African Newsletter

ON OCCUPATIONAL HEALTH AND SAFETY

Volume 22, number 2, September 2012

Small-scale enterprises and informal sector

African Newsletter

ON OCCUPATIONAL HEALTH AND SAFETY

Volume 22, number 2, September 2012

Small-scale enterprises and informal sector

Published by
Finnish Institute of Occupational Health
Topeliuksenkatu 41 a A
FI-00250 Helsinki, Finland

Editor in Chief
Suvi Lehtinen

Editor
Marianne Joronen

Linguistic Editors
Delingua Oy
Alice Lehtinen

Layout
Kirjapaino Uusimaa, Studio

The Editorial Board is listed (as of December 2011) on the back page.
A list of contact persons in Africa is also on the back page.

The African Newsletter on Occupational Health and Safety homepage address is:
http://www.ttl.fi/AfricanNewsletter

The next issue of the African Newsletter will come out at the end of December 2012. The theme of the issue 3/2012 is Nanotechnology.

African Newsletter is financially supported by the Finnish Institute of Occupational Health, the World Health Organization, WHO, and the International Labour Office.

Photographs of the cover page:
© International Labour Organization / A. Fiorente.

Finnish Institute of Occupational Health, 2012

Printed publication: ISSN 0788-4877
On-line publication: ISSN 1239-4386

Finnish Institute of Occupational Health

Contents

Small-scale enterprises and the informal economy

The majority of the world's workers are economically active in small-scale enterprises, a large proportion of which operates in the informal economy. In some jurisdictions, undertakings falling into this group are known as micro and small-scale enterprises (MSEs). The size of the sector is estimated in some parts of Africa to constitute 17–27% of the workforce while it is over 90% in others. The sector is heterogeneous in nature, comprising small businesses using relatively modern equipment and employing up to about 50 workers; microbusinesses employing up to around five persons, some of whom may be family members; and micro-enterprises run by individual self-employed persons and tending to use relatively old-fashioned or traditional equipment and/or production methods. Whereas businesses in the first category tend to be registered, most of those in the latter two categories are in the unregulated informal economy.

The occupational groups operating in this sector are as varied as the wide range of industries contained in it. They include persons involved in seemingly benign jobs such as catering and cleaning, market trading and street hawking as well as those in jobs generally regarded as hazardous by occupational safety and health (OSH) practitioners. The latter include waste-picking, agriculture and mining, to mention a few.

Increasingly, the distinction between the work and the non-work environment in some small-scale informal operations is becoming increasingly blurred. This has been attributed among others to massive expansion of the informal economy, outsourcing of production to home-based work and the direct proximity of homes to the place of work. Another observation is the fact that toxic substances are being used in home-based production processes. The hazardous exposures these substances pose in the domestic setting are less likely to be adequately identified or controlled, and may result in human health risks that are not found in typical workplace settings. This also implies that the workplace has categories of vulnerable persons in domestic exposure settings who are not normally present in a workplace, such as young children.

Because of factors such as the above, there is an essential need for the control of exposures in the small-scale sector and the informal economy, and this indeed constitutes a basic human right. Yet for the majority of these workers, access to OSH services is absent or at best grossly inadequate. Their economic activities are not adequately regulated or provided for by OSH and labour laws.

It has been suggested that dealing with the issue of OSH in the small-scale sector calls for inclusiveness grounded in a precise understanding of different occupational health status, related to different types and places of work. It is essential that occupational health practitioners adopt a holistic approach to the control of workplace hazards, including the possibility of such hazards moving from the work setting to the domestic environment or the dual use of the latter as both a living and work environment. Preventive measures include legislative steps, surveillance, research to identify hazards and prompt remedial action, effective hazard communication, and policies to reduce the vulnerability of non-working populations, as well as greater public and professional awareness. Recent findings from multi-country studies conducted among working women in the informal economy have led to conclusions that prevention of work-related ill-health and injuries and promoting health and safety should also include 'prioritizing of worker voice, development of partnerships between informal worker organizations and knowledge institutions, and bridging the divide between national OSH institutions and local government level health institutions'.

It is hoped that OSH practitioners, policymakers and the private sector in Africa will collectively take up the challenge of making concerted efforts to seek solutions that will enhance equity in the administration of OSH services for small-scale enterprises and the informal economy.

Dr **Edith Essie Clarke**
Program Manager
Occupational and Environmental Health
Ghana Health Service
Accra, Ghana

C.K. Theuri
KENYA

Small-scale enterprises and the informal sector in Kenya

Introduction

The informal economy encompasses a range of economic units, in urban areas, that are mainly owned and operated by individuals, either alone or in partnership with members of the same household. These units may employ one or more employees on a continuous basis in addition to the unpaid family worker(s) and/or casual employee(s). Typically these small-scale units have a low level of organization and little or no division between labour and capital. They are engaged in the production and distribution of goods and services with the main objective of generating employment and a basic income for the persons involved. The informal sector, which includes small-scale and medium-sized enterprises, continues to play an important role in employment creation in Kenya.

Hazards related to inadequate safety and health standards are particularly evident in the case of the informal sector. Informal sector workers do not have the necessary awareness, technical means and resources to implement health and safety measures. Protection of the health and safety of workers in the informal sector is a big challenge which should be faced with an integrated approach to health promotion, social protection and employment creation. Innovative means to prevent occupational accidents, occupational diseases and environmental hazards need to be developed through cost-effective and sustainable measures at the work-site level in order to allow for capacity-building within the informal sector itself. It is evident that high productivity and quality employment can only be reached when the requirements for preventing accidents and diseases and for protecting workers' health and welfare are integrated in the management of the production process.

A poor work environment, including inadequate premises and often very unsatisfactory welfare facilities, as well as practically non-existent occupational health services are causing large human and material losses. This situation burdens the productivity of the Kenyan economy, impairs health and general well-being, and is detrimental to the quality of life of informal sector workers. Meanwhile, the organizational efforts of informal sector operators themselves are the principal means whereby informal sector workers will be able to bring about changes in their working and living conditions.

Policy and regulations

In the National Poverty Eradication Plan 1999–2015 of February 1999 (1), the Kenyan Government aims at facilitating the development of informal enterprises by providing an enabling environment in which they can prosper. Sessional Paper No. 2 of 1992 on "Small Enterprises and Jua Kali Development in Kenya" is the policy blueprint for the development of the informal economy in Kenya. This paper sets out a comprehensive policy framework which includes:

a) providing information on management and entrepreneurial training
b) upgrading the skills of individual entrepreneurs
c) promoting the transition of micro and small enterprises into medium-sized enterprises
d) disseminating information on marketing and appropriate technology.

In Kenya it is not clear under which government ministry the small-scale and informal sector falls. This is because several ministries deal with different aspects of the sector and there is no proper coordination among them. The ministries that deal with small-scale enterprises and the informal sector include the Ministry of Labour, the Ministry Trade and Industry, the Ministry of Regional Development, the Ministry of Finance and the Ministry of Local Government.

According to the results of the Kenyan national census conducted in 2009, small-scale enterprises and the informal sector employ the majority of the working population. It is estimated that about 8.2 million are employed in the small-scale enterprises and informal sector, compared with 2.8 million in the formal sector. The statistics indicates that about 75% of the working population in Kenya work in the informal sector. These figures are expected to rise with the current rate of unemployment in the country.

Occupational safety and health in the informal sector

The majority of urban informal sector workers in Kenya live in slums, and they lack basic health and welfare services and social protection. They work in an unhealthy and unsafe work environment. For most informal sector operators, their home and workplace are one and the same place. Vulnerability to diseases and poor health result from a combination of undesirable living and working conditions. The

conditions under which most informal workers operate are precarious and unsafe. Many of the small-scale enterprises operate in ramshackle structures, lack sanitary facilities or potable water, and have poor waste disposals.

In the informal sector, the distinction between working and living conditions often becomes blurred, and both are related to broader problems of poverty and underdevelopment. The interaction between occupational hazards and poor living conditions can exacerbate the health problems of informal sector workers, since microenterprises in the informal sector, poor working practices and poor working conditions are interrelated.

Surveys show that while hazards varied according to individuals' occupation, some of the most prevalent problems are poor lighting, inadequate ventilation, excessive heat, poor housekeeping, inadequate working space, poorly designed working tools, lack of suitable and adequate personal protective equipment, exposure to hazardous chemicals and dusts, high levels of noise and long hours of work. The most prevalent health impairments are musculoskeletal disorders and low back pain, allergic reactions and other respiratory disorders, noise-induced hearing loss, physical strain, fatigue and stress. Workers are then forced to work long hours since the returns are directly proportionate to production, and also because most small and micro enterprises cannot afford to employ the required workforce. Workers in the informal sector engage in manual handling such as repetitive working movements, carrying of heavy loads and awkward postures, lifting, twisting, bending, pushing and pulling. These activities cause strain on the workers and fatigue, leading to injuries and cases of ill health.

Hazardous working conditions not only harm the informal sector workers' health but also decrease the enterprise's productivity which in turn decreases income because of poor health and the inability to work effectively. Awareness both of the adverse long-term effects of poor and hazardous working conditions as well as of how to improve workers' protection and business practices in order to increase productivity is very low among the microentrepreneurs.

In Kenya, the Directorate of Occupational Safety and Health Services (DOSHS) is the department in the Ministry of Labour that is responsible for promoting safety, health and welfare at work in all workplaces. The department enforces two Acts of parliament, namely the Occupational Safety and Health Act of 2007 (OSHA) and the Work Injury Benefits Act of 2007 (WIBA). The Occupational Safety and Health Act of 2007 applies to all workplaces where any person is at work whether temporarily or permanently, including small-scale enterprises and the informal sector. The purpose of the Act is to secure the safety, health and welfare of persons at work and to protect persons other than those at work against risks to safety and health arising from, or in connection with, the activities of persons at work. The Act of 2007 repealed the Factories and Other Places of Work Act, cap 514 laws of Kenya, which applied to factories and a few other specified workplaces. The Work Injury Benefits Act of 2007 applies to all employees with the exception a few classes of employees who are exempted. It provides compensation to employees for work-related injuries and diseases contracted in the course of employment and associated purposes. It repealed the Workman's Compensation Act, cap 236 laws of Kenya. The government has also developed a national policy for occupational safety and health. The policy addresses safety and health in all sectors, including the formal and informal sectors.

