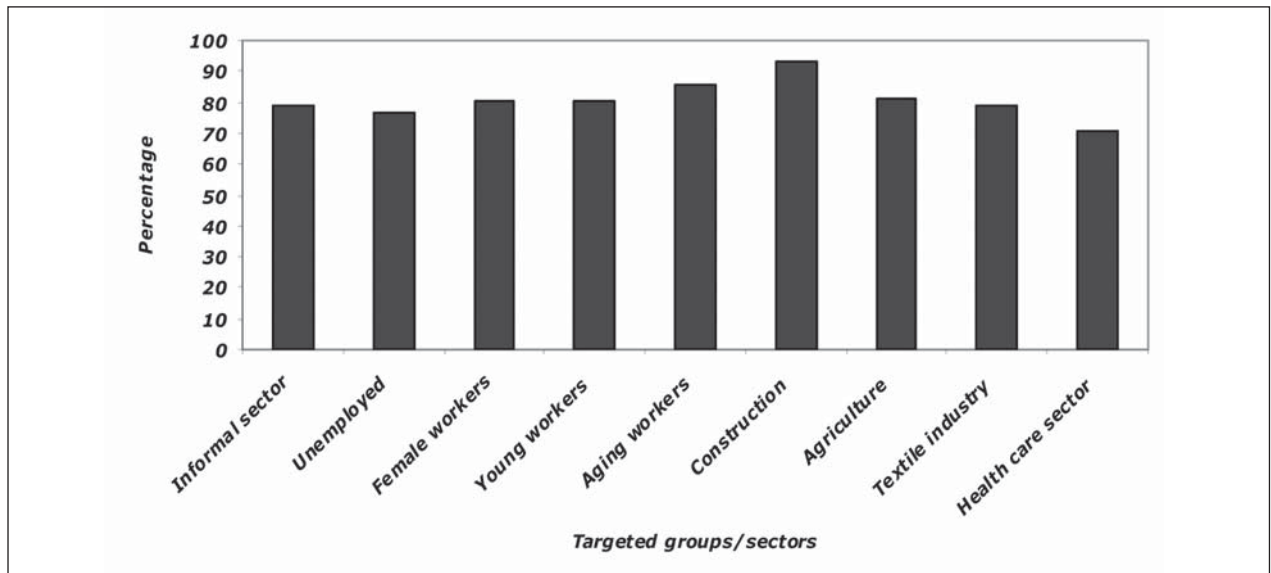
Of the 200 subjects eligible to join the study, 172 completed the questionnaire (86%) and 28 subjects who had given incomplete answers were excluded. The characteristics of the study subjects (responders) are given in table 1.

Over 70% of responders agreed (Likert items 4 and 5) that all targeted workers/sectors had a high risk for occupationally related health problems. Construction, aging workers and agriculture were

**Table 1** - Characteristics of the study subjects

| Characteristic                              | Study subjects<br>(n = 172) |
|---|-----------------------------|
| Males                                       | 94 (57.5%)                  |
| Age in years: Mean (range)                  | 47.4±9.6 (32-64)            |
| Working experience in years: Mean (range)   | 21.9±4.9 (12-34)            |
| Employed in public sector                   | 132 (76.7%)                 |
| Employed in private sector                  | 40 (23.3%)                  |
| University professors                       | 22 (12.8%)                  |
| Health care workers                         | 26 (15.1%)                  |
| Employers                                   | 31 (18.0%)                  |
| Ministries, Inspectorates (Representatives) | 34 (19.7%)                  |
| Industrial hygienists, Safety Engineers     | 32 (18.6%)                  |
| Trade Union representatives                 | 27 (15.7%)                  |

Numbers (%) are given, unless otherwise stated



**Figure 1** - Positive answer concerning high risk for occupationally related health problems in targeted groups/sectors: informal sector 79.1%, unemployed 76.7%, female workers 80.2%, young workers 80.2%, aging workers 86.0%, construction 93.0%, agriculture 82.3%, textile industry 79.2%, and health care sector 70.9%

evaluated as workers/sectors with high risk for occupationally related health problems by more than 80% of the responders (figure 1).

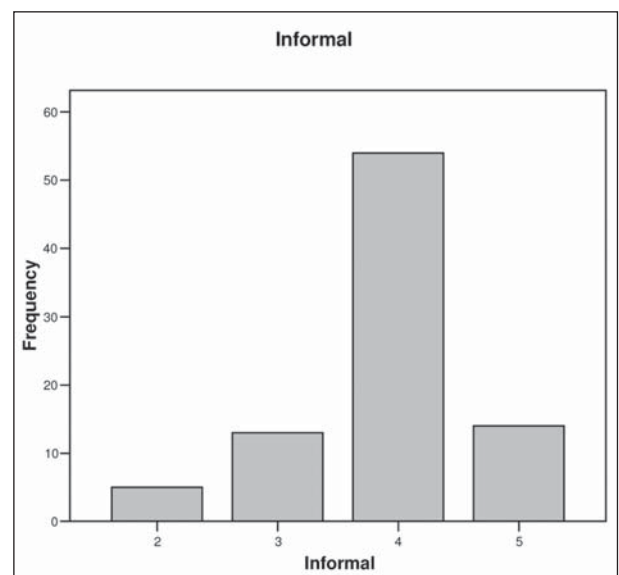
The informal sector was recognized as a high-risk sector for occupationally related health problems by 79.1% of the responders, i.e., the median of the summarized Likert responses was 4.00 and the mode was 4 (figure 2).