The Occupational Safety and Health Act of 2007 obliges employers, employees and self-employed persons to ensure safety, health and welfare at work. Despite this, the Directorate of Occupational Safety and Health Services faces several challenges in promoting safety and health and in enforcing safety and health standards in small-scale enterprises and the informal sector, where the majority are self-employed persons. Entrepreneurs in the informal sector lack the resources to implement the Directorate's recommendations or maintain good standards of safety and health. Furthermore, entrepreneurs lack the necessary training and information, and most of them do not have suitable premises. Other challenges are high staff turnover in the sector and the fact that most of the enterprises are operated by family members.

In the years 2010 and 2012, the Directorate of Occupational Safety and Health Services, in collaboration with the Danish International Development Agency (DANIDA)-Business Sector Programme, provided occupational safety and health training to 1,573 members of small-scale and micro enterprise associations in different parts of the country. However, considering that there are about 8.2 million workers in the small-scale and informal sector, this was just a drop in the ocean. The objective of the course was to raise occupational safety and health awareness by imparting practical knowledge, to enable the entrepreneurs to identify occupational safety and health hazards in their workplaces and consequently to recognize and voluntarily implement practical solutions to eliminate the hazards. The train-

Photo C.K. Theuri

Artisans working at a Jua Kali site.

ees were also expected to disseminate this knowledge to their colleagues. Among its other activities relating to safety and health in the small-scale and informal sector, DOSHS has intensified inspections during the past few years.

The Directorate needs to do the following in future:

a) organize more training on safety and health in the informal sector
b) produce pamphlets and posters on health and safety in the English and Kiswahili languages, for distribution to the sector
c) use various mass media to raise the sector's awareness of health and safety matters. In addition, it needs to post signs and notices on safety aspects at the sites.
d) cooperate with other stakeholders in encouraging the formation of more societies and associations. These will create fora for information dissemination during their meetings.
e) create a database for the dissemination of free information to the sector. This information should include the latest research on better, safer and more productive tools, etc.
f) come up with an effective means of collecting data on occupational accidents and diseases in order to ascertain their impacts and thereby improve the national profiles.
g) ensure that Jua Kali ("hot sun," in Swahili) workplaces are designed so as to incorporate various aspects of health, safety and work-related welfare.

Conclusion

The major challenge is sustaining continuous improvement and making improvements that are long-lasting. Collaboration among the different government agencies concerned with small-scale enterprises and the informal sector, such as the Department of Small and Micro-enterprises, the Ministry of Trade and Industry, and the Directorate of Occupational Safety and Health Services, is very critical. DOSHS should continue to collect, analyse and disseminate consistent, disaggregated statistics on safety, health and welfare in the informal economy. These statistics will enable and promote the identification of specific policies and programmes aimed at ensuring that the informal economy provides more decent jobs, as well as bringing the informal economy into the mainstream formal economy.

The national policy for occupational safety and health should also be fully implemented in all sectors of the economy, in order to promote safety, health and welfare at work in Kenya.

Charles K. Theuri
Occupational Safety and Health Officer
Directorate of Occupational Safety and Health Services
P. O. Box 34120-00100, Nairobi, Kenya
Email: theurick@gmail.com

Literature

1. Poverty Eradication Plan 1999–2015. Feb 1999, Ministry of Planning and National Development.
2. National Micro and Small Enterprise Baseline Survey, 1999. Central Bureau of Statistics, International Center for Economic Growth & K-Rep Holdings Ltd.
3. National Census Report 2010, Ministry of Planning and National Development.
4. IWM Karanja, FK Muchiri, A Muruka. Safety and health in the informal economy. African Newslett Occup Health and Safety 2003;13:4–6.

M. Okuga, R. W. Mayega, W. Bazeyo
UGANDA

Small-scale industrial welders in Jinja Municipality, Uganda

- awareness of occupational hazards and use of safety measures

Introduction

Exposure to occupational hazards, with the resultant injuries, diseases and death, has profound effects both on work productivity as well as on the socioeconomic well-being of workers, their families and dependents. These hazards are the most common in the informal sector, which is inadequately supervised and lacks occupational health services (1). Because of inadequate financing and difficulties in obtaining credit facilities, small-scale industries (SSI) use poor, outdated machinery and equipment, thus limiting their productivity and increasing exposure to hazards (2). The work processes present the risk of physical injuries – such as cuts, burns, hearing impairment resulting from loud noises and eye injuries due to excessive UV-radiation and respiratory dysfunctions due to the noxious metal fumes inhaled (3–9). There is also a risk of psychosocial hazards such as stress at work and exhaustion, in addition to the ergonomic hazards that mainly involve musculoskeletal injuries such as muscle sprains, muscle pain, dislocations and fractures (5, 10, 11).

How the study was carried out

A cross-sectional study using both quantitative and qualitative methods was carried out in Jinja Town in Uganda in order to assess the level of awareness of occupational hazards and the use of safety measures among SSI welders in a low-income setting with the aim of establishing the gaps in knowledge and practice, to serve as a basis for health education. Study approval was obtained from the Makerere University School of Public Health Higher Degrees Research and Ethics Committee (MakSPH-HDREC). Written informed consent was obtained from respondents prior to the interviews. Confidentiality and respondent anonymity were maintained throughout the study.

Results

A total of 218 roadside welders with a mean age of 31 years and an age range of 18 to 53 years participated in the study. Most of the welders (72%) were above 25 years of age. All of the respondents were male and 45% had a secondary-level education, while 7% had received no formal education. The mean duration of welding work was 8.6 years (SD 6.5); the range was from 1 to 30 years. Most welders (86%) arrived at their workplaces by 8:00 a.m. Predominantly, 97% of the respondents had a work schedule of 12 hours. The mean duration of work per day was 11.6 hours (SD 0.79; range 8–13 hours). All of the welders did not have any shifts at work, although 68% of them had rest periods during working hours. About 170 (78%) were trained in metal work through apprenticeship. Most of the respondents – 81% – were not supervised while at work. A hundred and ninety eight respondents (91%) had workstations that were not sheltered from the sun.

The results showed that 92% of the welders reported injuries or illnesses that they suspected of being caused by their work. The most common types of injuries obtained were cuts and burns, cumulatively accounting for 73% of all injuries, and the least common were fractures (0.5%). Other injuries included backache and chest pain (14%), eye injuries (6%), and hearing problems (6%). The cause of these injuries was mainly attributed to the lack of personal protective equipment (PPE) or insufficient use of this equipment (64%). Other reasons given were carelessness or accidents at work (16%), fatigue caused by overworking and lack of modern equipment (16%). Eight respondents (4%) attributed the injuries to lack of skill or inexperience.

Of the 218 respondents, 181 (83.3%) were aware that there were risks associated with their work. Awareness of occupational hazards was independently associated with being in the age category of 25 years and above (OR 0.004, p 0.000), having received formal education (OR 3.69, CI 1.13-11.13, p-value 0.02), being married, having worked for more than five years, not being supervised at work and having acquired welding skill through formal training. The prevalence of regular use of PPE was 69%. Reasons cited for irregular use included that PPE was uncomfortable (47%), not always available because of the cost implications, PPE was shared among colleagues (25%), forgetfulness (13%) and not being aware that PPE is needed for even 'simple' tasks (15%). The most common type of PPE owned were goggles, while the least commonly owned were gloves (1%). Ninety-eight percent of the

Photo S. Lehtinen

The proper personal protective equipment should be used to avoid any kind of hazards. Sunglasses should not be used as goggles.

References

1. World Health Organization (WHO). 2008. The World Health Report.
2. Aguma-Acon J. Occupational Health and Safety in Small Scale Industries in Uganda. Afr Newslett on Occup Health and Safety Supplement 1999;9(1):46–8.
3. Sabitu K, Iliyasu Z, Dauda MM. Awareness of Occupational Hazards and Utilization of Safety Measures Among Welders in Kaduna Metropolis, Northern Nigeria. Ann Afr Med 2009;8:46–51.
4. Shaikh TQ, Bhojani FA. Occupational Injuries and Perception of Hazards Among Road-Side Welding Workers. J Pak Med Assoc 1991;41:187–8.
5. Kasule S. Occupational Health Problems Among Workers in Small Scale Metal Works Industries in Katwe Area, Kampala. A dissertation submitted to Makerere University for partial fulfilment of the requirements for the MPH degree. 1994.
6. Mbulingwe ES. Levels and Influencing factors of Noise Pollution from Small Scale Industries in a Developing Country. Journal of Environmental Mgt 2004:33(6):830–9.
7. Ocen D. Occupational Hazards in Small Scale Metal Workshops in Katwe, Makindye Division Kampala District. A dissertation submitted to Makerere University for partial fulfilment of the requirements for the BEH degree. 2007.
8. Sorensen AR, Thulstrup AM, Hansen J, Ramlau-Hansen CH, Meersohn A, Skytthe A, Bonde JP. Risk of Lung Cancer According to Mild Steel and Stainless Steel Welding. Scand J Work Environ Health 2007;33:379–86.
9. Zhang M, Qi C, Chen WH, Lu Y, Du XY, Li WJ, Meng CS. [Re-Analysis of Occupational Hazards in Foundry]. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi 2010;28:280–5.
10. Majaja BA, Elias E, Kafuku J, Ibrahim S. Ergonomic Aspects in Local Small Scale Metal Work Enterprises. Paper presented at the International Conference of industrial design engineering. Dar-es-Salaam. July 17–18, 2000.
11. Torner M, Blide G, Eriksson H, Kadefors R, Karlsson R, Petersen I. Workload and ergonomics measures in Swedish professional fishing. Appl Ergon 1988;19:202–12.

welders reported having goggles, but it is worth noting that of all these, only six welders (2.8%) had the proper welding goggles. The rest had sunglasses that they used as goggles. Only 12.8% respondents had 'all' of the gear, including goggles, gloves, overalls, and boots. Upon adjusted analysis, the factors independently associated with use of safety measures included having acquired metalworking skills through formal education (OR 0.27, p value 0.009 for skill obtained through apprenticeship) and not having any supervision at work (OR 2.74, p value 0.017).

Conclusions

In this study, we found that roadside welders had a high level of awareness of occupational hazards, but their use of safety measures was less than optimal. Most of the welders (83%) were aware that their work was hazardous to their health. This figure compares favourably with the finding of 78% seen among welders in Nigeria (3) and differs drastically from that for welders in India (4), where only a few welders perceived their occupation as hazardous. In our study, awareness was positively influenced by age, educational status, marital status, work experience, type of training and supervision. Generally, the high level of awareness may be used as a window of opportunity for involving welders in decision-making as regards their working conditions.

In our study, the great discrepancy between the level of awareness and the use of personal protective equipment could be attributed to factors such as discomfort of wear, not being aware that even 'simple tasks' require protection and the unavailability of personal protective equipment because of the high costs associated with their acquisition, leading to sharing of the equipment available among colleagues.

Despite the high levels of awareness of occupational hazards among roadside welders in Jinja, the use of safety measures is still low, leading to an increased risk of avoidable injuries. Strategies are therefore needed not only to enforce policy but also to cover the informal work sector, in order to ensure the safety of welders.

Monica Okuga
Department of Health Policy
Planning and Management
Makerere University
School of Public Health
Kampala, Uganda

Roy William Mayega
Department of Epidemiology
and Biostatistics
Makerere University
School of Public Health

William Bazeyo, Dean
Makerere University
School of Public Health

F. Muchiri, ILO
D. Seblework, ETHIOPIA

Traditional women weavers in Addis Ababa, Ethiopia:
occupational safety, health and working conditions

In the world today, a majority of people work in the informal economy – because most of them are unable to find other jobs or start business in the formal economy[1]. Since the 1990s Ethiopia, with a population of about 80 million, has made concerted efforts to transform its economy rapidly in the context of Agricultural Development Led Industrialization (ADLI), through the Government's *Integrated Programme for Development of Cotton, Textiles, Garments Export*. This programme is part of the national development plan, which aims at building a free-market economic system that will enable rapid economic development and allow the poor to benefit from economic growth. To contribute to this and other national initiatives, the International Labour Organization (ILO) office in Ethiopia, within its mandate and in consultation with tripartite constituents, has supported the development and implementation of a Decent Work Country Programme (DWCP) which has prioritized, among others, the cotton and textiles sector as a key action sector, the main focus being to support entrepreneurship among women in the traditional cotton weaving sector. This decision was motivated by the fact that the sector is a large source of employment. Further, the textiles sub-sector is a domestic resource-based industry that has both a large domestic market and the potential to produce a wide range of exportable products that would enhance the country's foreign exchange earnings. However, to increase the competitiveness and potential of the sector to break into diverse global markets and maintain its presence there, it was necessary to enhance decent work practices within the sector and in particular to improve working conditions and occupational safety and health.

Traditional cotton weaving sector

Cotton is abundantly available in Ethiopia through small and large farm holdings. Traditional cotton weaving based on both endogenous as well as exogenous technology is known to have been practised for several centuries. Traditionally, cotton weaving was male dominated until recently, when women progressively entered the trade, mainly learning the art from their families. Most women weavers do their weaving in the family dwellings or compound, where they combine it with other household chores. However, with increasing demand and support to the sector from the Government, many weaving and outlet shops have expanded to formal shopping centres, for instance through programmes empowering women producers and entrepreneurs in the sector either as individuals or through cooperatives, the aim being to promote effective access to viable domestic and international markets.

The cotton weavers perform their work around small workplaces characterized by poor working conditions. They are not supported by occupational safety and health services nor are they covered by the national social security schemes, thus making women working in the weaving sector highly vulnerable. In respect of occupational safety and health and working conditions, the Decent Work Country Programme aimed to address some of these deficits systematically, firstly by generating insight on the sector through assessment that would highlight areas for priority action.

Assessment of occupational safety, health, working conditions and the environment

The main aim of the assessment was to identify the existing occupational safety and health, working conditions, and environmental challenges in the sector and their impact on productivity, quality and access to external markets. A questionnaire was developed to gather general information, including information from institutions that serve the sector. The assessment at workplace level was based on the principles of the ILO-Work Improvement in Small and Medium-Sized Enterprises (WISE) training methodology. WISE is a training methodology specifically designed to improve occupational safety and health, working conditions and productivity in small and medium-sized enterprises that applies a powerful action-oriented checklist to aid the prioritization of improvements on a continuous basis. The assessment covered the following areas:

- identification of good examples and areas requiring action for improvement and technical support;
- overview of the available technical support and other necessary services targeting the traditional weaving sector;
- exploration of appropriate systems and mechanisms that could be put in place to help the sector in meeting the basic occupational safety and health and working conditions that promote access to diverse international markets;
- analysis of the information gathered to guide in the development of a specific action manual for the continuous improvement of occupational safety and health, working conditions, and the environment in the sector.

1 ILO Resolution concerning decent work in the informal economy

The localized WISE methodology action checklist covered the following areas:

- materials storage & handling;
- use of hand tools;
- productive machine safety;
- improving work station design;
- work organization;
- lighting;
- premises;
- work-related welfare facilities;
- household hygiene and food safety.

Methodology

The assessment targeted women weavers in the three categories namely the micro-level weavers who weave in their homes, weavers in cooperatives and those weaving in small-scale enterprises in Addis Ababa. A pre-assessment walk-through survey was made to observe methods and culture of work and to gather information important for the adaptation of the assessment checklist and the design of focus group discussions. In addition to administering the adapted action checklist and holding focus group discussions, good practices from workplaces were documented and some were captured on still photographs. Some physical workplace factors, such as illumination levels, were also monitored. Sketches of workplaces were made to guide in illustrating possible improvements especially as concerns work organization, layout and work station design. As shown in Table 1, the assessment covered 88 women weavers in Addis Ababa and 408 male weavers, though the later were not the primary target.

Results

About 50 per cent of those found participating in the sector in Addis Ababa are between the ages 18–27 years, while 25 per cent are in the age group of 28–37 years and the rest were between 38 and 47 years, implying that the sector is capable of providing long-term employment opportunities. 66 per cent of the weavers were single, 17 per cent were divorced, 8 per cent were widowed and only 9 per cent were married. Over 75 per cent of the weavers have a high school education, an element that is pivotal in planning strategies for the improvement of a preventive safety and health culture in the sector and for learning and embracing new skills and technology.

On the specific technical areas covered in the adapted checklist, all three weaver categories (micro-level weavers, weavers in cooperatives and those weaving in small- scale enterprises) had poor working conditions and environment, and had low productivity and product quality. Weavers and owners of the small-scale enterprises were not aware of the benefits of improving working conditions, occupational safety and occupational health. Though they complained of fatigue from frequent bending and stretching to reach hand tools and parts of the loom controls, they never considered the design of work station as being of importance to their well-being and productivity. Both the traditional and improved weaving looms, which are used in cooperatives and small enterprises, do not have height adjustable rollers and this leads to awkward working positions. In particular, this forces the weavers to bend their necks and the rest of the body deeply during weaving and design of their product (see Photo 1). Lack of regular maintenance of the hand tools used for weaving also results in hand injuries and contributes to the low productivity and quality of products. The shuttles used in traditional weaving have a poor grip and differ in their design from those now being promoted by Federal Micro and Small Scale Enterprise Development Agency (FEMSDA) (Photos 2 and 3) that are known to have a better grip and to require less effort in using them in addition to enhancing productivity and quality.

Photos D. Seblework

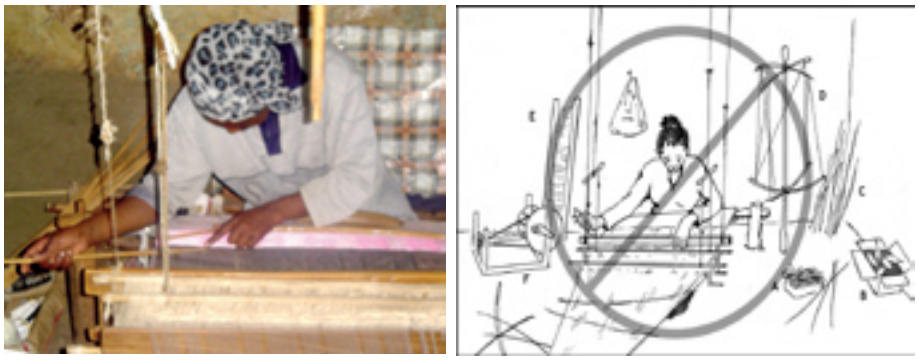

Photo 1. Deep and frequent bending and stretching of neck, body and hands in order to reach tools (e.g. A, B, C, D, E and F shown in sketch above)

Categories	Gender		Total
	Female	Male	
Micro-level weavers	7	6	13
Cooperative weavers	2	191	193
Small-scale enterprises	79	211	290
Total	88	408	496

Table 1. Categories of traditional weavers by level of organization and gender

Most of the weaving rooms were found to have a low level of light, while some experienced glare from improperly located light sources and this not only leads to eye strain, but also poor productivity and quality of weaved products. Weaving at the micro-level is done in the family dwelling and this exposes the living environment, including children, to multiple health hazards arising from the weaving activities. In addition, the rooms are poorly ventilated, there is exposure to electrical hazards, and they mainly are overcrowded with overlapping looms (see illustration in sketch Photo 5 and the recommended arrangement in sketch Photo 6) are among the many occupational safety and health factors and challenges encountered in the sector.

Recommendations for improvements

Immediate, medium-term and long-term recommendations for the improvement of occupational safety and health, working conditions and productivity were made on the basis of the assessment. Immediate recommendations were made during the assessment and follow-up visits. These included discussions on the positive impact of improving working conditions and types

Photo 2. Traditional Shuttle

Photo 3. Modern Shuttle

of low-cost solutions that could be applied as well as the benefits of sharing good practices through peer learning. The discussions were supported with photos of good examples or illustrations that could be applied to improve working conditions and at the same time enhance productivity and product quality. During the follow-up visits, it was observed that some of the weavers took immediate improvement interventions, such as the rearrangement of their working tools, the installation of ceilings and the opening of closed ventilation points.