The main reasons for this choice indicated by at least 50% of responders were poor working conditions, inadequate implementation of statutory protection and support; unsatisfactory relations between employer and employees.

High risk of health problems in unemployed workers was recognized by 76.7% of the responders (median 4.00, mode 4). The main reasons given for this choice were poverty or poor financial support, stress, uncertainty and marginalization in the society.

High risk of occupationally related health problems in female workers and workers aged under 18 years was confirmed by 80.1% of the responders (median 4.00, mode 4, and median 4.00, mode 4, respectively). Specific gender characteristics such as pregnancy, maternity and care of children, higher sensitivity to workplace hazards and lack of information and education about healthy lifestyles were

the main choices of the responders regarding occupationally related health problems in women. In young workers the reasons were immaturity and growth, poor income and lack of information and education about workplace hazards.



**Figure 2** - Central tendency of summarized Likert responses regarding high risk of occupationally related health problems in informal sector

Aging workers were recognized as high-risk workers for occupationally related health problems by 86.0% of the responders, i.e. median and mode of the summarized Likert responses was 4.00 and 4 (figure 3).

Health problems in general, higher sensitivity to workplace hazards and inadequate implementation of statutory protection and support were indicated as the main reasons for this choice in the majority of the responders.

Construction was identified by 93% of the responders as a high risk sector for occupationally related health problems. Median and mode of the summarized Likert responses was 4.00 and 5, respectively (figure 4).

High risk at workplace, poor working conditions and lack of adequate statutory protection and support was indicated by over 50% of the responders as the main reasons for such choice.

Agriculture was recognized as one of the sectors with the highest risk for health (81% of responders, median 4.00 and mode 4) (figure 5) because of the low level of education and knowledge, poor working conditions and lack of information and education about workplace hazards.

The textile industry was identified as a high-risk sector by 79.1% of the responders (median 4.00,

mode 4). The main causes given for high risk of occupationally-related health problems were low income, inadequate implementation of statutory protection and support and lack of official support by trade unions and employers' organizations.

The health care sector was recognized as a high-risk sector for occupationally related health problems by 70.9% of the responders (median 4.00,

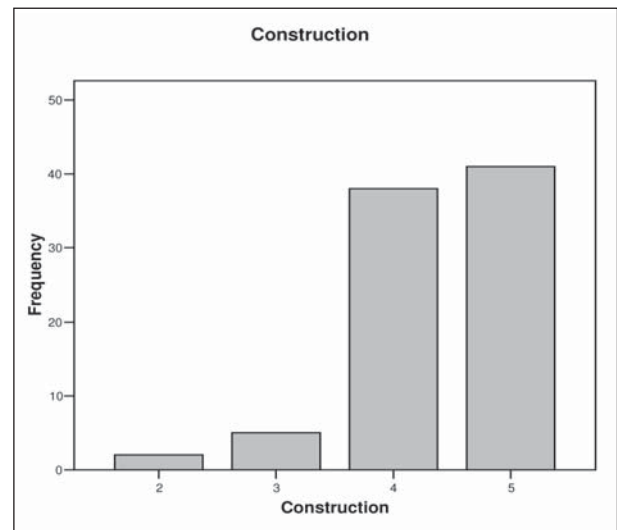


Figure 4 - Central tendency of summarized Likert responses regarding high risk of occupationally related health problems in construction workers

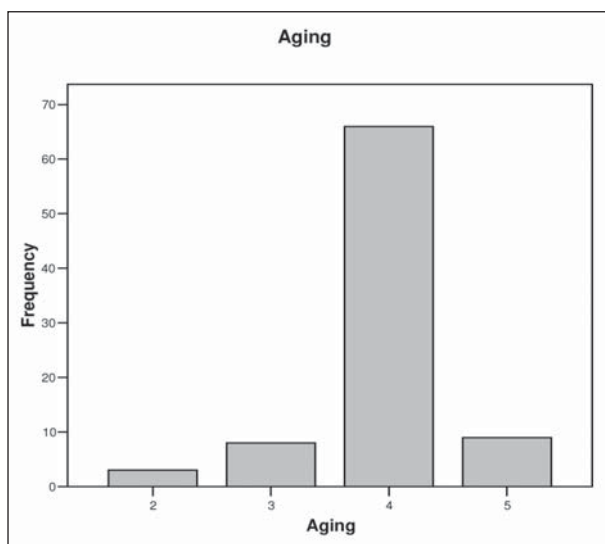


Figure 3 - Central tendency of summarized Likert responses regarding high risk of occupationally related health problems in aging workers