At a workshop held to share the draft report of the assessment and improvements made at the workplaces, weavers and representatives from government departments commended the action-oriented learning that they had received and enriched the draft action manual with examples of the improvements they had made. Further, they made suggestions aimed at improving occupational safety, working conditions and the environment in the sector, that are also linked to enhancing productivity, quality and access to international markets. These suggestions included:

- request to the competent authorities in government to provide systematic and continuous workplace inspections with the emphasis on the provision of advisory and information services;
- the need to redesign the latest type of improved looms to enable the adjustment of sitting positions and allow for sufficient space for resting weavers' feet;
- increased training and awareness on the improvement of working conditions and on basic hygiene, first aid, fire prevention and control;
- involvement of weavers in all stages of work organization, design and improvement of products and services, as well as the creation of a communication system to promote their participation in making suggestions on the sector's safety, health, working condition and the environment;
- the need to undertake similar periodic assessments in order to generate the information that can be used as a basis for the formulation of policies, programmes and action-oriented measures in order to improve women weavers' working conditions and environment.

Photos 4. Traditional loom (left) and modern loom (right), both involving strenuous postures

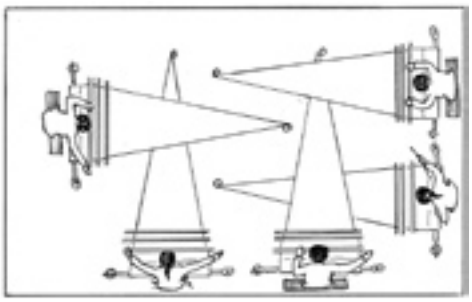

Photo 5. (sketch) Overlapping traditional weaving looms (left).

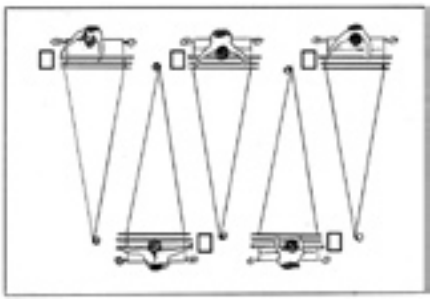

Photo 6. (sketch) The recommended arrangement (right).

Conclusions

The assessment was highly appreciated by both the weavers and service-providers as a key step for the development of action and tools to improve occupational safety and health, working conditions and the environment in the sector. In particular, weavers were encouraged by the positive principles that were applied in improving their workplaces; principles that also lead to improved productivity and quality down to the grassroots level. The initiatives call for continuous support and especially the development of policy tools and bilingual guides for continuous improvement that would not only support their survival, but also their growth and ability to compete on local and export markets.

F. Muchiri
Senior Occupational Safety and Health Specialist
International Labour Organization
Email: Muchiri@ilo.org

Dawit Seblework
P.O.Box 62603
Addis Ababa, Ethiopia
Email: dawitsk@gmail.com

AP. Ayelo, H. Lawin, B. Fayomi
BENIN

Factors associated with skin diseases among urban gardeners in Cotonou

Introduction

Gardening, defined as the culture or intensive production of vegetables, has taken on considerable importance in African cities in recent years, including those in West Africa, due to population growth and economic stagnation (1, 2, 3). Vegetable crops are important for the diet of people and prevention of diseases associated with micronutrient deficiency.

Indeed, gardening in Cotonou appears increasingly to be an essential activity, generating income and practice, but also leading to problems related to its organization and ecosystem factors. In fact, the uncontrolled use and large quantities of agricultural inputs and pesticides cause problems for the environment and public health.

Ignorance of the health situation in the places of production and among producers has raised questions within the team of the Community of Practice of Ecosystem and Human Health (COPEH) of Benin, who decided to assess the impact of gardening on the health of gardeners who work on the Houéyiho site in Cotonou.

One objective of the study was to describe the factors associated with dermatological disease among gardeners, which is the subject of this work.

What was done?

Setting of the study

The study was conducted on the Houéyiho gardening site in Cotonou. This is a geographical area of 15 hectares located in the vicinity of the Cotonou International Airport. Its location limits any possibility for its extension. A total of 335 gardeners, including 61 female gardeners, were working on this site at the time of the study.

Sampling and data collection

Gardeners who had at least two years exposure to pesticides were selected for the research of dermatological diseases. The sample size was 170 gardeners. The methods for data collection were clinical and laboratory investigations, panel discussions with growers and direct observations.

Apart from humans, the study took into account the water used to water plants and the soil cultivated by gardeners.

Several water samples were collected at the swamp, the drilling and the wells.

Once collected, these water samples were poured into sterilized bottles and stored in coolers at a temperature of 4°C, after which they were transported to the laboratory.

Soil samples were taken on three groups of plates:
- Plants watered with water from the swamp
- Plants watered with well water and
- Plants watered with water obtained through drilling.

Data analysis

An illustrated description (photos) was conducted of the dermatological lesions observed. In the waters sampled, the following biochemical and physicochemical parameters were analysed: pH, conductivity, turbidity, nitrites and nitrates.

The pH was measured using a WTW pH 730 pH meter, and turbidity with a HACH 2100. A turbidimeter (ISO Method 7027) was used, and conductivity was tested using a WTW conductivity meter. Nitrite and nitrate were measured using a HANNA brand PHYWE cell multi-parameter spectrophotometer.

In the soil samples, other physicochemical parameters such as the presence of nitrates (NO3) and ammonium (NH4) were also determined. The presence of heavy metals such as zinc (Zn), lead (Pb), cadmium, nickel and chromium, was determined using a WTW photoflex with specific preassembled kits.

Photo 1. Thickening of the foot

Photo 2. Appearance of "craters" on the foot of an old gardener (Sentant = 10 years). At this stage the lesions are painful, often making it difficult to walk. These "craters" give the soles of the older gardeners' feet an appearance resembling the lunar surface.

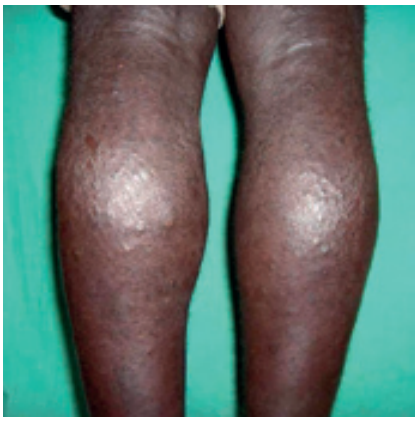

Photo 3. Eczema at 2 legs (back view)

Photo 4. Front view

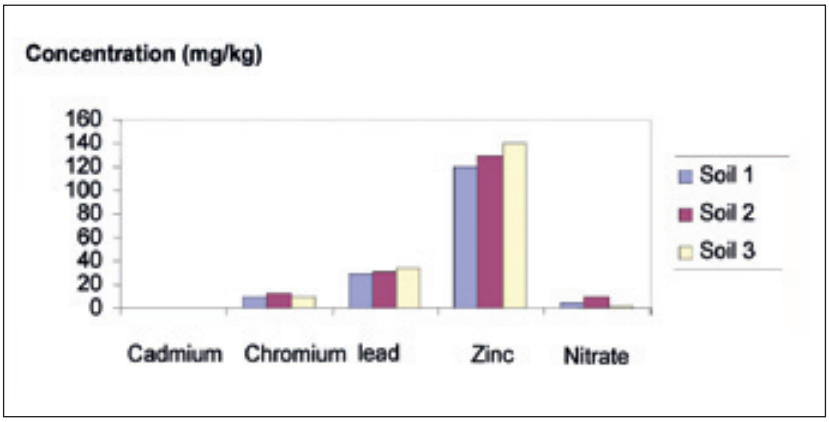

Figure 1. Determination of heavy metals and nitrate in soil
Source: Results COPEH-Benin

Results

Characteristics of dermatosis among gardeners

8.4% of patients were diagnosed with dermatological diseases. Two types of skin lesions are seen in gardeners. These are the plantar keratoderma and dermatitis eczema.

Plantar keratosis lesions

Photos 1 and 2 show two stages in the evolution of the lesions: the thickening stage and the stage of peeling or crater formation on the soles.

Eczematous dermatitis

This condition appears most often on the limbs, mainly the lower limbs (Photos 3 and 4). These images show chronic eczematous dermatitis with secondary infection.

Results of soil analysis

Figure 1 shows the levels of heavy metals and nitrate in soil samples taken from gardening sites. These soils are contaminated with toxic metals such as zinc, chromium, and lead. Trace amounts of cadmium were also identified.

These metals probably come from garbage dumped at the site and used as manure. The nitrate content of soil is an important indicator of the use of nitrogen fertilizers.

Results of the physico-chemical analysis of irrigation water

The results in Table 1 show that there is little variation in the water temperatures of the various sources used to water boards. The temperature of the water drawn from the swamps, wells and drilling on the north side is the same as that derived from the same sources along the south side. However, the temperature of the water derived from drilling is slightly higher compared to that from the well and still somewhat higher compared to that of the swamp. This difference may be explained by the fact that the waters of the marshes are open and they undergo heat exchange with the atmosphere.

Water	Temperature (°C)	pH	Conductivity	Turbidity
South swamp	27	7.36	1039	1.10
North swamp	28	7.26	1040	2.87
South well	29	6.92	1421	0.62
North well	29	6.66	1227	0.25
South drilling	30	6.37	1373	-
North drilling	30	6.44	1085	1.08

Table 1. Study of pH, conductivity and turbidity of water

Results of bacteriological analysis of water used for irrigation

Regardless of the period and the source of the sampling, the analysis of the irrigation water revealed the presence of germs such as Trichomonas hominis, Entamoeba coli, Entamoeba histolytica, Duodenalae ankylosto-

ma and Schistosoma japonicum.

Behavioural risk among gardeners

Several types of behaviour have been identified among both gardeners and workers at the site. These behaviours may explain the occurrence of infectious diseases in vegetables.

Lack of waste disposal devices

It is clear from the fieldwork that most operators defecate in the open air, a few meters from vegetable beds, because there is no toilet on the site. Moreover, the excreta of pigs raised on the site are used as fertilizer.

Lack of personal protective equipment

It was found that gardeners often remain barefoot while watering.

Other risky behaviours were also observed, for example:

- workers have no specific protective clothing which they wear during the application of pesticides
- they do not protect the body during treatment
- some workers do not wash after using insecticides and fertilizers.

Discussion

The skin lesions observed in gardeners are due to three factors:

- Poor hygiene at work
- Lack of personal protective equipment
- The action of chemicals.

The problem of occupational health

Ignorance and precarious living conditions are not conducive to compliance with minimum health and work requirements in gardening. Stepping almost always barefoot in water (permanent humidity) rich in parasitic microorganisms and chemicals irritating the skin is a key factor associated with the occurrence of dermatosis. Not washing after handling pesticides demonstrates ignorance of the risks associated with the chemicals handled. This state of neglect displayed by gardeners against their own health is a result of the complete absence of the concepts of hygiene and risk. The study has given them the opportunity to gain sufficient awareness of issues related to the high impact of their actions not only on their health, but especially on the consumers of their products and the environment in general.

The lack of personal protective equipment

Wearing appropriate clothing and footwear on the site is of little concern to gardeners, a fact which promotes the occurrence, spreading and infection of skin lesions observed. It is clear that the socioeconomic level of gardeners does not allow them to acquire the protective equipment, but the lack of organization and lack of knowledge of the risks have greatly contributed to this situation. This aspect has led to the establishment of a network of trained peer educators to help improve the safety and health in their profession.

The action of chemicals

Pesticides and mineral fertilizers infiltrate the soil and make the water of the swamp acidic or alkaline, depending on their compositions. Mineral fertilizers are intended to supplement the deficiencies in soil of inorganic nutrients, especially nitrogen, but also phosphorus and potassium. The most common NPK fertilizers consist of ammonium nitrate, phosphate and potassium salts (4). The presence of nitrates in the results of our soil analysis indicates the importance of the use of these products. But the biocidal activity of nitrates and their role in the onset of dermatitis have been determined (4). Pesticides handled by gardeners have been held responsible for occupational dermatosis in agricultural areas (5). The skin lesions observed are probably induced by the combined action of chemicals in soil samples.

Conclusion

This study showed a close link between health, environment and working conditions in urban gardeners in Cotonou. While the 8.4% of cases of dermatitis described in this survey are not sufficient to argue for stronger links in our context. Nevertheless, they encourage us to raise awareness of the risks among growers and to warn them about various occupational exposures.

It is therefore important that growers of other sites in Cotonou and other towns benefit from the results of this study. We must consider the possibility of setting up communication channels between them to share information and provide opportunities for learning.

Paul A. Ayelo, H. Lawin, B. Fayomi
University of Abomey Calavi,
Faculty of Health Sciences,
Unit of Research and Education in Occupational Health and Environment,
Cotonou, Benin

Corresponding author
Dr. Paul A. AYELO
Address: 01 BP 188 Cotonou
Phone: (+229 97026378)
Fax: (+229 21305223)
Email: paulayelo@yahoo.fr

References

1. Asomani-Boateng R. Urban cultivation in Accra: an examination of the nature, practices, problems, potentials and urban planning implications. Habitat International, 2002; 26(4):591–607.
2. Cissé O, Gueye NFD, Sy M. Institutional and legal aspects of urban agriculture in French-speaking West Africa: from marginalization to legitimization. Environment and Urbanization 2005;17(2):143–54.
3. Matthys B, Adiko FA, Cisse G. Le réseau social des maraîchers à Abidjan agit sur la perception des préoccupations et des risques sanitaires liés à l'eau. Vertigo – la revue électronique en sciences de l'environnement, Hors-série 3, décembre 2006.
4. Testud F. Engrais minéraux. EMC – Toxicologie-Pathologie. Janvier 2004;1(1):21–8.
5. Sanborn M, Cole D, Kerr K, Vakil C, Sanin LH, Bassil K. Pesticides Literature Review. Ontario College of Family Physicians, 2004, 186 p.

S.T. Olowogbon, A.J Jolaiya, A.Y. Adenrele,
A. Uhunmwangho
NIGERIA

Attitudes and practices of local food vendors regarding food hygiene and handling

Introduction

Food is a necessity for all living creatures, and it can be in liquid, solid or gaseous form. As such it should be handled and prepared in the safest way possible to meet all consumer needs. In many developing countries, street food or ready-to-eat food vendors are an important component of the food supply chain; street food satisfies a vital need of the urban population because it is reasonably priced and conveniently available, and sometimes some segments of the population depend entirely on it for survival (1). Food safety is a major concern with street food, as this food is generally prepared and sold under unhygienic conditions with limited access to the safe water, sanitary services, or garbage disposal facilities (2). Food safety as an applied element of a healthy nation is still non-existent or at low ebb in most developing nations. Unfortunately, the majority of the population cannot take pride in safe and hygienic food. During the last few decades, the sale of foods by local food vendors has expanded rapidly in urban areas of low-income and middle-income societies, both in terms of providing access to a diversity of inexpensive foods for low-income households and in offering job opportunities for many urban residents (3). The role of street foods in supplying the nutrient needs of urban populations has received little official attention; more notice has been paid to the potential dangers arising from the consumptions of street foods than to any benefits they might offer (4).

Street food is a public health concern, since safe food hygiene can be difficult to practise at street level in settings where resources are scarce and the surroundings are of low environmental and sanitary standards. Diarrhoea diseases due to contaminated and unhygienic food are among the leading causes of illness and deaths in low-income countries, and several outbreaks of disease have been attributed to the consumption of street food (5).

The need exists for food vendors and other food handlers to be trained in the basic principles of safe food handling (6). A study was carried out by the World Health Organization (WHO) concerning the application of the WHO keys of safer food to improve food handling practices of food vendors in a poor resources community in Ghana. Data were collected from food vendors which showed that the vendor constituted an important source of oral-faecal transmission. Following this, the five WHO keys of safer food were utilized in an evidence-based training programme for the vendors, the aim being to improve their food handling practices. Impact assessment of the food safety training showed that 68% of the vendors had acquired some knowledge from the workshop and were putting it into practice. Lack of food safety equipment was a major hindrance to behavioural change among the vendors, as far as food handling practices are concerned (7). A massive street food inspection carried out in Kerewan, Gambia in 2009 noted that food safety and hygiene are becoming of increasing concern to both the government and development partners such as the World Health Organization. Across West Africa, this is symptomatic of the alarm-

ing trend of increased demand for food outside the domestic environment in response to the growing corporate culture and a decline in food production.

Factors blamed for the decline in food hygiene, in addition to the proliferation of food vendors and contamination from raw food, included lack of proper transportation, the storage of prepared food, infected handlers, inadequate clean equipment, and the abuse of time and temperature. Doubts over sources of water and foodstuffs, as well as tableware are of primary concern, with the street food hawker likely to be living in slums with poor infrastructures, lacking clean toilets and drainages. Perhaps the most neglected aspect is the post cultivation and preservation processes. Research has uncovered, for instance, a high rate of aflatoxin, a toxin produced by mould before or after harvest. Aflatoxin, caused by low humidity during storage, can damage the liver or lead to liver cancer (8).

Consumers are increasingly demanding specific quality attributes of processed and other food products and are increasingly aware of food safety issues. Food-standards are increasingly stringent, especially for fresh and perishable food products such as fruits, vegetables, meat, dairy products, fish and seafood products, which are prone to food safety risks. These food quality and safety demands are most pronounced in industrialized countries but at low ebb in developing countries such as Nigeria. The high incidence of food-borne-illness has led to an increase in global concern about food safety. However, awareness of and adequate information on food safety issues are still lacking or insufficient. This study intended to bridge this information gap. A further study was carried out in Lagos, Nigeria, one of the most populous cities in West Africa.

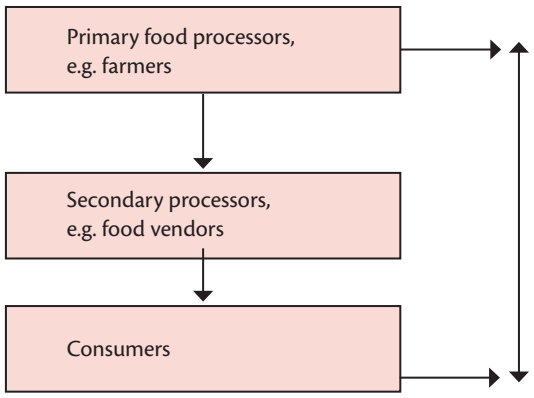

Figure 1. Food value chain

The above figure reveals the strategic role of food vendors in the value chain.

Data collection

The study was a cross-sectional study that applied a structured questionnaire and a rapid appraisal consisting of 40 random samplings among local food vendors working in various food establishments located in Surulere Area of Lagos State, Nigeria. Simple percentage and descriptive statistics were used to analyse the data obtained.

Results of the survey

Table 1. Main results of the questionnaire survey.

Demographic characteristics Age (years)	Frequency	Percentage
<20	10	25
21-30	20	50
>30	10	25
Gender		
Males	10	25
Females	30	75
Marital Status		
Single	12	30
Married	28	70
Educational background		
No formal education	20	50
Primary	10	25
Secondary	5	12.5
Tertiary	5	12.5
Number of workers		
1-person vendor	28	70
<5	7	17.5
>5	5	12.5
Water source for food preparation		
Tap & borehole	30	75
Well water	10	25
Duration of keeping cooked food		
1-24 hours	28	70
>24 hours	12	30
Awareness of food safety		
Yes	24	60
No	16	40
Implementation of food safety & hygiene		
Yes	22	55
No	18	45
Medical examination		
Once a year	7	17.5
Twice a year	10	25
Once in two years	12	30
Can't remember when last	11	27.5
Are you registered with any regulatory organization		
Yes	5	12.5
No	35	87.5

Photo A.J. Jolaiya

Food safety is a major concern with street food, as this food is generally prepared and sold under unhygienic conditions with limited access to the safe water, sanitary services, or garbage disposal facilities.

What we can learn?

Half of the vendors interviewed fell in the age bracket of 21–30 years. Three out of four respondents were female and 70% were married. Half had no formal education, while 12.5% had a post-secondary school education. Education status may have been a means of exposure to basic hygiene practices. 70% of the respondents operated as a sole business person, while 12.5% had more than five workers. 75% of the respondents used tap and borehole water for their vending activities. 60% of the respondents claimed to be aware of food safety methods such as hand-washing, good housekeeping etc. but only 55% have been able to implement these methods. 30% of the respondents claimed they visit a doctor for medical examination once in two years while 27.5 could not remember when they had last had a medical examination. This has serious implications for food safety, since the vendors are not certified as being healthy. 87.5 % of the respondents were not registered with any regulatory organization.