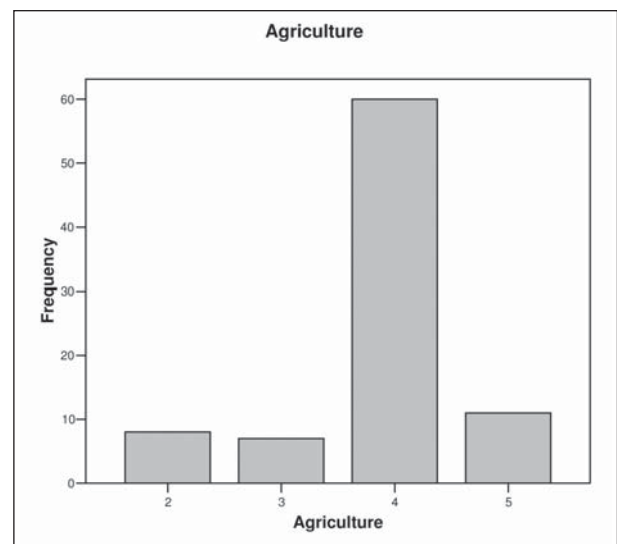


Figure 5 - Central tendency of summarized Likert responses regarding high risk of occupationally related health problems in agricultural workers

mode 4). The main reasons for this choice were high risk at the workplace and inadequate implementation of statutory protection and support.

Construction workers and aging workers were considered to have a low health status by the majority of the responders (81.4% and 79.1%, respectively). On the other hand, a good health status was considered to exist in female workers, young workers and healthcare workers (60.5%, 72.3% and 82.6%, respectively) (figure 6).

All targeted workers/sectors were deemed to have a good availability of primary health care services, confirmed by more than 80% of the responders.

The availability of occupational health services was indicated as poor in agriculture (83.7% of the responders), unemployed workers (79.1%), informal sector (65.1%) and young workers (59.3%) (figure 7).

More than 70% of the responders emphasized that some sectors/groups not mentioned in the questionnaire, such as mining, metallurgy, chemical industry, transport are more likely to have occupationally related health problems (accidents at work, premature death, work disability, occupational diseases, work-related diseases) compared to other sectors/groups.

The concept of Basic Occupational Health Services, defined as an essential service for protection of people's health at work, for promotion of health, wellbeing and work ability, as well as for prevention of diseases and accidents, in the framework of primary health care through the public health approach, was deemed a good concept by over 90% of the responders. At the same time, over 90% of the responders thought that BOHS should be provided to the vulnerable groups/sectors via the public health approach by implementing the principles of primary health care in the Republic of Macedonia.

There were a few suggestions by the responders concerning vulnerable groups/sectors in Macedonia focused on strong support via the intersectoral approach, improvement of social dialogue, strengthening the role of the Government and Authorities in the implementation of specific legislation and adequate development of an occupational health system in the country.

## DISCUSSION

This is the first major national survey in this area, considering the fact that so far there has been little knowledge and few documents issued on vul-

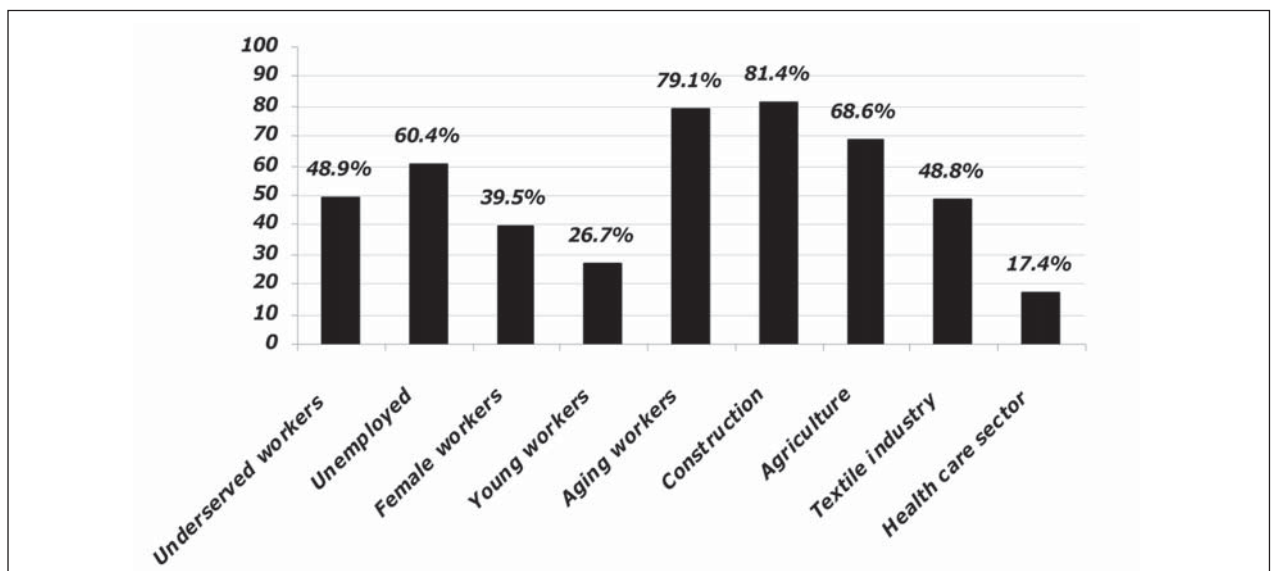
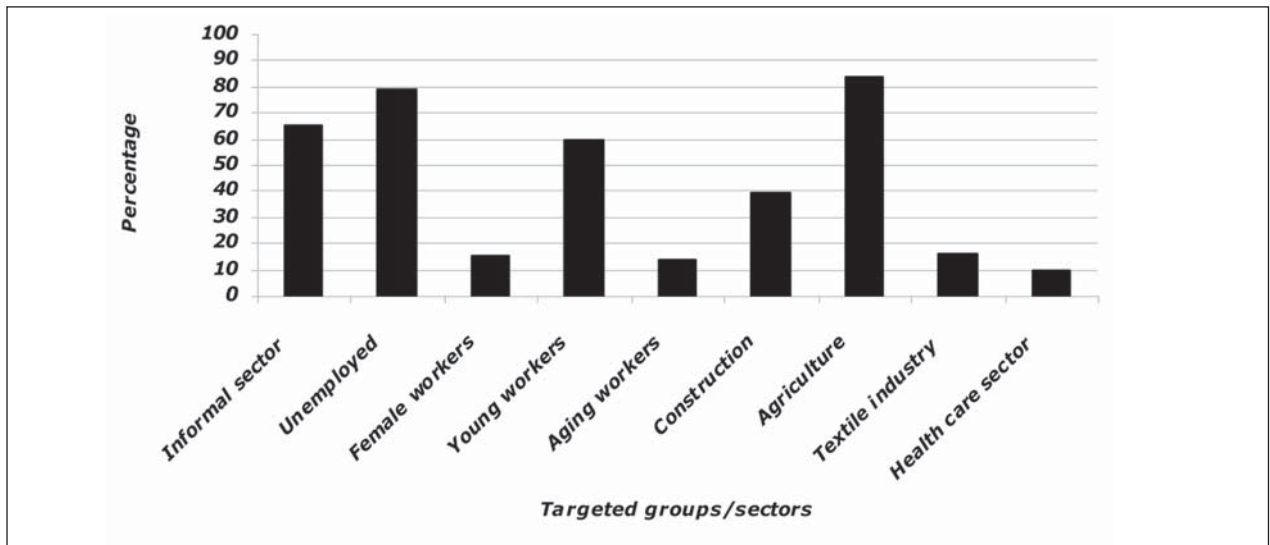


Figure 6 - Positive answer concerning low health status in targeted group/sectors



**Figure 7** - Positive answer concerning poor availability of occupational health services in targeted groups/sectors: informal sector 65.1%, unemployed 79.1%, female workers 15.1%, young workers 59.3%, aging workers 13.9%, construction 39.5%, agriculture 83.7%, textile industry 16.2%, and health care sector 9.3%.

nerable groups in the Republic of Macedonia. A strategic paper concerning Occupational Health Services, prepared by the Ministry of Health of RM (5, 38, 39) and new legislation in the field (33), provides the basis and enables access to occupational health services and preventive activities of vulnerable groups within the framework of general workplace safety and health issues. In the last ten years some important research data on this issue have been forthcoming, as a result of different epidemiological studies and scientific activities (3, 6, 8, 42) and national prevention programmes (40, 41), focused on the selected vulnerable groups of workers like health care workers, unemployed persons, agricultural workers, etc.

In 2004 the Health and Safety Commission, in a publication dedicated to thirty years' work in health and safety issues in Great Britain, emphasized the importance of the diversity and specificity of different groups of the working population (25). Occupational hazards are known to be distributed unequally and workers with specific biological, social, and/or economic characteristics are more likely to have increased risks of work-related diseases and accidents.

According to the data of the Trades Union Congress - Commission on Vulnerable Employment,

UK, 2007, one in five workers in the United Kingdom are vulnerable workers (54).

Taking measures to reduce or minimize the gaps between different groups of workers should be the real challenge for a new approach to workers' health, promoted by the WHO, via an occupational health policy, system and services in the country (7, 58).

This national survey focused on vulnerable workers was one step more in such process.

In this study, the key informant survey was applied as a useful, simple, non-expensive instrument in facilitating communication between different stakeholders and in providing important data for basic situational analysis. The disadvantage of this technique might be the possible bias of the informants due to subjective and sometime limited viewpoints on the problems addressed. However, numerous studies confirm the value of this survey in the identification of target population groups and the assessment of needs that can measure the factors affecting a community's health (24, 46, 49).

The results of our study showed that more than 70% of responders agreed that all targeted workers/sectors have high risk for occupationally related health problems. Construction, aging workers and agriculture were deemed to be workers/sectors with



high risk for occupationally related health problems by more than 80% of the responders.

The *informal sector* was recognized as a high-risk sector for occupationally related health problems by 79.1% of the responders. This result confirms well known facts, i.e. that informal employment is often followed by increased job insecurity and inadequate labour and statutory protection. Safety, health and environmental hazards are particularly evident in the informal sector with a majority of small and medium-sized enterprises (15, 19). Poor working conditions are interrelated with poor work practices and accident rates are considerably higher in small enterprises (14, 23).

High risk of health problems in *unemployed persons*, recognized by 76.7% of the responders, was related to poverty or poor financial support, stress, uncertainty and marginalization from society in our study. Unemployment is a serious problem especially in countries in transition, like Macedonia with 35% registered unemployed persons in 2008, with a large proportion of informal economy (2). Unexpected loss of job can provoke an acute reaction of stress, but long-term unemployment can cause chronic stress which leads to poor health (35). The study aimed at defining conditions that can cause chronic stress and assessing the effects of stress on health among unemployed in Macedonia, as part of a "Preventive programme for evaluation of health conditions and work ability of the unemployed in the Republic of Macedonia" carried out in 2007 (40). The preliminary data reported suggest that the unemployed are heavily exposed to chronic stress which leads to psychological (more than 60%) and cardiovascular health problems (38%).