The vendors' personal hygiene was appraised. It was found that 71% of the vendors did not use aprons, 66% handled food with their bare hands, and 87.5% of the vendors handled money while serving, which could be a serious source of pathogenic organisms. The majority of the food vendors conducted their business in marketplaces, and some of them also had their food business on the roadsides and junctions of major roads. About 30% out of the local food vendors served fast-food meals consisting of fried rice with meat, and 53% served traditional meals consisting of fufu and amala (cassava flour) and various traditional soups. 35 % of the vendors served both fast-food and traditional meals, and it was observed that 17% of the vendors also served side dishes of salads of raw vegetables such as lettuce, cabbage and spring onions. Based on observation, owing to the location of their food vending activities, about 75% of the vendors interviewed prepared their foods in unhygienic conditions. 30% of the vendors interviewed said that they usually had leftover food that could serve as a breeding ground for microorganisms that could lead to food poisoning.

Conclusion and recommendations

Food is a necessity for all and it should be handled and prepared in the safest way possible in order to meet all consumer needs. There is therefore a need for the collaborative efforts of all stakeholders that would ensure food safety standards to reduce food poisoning and other food-borne diseases such as cholera, dysentery, diarrhoea, etc., thereby contributing to the nation's health and productivity. Based on the study, the following actions are recommended:

- Compulsory registration of local food vendors with the government
- More effective, better equipped and well trained public health officers/inspectors
- Training of food handlers and vendors in basic food hygiene practices, such as hand-washing, good housekeeping, proper food storage and the use of cooking gear.
- Compulsory periodic medical examination for food handlers and vendors
- Legislation on food safety standards
- The provision of laboratories where foods are tested for pathogens and other related infectious organisms in food in order to help curb food poisoning.
- Increased public awareness and enlightenment on food safety standards.

References

1. Jones TF, Angulo FH, Bernard OV. Eating in restaurants, a risk factor for food borne disease? Clinical Infectious Disease 2006;43;1324–8.
2. Isara AR, Isah EC, Aino BG. Knowledge and practice of food hygiene and safety among food handlers in fast food restaurants in Benin City. Edo-state Post graduate Medical Journal 2009;16(3)207–12.
3. Green L, Selman C, Decik BJ. Food service workers self reported food preparation practice. International Journal of Hygiene Environmental Health 2005;208:27–35.
4. Gupta SC, Ketkar YF, Valourd ZM. Prevalence of intestinal parasites in food handlers. Indian Medical Gazette [SH1][SO2]1981;158:295–8.
5. Okpaala IA, Osbert FC, Wilfred DC, Survey of the incidence of intestinal parasites among school children. West African Medical Journal 2003;10(1):143–57.
6. Idowu OA, Rowland SA, Femi FV. Oral faecal parasites and personal hygiene of food handlers in Abeokuta Nigeria. African Health Science 2006;6:160–4.
7. Abdul-salami MY, Kafesterm FK, Robert WA. Food safety: Safety of street foods. World Health Organization 1998;14:191–4.
8. Oluchi Agbanyim. Food hygiene West Africa Insight Publication; 2011 retrieved from http://allafrica.com/stories/200911021342.html on 20/04/12.

Samuel T. Olowogbon,
Yetunde A. Adenrele, Ama Uhunmwangho
Occupational Health and Safety Division of Vertext Media ltd, Mokola
Ibadan, Nigeria.
E-mail: olowogbonsam@yahoo.com

Ademola J Jolaiya
Department of Agricultural Economics
University of Ilorin, Nigeria.

D. Menya, C. Walekhwa, P. Koskei, R. Too, KENYA
R. S. Carel, ISRAEL

Occupational risk factors in the Jua Kali industry, Eldoret, Kenya

Photo R. S. Carel

Introduction

The urban informal sector is described by the International Labor Organization (ILO) as a part of the national economy composed of a wide range of small-scale economic units producing and distributing goods and services, consisting largely of independent, self-employed producers in the urban areas of developing countries. These small-scale economic units often employ family labour or a few hired workers or apprentices. Typically these units operate with little technology and skills, at a low level of productivity, and provide very low and irregular incomes. Their primary objective is to generate employment and basic income to the individuals directly involved (1). Generally, these enterprises are not registered or regulated, and do not benefit from support and subsidies by government or other agencies. Health and safety issues are hardly considered, and work accidents are rarely reported and probably never compensated (2, 3).

The sector is "informal" in the sense that the economic units are unregulated and unrecorded in official statistics. They tend to have little or no access to organized markets, formal credit sources, education or training institutions, public services, and amenities. Nevertheless, the informal labour sector is playing an increasingly important role in the economies of developing countries, and in many of them 50–80% of the national workforce is employed in such micro- and small-scale enterprises that employ, in most instances, fewer than ten workers (4–7).

In Kenya, the *Jua Kali* ("hot sun," in Swahili) industry is a major economical component of the urban informal sector (2, 8). It consists primarily of manufacturing and repair shops. These activities take place in open yards, undeveloped urban plots, or even on street pavements. Often the facilities provide merely a roof, sometimes not even this. Usually, *Jua Kali* enterprises are concentrated in designated areas in or around towns, where hundreds and sometimes thousands of workers pursue their economic activities. The *Jua Kali* sector does not include farming, food and vegetable sellers, traders, street vendors, or small retail shops. Although women constitute about 70% of the general informal sector workforce, *Jua Kali* artisans are mostly men (9).

The failure of the formal urban employment system in recent years has led to the rapid expansion of the informal sector. Thus, *Jua Kali* workers provide a source of income for millions who would otherwise lack the basic needs for survival. It is estimated that in 1999 there were about 1.3 million *Jua Kali* enterprises in Kenya and that number grows each year by about 10% (3, 4). Other evaluations of the *Jua Kali* industry in Kenya have estimated that in 2001 this sector employed more than 5 million workers, which is close to 50% of urban employment (4, 10).

Although several socioeconomic and administrative evaluations of this sector have been conducted (10–13), there is little documentation of working conditions, occupational hazards, or safety needs and practices in *Jua Kali* enterprises. The aim of this study was to acquire quantitative health and safety data on a typical group of *Jua Kali* workers in order to identify areas in which interventions are needed to protect the health and safety of these workers and to sustain their productive years at work.

Material and methods

A cross-sectional survey was conducted in August 2005 in a large *Jua Kali*i area in Eldoret, Kenya. A detailed questionnaire was developed to collect data on the socio-demographics, work, safety, and health parameters characterizing the group of workers under consideration. The questionnaire was interviewer-administered with the assistance of 4th year medical students who were undertaking their course in Occupational Health. Data were collected from workers at different enterprises who agreed to participate. In addition, observations of the workplace were made according to an observation guide.

The statistical analyses included frequency tables of the relevant variables, chi-square tests for comparison of categorical variables, and multivariable analyses using SPSS 13.0 software.

Results

All those interviewed were male (n=121). Table 1 provides information about the interviewees' age distribution, education level, marital status, number of children, and length of stay at the current residence. *Jua Kali* workers in this study were generally young, with a mean age of 30.4+9.3 years. Over 70% were below 35 years and less than 10% were over 45 years. Nearly half of the interviewees had no formal education beyond primary school, but over 20% had completed secondary school and some had a college degree. Sixty four per cent were married, with an average of 3.4±2.0 children (range 1-8 children). More than half of the married men stated that their wives were also working, mostly in the informal sector as businesswomen, selling goods.

About a third of the group indicated that they had been living in their current place of residence less than 4 years and about 20% for over 10 years. Most of the subjects said that their place of residence was one of the surrounding peri-urban areas or slums.

Information concerning the type, size, and other features of the worksites in the *Jua Kali* is shown in Table 2. About two-thirds of the enterprises were small businesses (micro-enterprises) employing fewer than five people. Only about 10% of the worksites employed ten or more workers.

Table 1. Socio-demographic characteristics of the interviewees

Characteristic	Number	(%)
Age group (years)		
18–24	34	(28)
25–34	53	(44)
35–44	25	(21)
45+	9	(7)
Education		
Some primary	17	(14)
Completed primary	40	(33)
Some secondary	37	(31)
Completed secondary	23	(19)
College	4	(3)
Marital status		
Single	41	(34)
Married	77	(64)
Divorced	1	(1)
Widowed	2	(1)
Number of children		
1	14	(18)
2–3	34	(44)
4–5	16	(21)
6+	13	(17)
No children	44	(36)
Length of residence in the current place		
< 1	16	(13)
1–3	31	(26)
4–10	52	(43)
10+	22	(18)
Total	121	(100)

Table 2. Organizational characteristics of the Jua Kali worksites.

Characteristic	Number	(%)
Number of workers in the enterprise #		
1	9	(11)
2	14	(17)
3	19	(23)
4	12	(14)
5	7	(8)
6–9	14	(17)
10+	9	(10)
Status in the enterprise		
Owner or partner	68	(56)
Employee	49	(41)
Other	4	(3)
How were you trained for the job? *		
Apprenticeship	63	(52)
Institutional	34	(28)
Self-taught	13	(11)
No training	2	(2)
No data	9	(7)
Number of years at the current job**		
0–1	14	(13)
2–3	34	(29)
4–6	34	(29)
7–10	13	(11)
10+	21	(18)
Monthly income (Ksh/month)		
<2,500	10	(17)
2,500–3,900	9	(15)
4,000–5,900	15	(25)
6,000–9,900	14	(23)
10,000–20,000	7	(12)
20,000+	5	(8)
No data	61 cases	
Total	60	(100)

37 cases, missing data
* 9 cases, missing data
** 3 cases, missing data

Close to 90% of the interviewees (100 persons) described themselves as skilled workers (fundi), and 15 (13%) described themselves as unskilled workers (watu wa mkono). Participants were employed at their current job for 3 months to 28 years, with an average of 5.4+4.3 years. About 20% were employed in the current enterprise for more than 10 years.

Over half of the interviewees claimed to be owners or partners of the enterprise, and the rest were employees. Most of the workers were trained on the job, either through apprenticeship (56%) or by self-training (12%). About a third had received institutional training.

As expected, the monthly income of these *Jua Kali* artisans was low. About a

Photo R. S. Carel

Jua Kali enterprises provide and create significant job opportunities for a large proportion of Kenya's urban workforce.

Table 3. Physical characteristics of the worksite

Characteristic	Number	(%)
Structure of the premises*		
Open	55	(46)
Roof only	7	(6)
Some side walls	11	(9)
Enclosed	47	(39)
Estimated size of the facility (m^2)**		
1–5	5	(9)
6–9	6	(11)
10–14	11	(20)
15–20	5	(9)
21–24	12	(21)
25–34	5	(9)
35+	13	(21)
Electricity***		
Yes	75	(69)
No	33	(31)
Water Source		
Tap water	100	(83)
River	14	(11)
None or missing	7	(6)

* 1 case, no data
** 65 cases, no data
*** 13 cases, no data

third earned less than 4,000 Kshs/month (less than USD 2.00/day), and only about 20% earned more than 10,000 Kshs/month (approximately USD 4.00/day). Earnings correlated significantly with age and marginally with education. The association between education and age was positive. When the association between education and income was evaluated by age groups, no statistically significant relationship could be demonstrated (possibly because of the small size of the group, as only half the study group provided information on income).

Most of the interviewees worked in enterprises engaged in manufacturing or repair activities such as metal work and welding (47%), auto repair (25%), battery reclaiming and rubber production shops (4% in each). Six interviewees indicated that their main job was painting (usually car painting), four worked as carpenters, and five as tailors or cushion makers. Two were bicycle repair artisans and five indicated that their main tasks were selling finished products. Some claimed to be doing several tasks, e.g. metalwork, painting, and selling.

The physical characteristics of the enterprises are shown in Table 3. Over half the premises were open spaces or had only a roof. Less than 40% were enclosed structures. About 20% of the sites was less than 10 m^2 in size and only less than a quarter were larger than 35m^2. Eighty three per cent of the enterprises had tap water supply and less than 70% had electricity.

Most of the interviewees described their working conditions as poor. Table 4 provides information about the hygienic conditions of the facilities. About 30% of the subjects did not have easy access to toilets. Over a third of the toilets in use were described as being in poor condition.

Eighty five per cent of the participants were aware of various occupational risk factors at their current place of employment (Table 5). The three main areas of concern, with over 20% of the interviewees mentioning each area, were: breathing difficulties due to exposure to smoke, fumes or gases; work accidents; and eye injuries. Other categories of risks mentioned, at much lower rates, were burns, cuts, skin and hearing damage. Awareness of occupational risks at work was not dependent on age (p=0.79) or education level (p=0.384).

Twenty six per cent of the interviewees indicated suffering from at least one of the following health problems related to their specific job or exposure. Twelve mentioned complaints related to breathing or chest difficulties and eleven indicated some eye problems. Two workers complained of each of the following categories: musculoskeletal problems; work injuries; and skin problems. Many participants had clear concepts of occupational exposure to, e.g. solvents in paints, fumes, welding gases, radiation, oils and gasoline, metals, and acids at their worksite. When asked specifically about safety measures or protective devices required by their specific job, most participants were aware of what was needed or could be done to protect their health.

Forty four (36.4%) interviewees stated that they have changed their job in recent years. Table 6 lists the reasons given for this decision. As expected, economic reasons played a major role in the decision to change jobs (28/44), but over 20% of the subjects claimed that they have changed their jobs because of health problems or health considerations. Moreover, 16 subjects indicated that they were aware of other fellow workers who had quit their work because of work-related health problems.

Only about 20% of the subjects claimed to be current smokers. Those who were smokers smoked on average 6.9+4.6 cigarettes/day. The mean duration of smoking was 7.2+4.7 years. Thirty six per cent of the subjects stated that they drank alcoholic beverages at an average of 3.7+1.7 bottles/day and a mean duration of drinking of 7.3+6.0 years. Beer was the most commonly consumed alcoholic beverage (25/44), followed by spirits, chang'aa (a home-brewed spirit), and combinations of drinks. Of the 21 participants who smoked, 15 (71%) also drank alcohol regularly. Among the non-smokers, 26% (22/85, p<0.001) drank alcohol regularly.

Discussion

The informal sector is currently a major component of the national economies of developing countries, and it is rapidly expending (8,12–15). In general *Jua Kali* businesses, mostly unregulated, do not benefit from government subsidies and support. Thus, infrastructures (shelter, roads, drainage systems, electricity, and water supply) are at a bare minimum.

These small-scale enterprises (SSEs) usually employ fewer than ten workers and have many common characteristics despite the great diversity in type of industrial activities (16). *Jua Kali* enterprises provide and create significant job opportunities for a large proportion of Kenya's urban workforce and contribute to the urban migration that characterizes modern society in Kenya. Not only do they provide employment for large number of workers but they are also the main supplier of goods and services for the lower income strata of Kenyan society. This large segment of the workforce, however, generally is not covered by labour protection legislation and does not benefit from health or safety services.

Sustaining these businesses and protecting the health of their workers are crucial for the survival and future of the families of *Jua Kali* workers. For a *Jua Kali* artisan to be able to provide for his family and ensure a better future for his children, certain economic and health conditions must prevail simultaneously. Several studies (8,17–20) have addressed the economic and organizational aspects of operating such enterprises that would enable this industry to survive and develop. But workers' health has been given only limited attention in these studies and programmes, and no comprehensive evaluation has been carried out to determine the occupational health risks of this group of workers and the consequences on their health and employability.

The main findings of this study are consistent with expectations. Generally, these male workers are relatively young (their mean age is 30 years), mostly with a limited level of education and a low income. A similar age distribution (and other socioeconomic parameters) has already been noted in an earlier evaluation of the *Jua Kali* enterprises conducted in the 1970s (8). In many of the work facilities, old and obsolete procedures are being used, usually placing significant physical demands on the workers. Tools and practices require major improvements in order to provide appropriate working conditions, in compliance with modern scientific knowledge and current legislation in Kenya (14, 16, 18, 21, 22). Changes in these areas require major financial investments and administrative commitments that are probably not easily achievable. But in such areas as institutional training, safety practices, and prevention, much can be accomplished with limited, affordable resources (23–25). Such improvements would include the provision of safe drinking water, accessible clean toilets, changes in working conditions (chairs, tables, lighting), training in safe work practices, the provision of basic protective devices such as goggles, gloves and aprons, improved methods of handling hazardous materials, and assistance in training to update work skills in light of changing technologies in their areas of employment.

In this initial survey of *Jua Kali* workers in Kenya, several harmful occupational exposures were identified, including lead fumes in battery reclaiming shops, asbestos dust among brake repair workers, solvents among car painters, and UV exposure among welders. In addition, the basic safety and hygiene conditions at worksites were deficient.

Although these workers are often aware of the occupational risks inherent in their work (Table 5) and of the methods for protecting themselves, lack of financial resources prevents such interventions. In general, this is a markedly underserved group of workers that does not benefit from the available knowledge or from the enforcement of standards mandated by legislation. Acute care services are not readily available, and workers are not entitled to social benefits for work accidents or occupational diseases. Reports from different countries have pointed out the poor work conditions and the high prevalences of work accidents and illness in the informal sector, but because of gross underreporting, these issues do not receive the attention they deserve (13, 23, 25).

To achieve sustainable and successful economic development of the *Jua Kali* enterprises, it would be vital to maintain the

Table 4. Hygienic conditions at the worksites (without missing values)

Characteristic	Number	(%)
Access to toilet facilities		
Yes	80	(70)
No	34	(30)
Type of toilet available		
Flush toilet	53	(68)
Pit latrine	25	(32)
Condition of the toilet		
Clean/Good	28	(55)
Fair	5	(10)
Dirty/Poor	18	(35)
Places to pass urine		
Nearby hotel/ restaurant	13	(35)
Municipal facility	23	(62)
Bushes	3	(1)
Other	5	(2)

Table 5. Evaluation of occupational exposures at the worksites

Characteristic	Number	(%)
Are you at a special health risk at work?		
Yes	99	(85)
No	18	(15)
Type of the occupational risks or symptoms*		
Breathing difficulties and chest problems	45	(28)
Work accidents	38	(24)
Eye injuries	34	(24)
Burns	10	(6)
Cuts	10	(6)
Skin problems	6	(4)
Exposure to toxic materials	6	(4)
Hearing damage	4	(2)
Heavy physical load	3	(2)
Electrical shocks	2	(2)

* Some subjects mentioned multiple risks, for which reason the percentages were calculated for the total number of risk factors and not persons.

Table 6. Reasons for leaving the previous job

Reasons	Number	(%)
Better pay	28	(64)
Business collapsed	4	(9)
Getting better training	1	(2)
Start my own business	2	(5)
Job too demanding physically	3	(7)
Health problem	5	(11)
Due to an accident	1	(2)
Total	**44**	**(100)**

health of the workers and to improve the financial or commercial parameters of these enterprises. In addition to the recommendations made by earlier studies with respect to financial and organizational improvements in the *Jua Kali* sector, national and international initiatives should be undertaken to provide these workers with the basic occupational health services they deserve. Improving and maintaining the health of these workers would enable them to pursue longer and more productive working lives. In order to integrate the *Jua Kali* sector into the mainstream national economy, a clear understanding of the main occupational risk factors prevailing in the various types of *Jua Kali* enterprises, and of the deleterious health effects of these factors, is needed. Also needed is the establishment of modern occupational health services to deal with these issues.

Acknowledgements

We would like to thank the following: leaders of Eldoret's *Jua Kali* Association; the workers who participated in the study; Charles Walekhwa and Peter Koskei, of the School of Public Health, Moi University, for initiating community entry; 4th year medical students of the 2004/2005 academic year and Mrs. Winifred Nyandieka of the Department of Epidemiology and Nutrition, School of Public Health, Moi University.