One the main reasons for the high risk of occupationally related health problems in *female workers*, confirmed by 80,1% responders in this study, were specific gender characteristics. It is known that women differ from the standard male worker and work organization has to be adapted to gender specificity especially with the increased participation of women in the workforce (16). The double work burden of women (at work and at home) causes different health disorders, that has been confirmed in many studies (14, 17, 22, 23, 43).

More than 80% of responders in this study recognized the high risk of occupationally related health problems in *young workers* (aged under 18 years), with problems of immaturity and growth and specially the lack of information and education about workplace hazards identified as crucial reasons. Teenagers are at risk of accidents, illness, and even death on the job, just as other workers are, but may face additional risks due to their youth. According to the National Institute for Occupational Safety and Health (NIOSH) data, an estimated 84,000 work-related accidents and diseases were treated in hospital emergency departments in youths under 18 years of age (5.2 accidents per 100 working youths) in the USA (53). According to our data, at least 50% of responders (choice: strongly agree/agree) recognized the good health status in young workers (73%) as their personal opinion and it is necessary to achieve and support this in practice with effective interventions recommended by the European Agency for Occupational Safety and Health (18).

The results of our survey indicated that *aging workers* (over 55 years of age) were identified as workers with high risk for occupationally related health problems and low health status by about 80% of the responders. The population in Macedonia as well as worldwide is aging according to the demographic trend. From 1990 to 2003, the percentage of the population over 65 years of age increased from 7,9% to 10,6% (38). The process of privatization and fragmentation of the labour market has negative effects on the health of aging workers in the country. There is a need for regular health surveillance and promotion of a healthy lifestyle since the incidence of general health problems like cardiovascular diseases, musculoskeletal and neurodegenerative diseases, cancer or mental health problems increases with age (17, 19, 23).

More than 75% of responders in the study selected *construction* as a sector with the highest risk for occupationally related health problems like accidents at work, premature death, work disability, occupational diseases, and work-related diseases. High risk at the workplace, poor working conditions, lack of adequate occupational health care, but also the type of employment contract (tempo-

rary workers) could be the key factors associated with the incidence of occupational accidents, as a one of the main occupational disease problems (14, 20). In last ten years in Macedonia, according to the official statistics on fatal accidents from the Macedonian Labour Inspectorate, construction is recognized as a sector with the highest risk (52). One of the recognized issues in this high risk sector is low health status, with a predominance of work-related diseases like musculoskeletal disorders, cardiovascular diseases, alcohol dependence (37, 47).

*Agriculture* was recognized as one of the sectors with the highest risk for health (81% of responders): low level of education and knowledge, poor working and living conditions, lack of adequate occupational health care were identified as factors favouring the development of occupational health problems. Rural inhabitants, and not only rural workers, suffer from an evident gap in the quality of life, sanitation, income and distribution of welfare benefits, including occupational health services even in the developed countries (29). The research data confirm that heavy physical work, heat stress, pesticide poisoning, organic dust, biological hazards and occupational accidents are the main causes of occupational diseases (11, 17, 20, 30, 42, 51). The ILO estimates that almost half of the occupational fatalities occurring in the world are in agriculture. This means that every year about 170,000 agricultural workers lose their lives in occupational accidents (29). The rural population in Macedonia is adequately provided with primary health care by general practitioners, but our data suggest the need to establish health surveillance at work in agricultural workers in the country (29, 38, 39, 41).

About 80% of responders identified *textile workers* as a high risk group for occupational health problems but at the same time more than 50% of the participants reported that textile workers have a good health status. Specific occupational risks in the textile industry, like dust, chemicals, noise, and ergonomic hazards are confirmed by many epidemiological studies (1, 42, 48). The textile industry in Macedonia, with numerous small enterprises, created new jobs with a predominant participation of female workers. Some of the contributing factors

related to the occupational health problems in textile workers could be low salaries, lack of official support by trade unions and inadequate employers/employees relations (15, 16, 19). Implementation of statutory and prevention measures should ensure social inclusion of this high risk group of workers (33, 39).

Recognition of the *health care sector* as a high risk sector in the WHO Global plan of Action on Workers Health 2008-2017, objective 1 (58) was confirmed by 70.9% of the responders in our study. Each year, 3 million healthcare workers (HCW) worldwide are exposed via the percutaneous route to blood-borne pathogens: 2 million are exposed to hepatitis B, 900.000 to hepatitis C and 170.000 to HIV. Such exposures lead to 15.000, 70.000 and 1.000 infections, respectively. More than 90% of these infections occur in developing countries. The problem of occupational health of HCW is also associated with heavy work burdens, increased application of new technologies, and opportunities for personal development and promotion (9, 56). Recent studies in Macedonia, coordinated by the Institute of Occupational Health of Macedonia, suggest that infectious and psychosocial agents among healthcare workers is a current problem and should become public a health priority (3, 4, 6, 32, 36). Therefore, a global approach is necessary in order to develop a preventive strategy for the protection of HCW exposed to occupational risks (10, 56).