Diana Menya (Epidemiology), Senior Lecturer
Robert Too, (Biostatistics), Tutorial Fellow

Dept. of Epidemiology and Nutrition,
School of Public Health
Moi University
P.O. Box 4604
30100, Eldoret, Kenya

Rafael S. Carel
Prof. School of Public Health
The University of Haifa
Haifa, Israel
E-mail: rcarel@researc.haifa.ac.il

Address of correspondence:
Dr. Diana Menya, School of Public Health
Moi University
P.O. Box 4606
30100, Eldoret, Kenya
Fax 053-2030534
Email address: dianamenya@gmail.com

Photo R. S. Carel

References

1. International Labor Office. Resolutions concerning statistics of employment in the informal sector. In: Current International Recommendations on Labor Statistics, Geneva: ILO Office, 2000.
2. Karanja IWM, Muchiri FK, Muruka A. Safety and Health in the Informal Economy. Afr Newslett Occup Health Safety 2003;13:14–6.
3. National micro and small enterprises baseline survey. Central Bureau of Statistics, Ministry of Planning and National Development, Kenya, 1999.
4. Economic survey. Central Bureau of Statistics, Ministry of Planning and National Development, Kenya, 2002.
5. Sethuraman SV. Urban employment and the informal sector: A critical assessment of the current strategies. Geneva, ILO 1997.
6. Leidhohn C, Mead D. Small scale industries in Africa: An overview. In: Berg R, Whitaker J. Strategies for African Development. Berkeley. University of California Press, 1986.
7. Boateng EO, Kanbur R. A poverty profile for Ghana, 1987–88. J Afr Economy 1994;1:25–58.
8. King K. Jua Kali Kenya Change and Development in an Informal Economy 1970–1995. Athens, Ohio University Press, 1995.
9. Republic of Kenya. National Development Plan for the Period 1997–2001. Nairobi: The Government Printer, 1997.
10. Odhiambo W, Kulundu Mauda D. Urban poverty and labor force participation in Kenya. World Bank Urban Research Symposium. Washington, D.C. Dec. 15–17; 2003.
11. Parker HC, Torres TR. Micro and small enterprise in Kenya – results of the 1993 national baseline survey. Bethesda, MD: USAD/GEMWI, 1994.
12. Undugu. Survival: The Undugu Society of Kenya's Integrated Approach to Urban Developments, including 1992–3 Biennial Report. Nairobi, 1994.
13. Gerxhani K. The informal sector in developed and less developed countries: A literature survey. Public Choice 2004;120:267–300.
14. Maundu JN. Towards meeting local training requirements of Jua Kali artisans in Kenya: some lessons of experience. FSU/ADEA conference on non-formal and Adu It education in Africa. Harare, Zimbabwe, 1997:12–5.
15. Psacharopoulous et al. Poverty and income distribution in Latin America: The story of the 1980s. Latin America and the Caribbean Technical Dept. Regional Studies Program. Washington DC: the World Bank, 1993:27.
16. Mikheev MI. Occupational health and safety in small enterprises. Int Arch Occup Environ Health 1998;71:10–2.
17. Sachs J. The End of Poverty. Penguin Books, 2005.
18. Baltimore B, Kabisu J. The informal sector in Eldoret town – A baseline study of Jua Kali enterprises. A paper submitted to the Kenyan Ministry of Finance, Provincial Office Rift Valley, Uasin Gishu District Development Office, 2004.
19. McCormic D. Success in urban small scope manufacturing: Implications for economic development. In: Caughlin P, Ikiara G, eds. Kenya's Industrialization Dilemma. Heinemann Kenya Ltd, 1991.
20. Republic of Kenya. National Development Plan for the Period 1997–2001. Nairobi, The Government Printer, 1997.
21. Kipkurui L, Kithyo IM, Okeinwa P, Korir JK. Modernization in automotive technology and performance of informal sector mechanics in Kenya. CIGR J Sci Res Develop. 2004:6.
22. King K. Training for the informed sector. In: King K. Aid and Education in the Developing World. Longman, Harlow, 1991.
23. Rosenstock L, Cullen MR, Fingerleut M. Advancing worker health and safety in the developing world. J Occup Environ Med 2005;47:132–6.
24. Manuaba A. Total approach is a must for small and medium enterprises to attain sustainable working conditions and environment, with special reference to Bali, Indonesia. Indust Health 2006;44:22–6.
25. Hasle P, Limborg HJ. A review of the literature on preventive occupational health and safety activities in small enterprises. Indust Health 2006;44:6–12.

WHO Collaborating Centres Meeting in Cancun, Mexico

Occupational health and safety are important topics on the national agendas of every country. No country can be successful in today's global competition without taking good care of its workforce and its health and safety.

Occupational health is also an important topic on the agenda of the World Health Organization. The Global Plan of Action on Workers' Health 2008–2017 was endorsed by the World Health Assembly in 2007 (WHA60.26). The activities for developing work lives in all Member States are discussed in the meetings of the Global Network of WHO Collaborating Centres in Occupational Health.

Resolution 60.26 concerns all WHO Member States. In order to facilitate the implementation of the Resolution as widely as possible, the Global Network of WHO Collaborating Centres in Occupational Health is used to develop good examples and good practices that can be shared with as many countries as possible. The Network reaches more countries and more institutions than the bilateral programmes of WHO country offices alone. In the Collaborating Centre Network, WHO has a good arm to work for improving working conditions and workers' health in all countries of the world. The global workforce is 3.2 billion, and only 85% have access to any kind of occupational health services. This speaks for the huge need for improving workers' health everywhere.

The 9th meeting of the Global Network was organized on 14–16 March 2012 in connection with the ICOH2012 World Congress, held in Cancun, Mexico. The meeting was attended by more than 100 experts from all continents. A total of 45 CCs were represented, as were the sister International Labour Office, ILO, and NGOs, such as the International Commission on Occupational Health, ICOH; the International Ergonomics Association, IEA; and the International Occupational Hygiene Association, IOHA.

The main topic on the agenda was n the 2012–2017 Work Plan , called the Global Master Plan. The Collaborating Centres and other key actors had been invited to submit their proposals for contributions to implement the Plan, which had been prepared on the basis of the discussions in the Planning Committee Meeting on 16–17 June 2011, in Oslo, Norway.

The seven draft priority objectives were broadly discussed in Cancun, and the final list is as follows: Priority 1. Regional and national programmes on occupational non-communicable diseases, with focus on cancer, silica and asbestos-related diseases; Priority 2. National programmes and good practices for occupational health and safety of health care workers; Priority 3. Tools, standards and capacities for healthy workplaces; Priority 4. Strengthening health systems, governance, capacities and service delivery for workers' health; Priority 5. Occupational health aspects of emerging technologies; Priority 6. Classification, diagnostic and exposure criteria for occupational diseases; Priority 7. Knowledge networks on occupational health of vulnerable groups and high risk sectors.

The first five-year work plan 2008–2012 was reported in the Cancun Network Meeting. Several examples of success stories from the project coordinators and agencies implementing the projects were described in a draft publication. The publication will be finalized by the Occupational Health Programme in the WHO Headquarters and will be ready by the World Health Assembly in 2013, when the first reporting back of Resolution WHA60.26 will take place.

Suvi Lehtinen
Finnish Institute of Occupational Health,
Helsinki, Finland

Photos S. Lehtinen

Contact persons/country editors

Chief Health and Safety Officer
Ministry of Labour and Home Affairs
Division of Occupational Health and Safety
Private Bag 00241
Gaborone
BOTSWANA

Samir Ragab Seliem
Egyptian Trade Union Federation
Occupational Health and
Safety Secretary
90 Elgalaa Street
Cairo
EGYPT

Ministry of Labour and
Social Affairs
P.O. Box 2056
Addis Ababa
ETHIOPIA

Commissioner of Labour
Ministry of Trade Industry and
Employment
Central Bank Building
Banjul
GAMBIA

The Director
Directorate of Occupational
Health and Safety Services
(Commercial Street)
P.O. Box 34120
00100 - Nairobi
KENYA

The Director
Occupational Safety and Healh
Private Bag 344
Lilongwe
MALAWI

Mrs Ifeoma Nwankwo
Federal Ministry of Labour
and Productivity
Occupational Safety and
Health Department
P.M.B. 4
Abuja
NIGERIA

Peter H. Mavuso
Head of CIS National Centre
P.O.Box 198
Mbabane
SWAZILAND

Chief Executive
Occupational Safety and
Health Authority (OSHA)
Ministry of Labour and Employment
P.O. Box 519
Dar es Salaam
TANZANIA

Commissioner
Occupational Safety and
Health
Ministry of Gender, Labour and Social
Development
P.O. Box 227
Kampala
UGANDA

Tecklu Ghebreyohannes
Director of Labour Inspection Div.
Ministry of Labour and Human
Welfare
Department of Labour
P.O. Box 5252
Asmara
ERITREA

Dr Mukhtar Mohamed Ali Mukhtar
Health, Safety, Security, Environment &
Quality Expert
Government of Sudan
Ministry of Electricity & Dams
Al Riyadh, Al Mashtal St. Buil. (5), Sq. (16)
Khartoum
SUDAN

NORDIC ECOLABEL
441 763
Printed matter
SLY-Lehtipainot OY, Kirjapaino Uusimaa, Porvoo

Editorial Board

as of 1 December 2011

Chief Health and Safety Officer
Ministry of Labour and Home Affairs
Division of Occupational Health and Safety
BOTSWANA

Mathewos Meja
OSH Information Expert
Ministry of Labour and
Social Affairs
ETHIOPIA

Chief Inspector of Factories
Ministry of Employment and
Social Welfare
GHANA

The Director,
Occupational Health and Safety
Ministry of Labour and Industrial Relations
MAURITIUS

Chief Inspector of Factories
Ministry of Labour
SIERRA LEONE

Dr Mukhtar Mohamed Ali Mukhtar
Ministry of Electricity & Dams
Government of Sudan
Khartoum, SUDAN

International Occupational Safety and Health Information Centre
International Labour Office
CH-1211 Geneva 22
SWITZERLAND

Evelyn Kortum
Technical Officer
Occupational Health
Interventions for Healthy Environments
Department of Public Health and Environment
World Health Organization
CH-1211 Geneva 27
SWITZERLAND

Jorma Rantanen
Past President of ICOH
ICOH International Commission on
Occupational Health

Harri Vainio
Director General
Finnish Institute of Occupational Health
FINLAND