More than 70% of the key informants-responders in the study emphasized that some sectors/groups that are well known as high-risk work settings, like mining, metallurgy, chemical industry, transport and others, are not mentioned in the questionnaire so there is a need for further action in this directions.

All targeted workers/sectors were deemed as having good availability of primary care health services, confirmed by more than 80% of the responders in the survey. Primary health care directed towards the individual, the family, and the community with emphasis on preventive health care and on satisfying the majority of the needs of the population, will continue to be the basis of the health care system in the country. The Health Strategy of Macedonia 2007-2020 sets out the prospects for

improvement in health and in the health care system, which will respond to the needs of the population (38). As for availability of occupational health services, the unemployed (79,1%), informal workers (65,1%) and specially agricultural workers (83,7% of responders) were deemed as faring the worse, compared to other workers and sectors according to the opinion of the responders in the survey. It is important to note that the majority of the responders (more than 80%) strongly disagreed/ disagreed that there are differences in the availability of occupational health services according to gender or age. Improvement in working conditions, regular health surveillance and better availability of occupational health services and also prevention measures should be essential tools of prevention activities in the country.

Changes in working life, linked to globalization, the transitional process and EU accession led to the strong reform process in Macedonia, in all sectors, including occupational health and safety. National strategic documents in the field (33, 38, 39), stimulated action to improve the performance of and access to OHS by identifying appropriate mechanisms to ensure development of competent and relevant OHS for all workers, as essential tools for prevention and promotion of workers health. The planned development of the OHS within the framework of a national public health network should establish efficient and functional OHS following the BOHS approach (31, 34, 44, 45), according to national and local conditions and needs. A national public health network for OHS led by the Institute of Occupational Health of Macedonia, using existing human resources and infrastructure should ensure equality, quality and coverage in OHS provision to all workers, especially for underserved and vulnerable populations. In 2007 the Government of the Republic of Macedonia for the first time adopted special preventive programmes focused on health prevention and health promotion in specific vulnerable groups/sectors of workers (40, 41). This is a significant step forward in the national public health policy where unemployed and agricultural workers are recognized as very important vulnerable groups which need societal and institutional support. At the same time these pro-

grammes in practice promote the availability of occupational health services through the basic occupational health services (BOHS) concept and support the Institute of Occupational Health of Macedonia, WHO Collaborating Center for implementing WHO activities according to the Global Plan of Action on Workers Health (58), at national level.

## CONCLUSION

In conclusion, in the questionnaire-based study aimed at identifying vulnerable groups and high risk sectors including different stakeholders and key players in the process of improving health and safety at work, all examined groups/sectors were judged as having high risk for occupationally related health problems. Construction, aging workers and agriculture were judged as having the highest risk for such problems, as well as low health status. All examined groups/sectors were judged as having good availability of primary health care services, while agricultural, unemployed, the informal sector and young workers were judged as having poor availability of occupational health services. The provision of basic occupational health services (BOHS) via the public health approach, focused on workers' health and with implementation of the primary health care principles (equality, universality) was judged as a good concept for Macedonia.

To maintain workers' health and safety at work via the WHO/ILO principles and national legislation should be the real task and challenge for society.

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED

## REFERENCES

1. ABRAMS K, FENTY J, JONES DR, LEVY LS: Systematic review and Meta analysis of mortality and cancer incidence among workers in the textiles, fibers, and fabrics sector of the chemical industry. *Occupational and Environmental Medicine* 2004; 61: 52

2. Agency for employment of R. Macedonia. Skopje: 2008. (Last accessed 15 June 2009). Available at: <http://www.avrm.gov.mk>
3. BASAROVSKA V, KARADZINSKA-BISLIMOVSKA J, MIJAKOSKI D, STOLESKI S: Burnout syndrome among nurses from different departments. In Book of abstracts, *28th International Congress on Occupational Health*, Milan, 2006: 100
4. BASAROVSKA V, KARADZINSKA-BISLIMOVSKA J, STOLESKI S, MIJAKOSKI D: Surgical nurses, stress at work and Burnout syndrome. In WHO GOHNET special issue: *Addressing psychosocial risks and work-related stress in countries in economic transition, in newly industrialized countries, and in developing countries*; September, 2007
5. Biennial Collaborative Agreement (BCA), between the Ministry of Health of R. Macedonia and the Regional Office for Europe of the World Health Organization 2008/2009
6. BISLIMOVSKA KARADZINSKA J, MIJALKOV B, GRUNEVSKA V, et al: Specific occupational risks in health care workers - infectious and psychosocial hazards. Scientific project No 40116101/0, Skopje: Ministry of Education and Science of R. Macedonia; 2004
7. BISLIMOVSKA J, MINOV J, RISTESKA-KUC S, et al: Occupational Health Services - key tool in the development of workers' health as public health approach. In Kovacic L, Bozиков J (eds.): *A Handbook for Teachers, Researchers and Health Professionals*. Zagreb: Jacobs Publishing Company; 2008
8. BISLIMOVSKA J, RISTESKA KUC S, NAUMOSKA R, KISMAN HRISTOVSKA M: Specific occupational risks in vulnerable groups of workers - actual state and directions for action. In *Proceeding of the 3rd Congress of Preventive Medicine* in R. Macedonia with International Participation; 4-7 October 2006; Ohrid, Macedonia. Skopje: Macedonian Medical Association; 2006: 126
9. CENTER FOR DISEASE CONTROL (CDC): *Exposure to blood. What health care personnel need to know*. Atlanta; 2003
10. CENTER FOR DISEASE CONTROL (CDC): Updated U.S. Public Health Services guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis. *Morbidity Mortality Weekly Report (MMWR)* 2001; 50: 1-42
11. COLOSIO C, ARIANO E, PATIL A: Lodi Declaration on Healthy Villages. Adopted by the 16th International Congress of Agricultural Medicine and Rural Health, Lodi, Italy, 18-21 June 2006. *Med Lav* 97: 814-815
12. DAWES J: Do data characteristics change according to the number of scale point used? An experiment using 5-point, 7-point and 10-point scales. *International Journal of Market Research* 2008; 50: 61-77
13. EIJKEMANS G: Occupational health services as a part of primary health care. In Lehtinen S, Rantanen J, Elgstrand K, et al (eds): *Challenges to occupational health services in the regions: the national and international responses: Proceedings of an ICOH/WHO/ILO Workshop; Helsinki, Finland*. Helsinki: Finish Institute of Occupational Health; 2005: 1-3
14. EUROPEAN COMMISSION (EC): Adapting to change in work and society: a new community strategy on health and safety at work 2002-2006. Available at: <http://europe.osha.eu/int/systems>
15. EUROPEAN COMMISSION: SMEs in Europe 2003. Luxembourg: European Union; 2003. Observatory of European SMEs no. 7
16. EUROPEAN AGENCY FOR SAFETY AND HEALTH AT WORK: Gender issues in safety and health at work. Available at: [http://Europe.osha.eu.int/good\\_practice/person/gender](http://Europe.osha.eu.int/good_practice/person/gender)
17. EUROPEAN AGENCY FOR SAFETY AND HEALTH AT WORK: Work-related musculoskeletal disorders in Europe
18. EUROPEAN AGENCY FOR OCCUPATIONAL SAFETY AND HEALTH (OSHA): OHS in figures: Young workers - facts and figures. Office for Official Publication of the EC, Luxembourg; 2007
19. EUROPEAN FOUNDATION FOR THE IMPROVEMENT OF LIVING AND WORKING CONDITIONS: Quality of work and employment in Europe: issues and challenges. Luxembourg: European Union; 2002
20. EUROSTAT: Accidents at work in the EU. News release 55, 2004. Luxembourg: European Commission; 2004
21. EUROSTAT: Eurostat Yearbook 2004. Luxembourg: European Communities; 2004
22. FINGERHUT M (ed.): Contribution of Occupational Risks to the Global Burden of Disease. Special Issue *AJIM* 2005; 48 (6): 395-541
23. FRONEBERG B: Challenges in occupational safety and health from the global market economy and from demographic change - facts, trends, policy response and actual need for preventive occupational health services in Europe, *Scandinavian Journal of Work, Environment and Health* 2005; 1: 23-27
24. GARCÍA AM, LÓPEZ-JACOB MJ, AGUDELO-SUÁREZ AA, et al: Occupational health of immigrant workers in Spain [ITSAL Project]: key informants survey. *Gac Sanit* 2009; 2: 91-8
25. HEALTH AND SAFETY COMMISSION, UK: Thirty years on and looking forward. Health and Safety Executive (HSE). 10/04 C25; 2004
26. Implementing the WHO Global Plan of action on workers' health in the European region. The first meet-

- ing of WHO contact persons for workers' health. House of the Estates, Helsinki, Finland; 2008: 22-23
27. Improving quality and productivity at work. Community Strategy for safety and health and work 2007-2012. Occupational Safety and Health Agency. Available at: <http://www.osha.gov>
  28. INTERNATIONAL LABOUR ORGANIZATION (ILO): *Ilolex database of international labour standards*. Geneva: ILO; 1996-2005, March, 2005
  29. INTERNATIONAL LABOUR ORGANIZATION (ILO): ILO Safe Work, Occupational Safety and Health in Agriculture. Geneva: ILO; March, 2000. Available at: <http://www.ilo.org/public/english/protection/safework/agriculture/index.htm>
  30. KARADZINSKA-BISLIMOVSKA J: The main problems of work ability assessment in agricultural workers. In Book of abstracts: *Second International Conference on rural health & First International Conference on occupational and environmental health in Mediterranean, South East, and Central European Countries*, Belgrade, 2004: 130-131
  31. KARADZINSKA-BISLIMOVSKA J: Occupational Health Services in R. Macedonia - current status and future trends. Challenges to occupational health services in the regions, *Proceedings of a WHO/ICOH/ILO Workshop*, 2005: 20-23
  32. Karadzinska-Bislimovska J, Risteska-Kuc S, Mijakoski D, et al: Stress at work and occupational risk of infection among Macedonian health care workers. In: Book of abstracts, The 6<sup>th</sup> ICOH International Conference on occupational health for health care workers, Kitakyushu, 2004: 74-75
  33. LAW FOR SAFETY AND HEALTH AT WORK: Official Gazette of R. Macedonia, 92/07
  34. LEHTINEN S, RANTANEN J, ELGSTRAND K, et al (eds.): Challenges to occupational health services in the regions: the national and international responses: *Proceedings of an ICOH/WHO/ILO Workshop*; Helsinki, Finland. Helsinki: Finish Institute of Occupational Health; 2005
  35. MCKEE-RYAN F, SONG Z, WANBERG CR, KINICKI AJ: Psychological and physical well-being during unemployment: a meta-analytic study. *J Appl Psychol* 2005; 90: 53-76
  36. MIJAKOSKI D, KARADZINSKA-BISLIMOVSKA J, STOLESKI S, RISTESKA-KUC S: Occupational sharp injuries, ageing, and preventive measures in laboratory workers. *Ergonomia IJE&HF* 2007; 29: 267-271
  37. MIJALKOV B, RISTESKA S: The problem of dust in tunnel building and risk for silicosis. In Book of abstracts: *Symposium for pneumoconiosis*, Soko Banja; 1995: 135-136
  38. MINISTRY OF HEALTH OF R. MACEDONIA: Health Strategy of the R. Macedonia 2020, Skopje; 2007. Available at: <http://www.moh-hsmp.gov.mk>
  39. MINISTRY OF HEALTH OF R. MACEDONIA: National Strategy for health, healthy environment and safety at work, Skopje; 2006. Available at: <http://www.zdravstvo.gov.mk>
  40. MINISTRY OF HEALTH OF R. MACEDONIA: Preventive program for health and work ability assessment in unemployed population in R. Macedonia, Official Gazette of R. Macedonia, 42/07
  41. MINISTRY OF HEALTH OF R. MACEDONIA: Program for analysis and prevention of occupational risks in rural population in R. Macedonia. Official Gazette of R. Macedonia, 03/09
  42. MINOV J, KARADZINSKA-BISLIMOVSKA J, VASILEVSKA K, et al: Exercise-induced bronchoconstriction in textile and agricultural workers and in bakers. *Arh Hig Rada Toksikol* 2006; 57: 379-386
  43. MINOV J, KARADZINSKA-BISLIMOVSKA J, RISTESKA-KUC S, et al: Exercise-induced bronchoconstriction in female cleaners: effect of smoking. *Nauka pulmologija* 2007; 1: 41-44
  44. RANTANEN J: Basic Occupational Health Services: a WHO/ILO/ICOH/FIOH guideline. 2<sup>nd</sup> ed. Helsinki (Finland): Finish Institute of Occupational Health; 2005
  45. RANTANEN J: Basic occupational health services - their structure, content and objectives. *Scandinavian Journal of Work, Environment and Health Suppl* 2005; 1: 5-15
  46. RICHARD BE, HOLTBY S, ZAHND E, ABBOTT BG: Community-based Participatory Research in the California Health Interview Survey. *Prev Chronic Dis* 2005; 2: A03
  47. RISTESKA KUC S, KARADZINSKA BISLIMOVSKA J, EZOVA N, MINOV J: Occupational rhinitis among workers in the production process of additives for construction materials. *Mak med preglod* 2002; 56 (supplement 52): 78
  48. SINGH MB, FOTEDAR R, LAKSHMINARAYANA J: Occupational Morbidities and their Association with Nutrition and Environmental Factors among Textile Workers of Desert Areas of Rajasthan, India, *Journal of Occupational Health* 2005; 47: 371-377
  49. SPIEGEL A, HYMAN H: *Strategic Health Planning: Methods and Techniques Applied to Marketing and Management*. Norwood, New Jersey: Ablex Publishing Corporation; 1998
  50. STATE STATISTICAL OFFICE OF R. MACEDONIA, Statistical Yearbook of the R. Macedonia, 2004
  51. STOLESKI S, KARADZINSKA-BISLIMOVSKA J, MINOV J, et al: Respiratory symptoms, atopic status and lung

- function tests in agricultural workers. Abstract Book of the XXVI Congress of the European Academy of Allergology and Clinical Immunology 2007; 224
52. TAKALA J: ILO approach to occupational health services. In Lehtinen S, Rantanen J, Elgstrand K, (eds): Challenges to occupational health services in the regions: the national and international responses: *Proceedings of an ICOH/WHO/ILO Workshop; Helsinki, Finland*. Helsinki: Finish Institute of Occupational Health; 2005: 4-6
53. THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH): Center for Disease Control (CDC). NIOSH Safety and Health Topic: Young Worker Safety and Health. Available at: <http://www.cdc.gov/niosh/topics/youth>
54. TRADES UNION CONGRESS (TUC): Commission on Vulnerable Employment. Hard work, Hidden Lives. Report, London, UK; 2008. Available at: <http://www.vulnerableworkers.org.uk>
55. WORLD HEALTH ORGANIZATION (WHO): *Global Strategy for Occupational Health for All*. Geneva: WHO; 1995. WHO/OCH/95.1
56. WORLD HEALTH ORGANIZATION (WHO): Hepatitis C. Fact Sheet 164. Geneva; 2000. Available at: <http://www.who.int/mediacentre/factsheets/fs164/en/>
57. WORLD HEALTH ORGANIZATION (WHO): *The world health report 2000-health systems: improving performance*. Geneva: WHO; 2000
58. WORLD HEALTH ORGANIZATION (WHO): *Global Plan of Actions on Workers Health 2008-2017 (GPA)*. Sixtieth World Assembly, WHA60.26, Geneva: WHO; 2007

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