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DEVELOPMENT OF THE INTERNATIONAL AND EGYPTIAN OCCUPATIONAL DISEASES' LISTS - REVIEW

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Abstract:

An occupational disease is typically identified when it is shown that it is more prevalent in a given group of workers than in the general population, or in other worker populations.

The present review study aims at eliciting development of the occupational diseases concepts and lists in Egypt and internationally, in order to anticipate the future trends in enhancing the supportive activities targeting healthcare activities of the Egyptian workers. The historical and present situation of occupational diseases are carefully reviewed and discussed, emphasizing the foot prints of related conceptions in Egypt and ILO.

Future ambitions are expressed by the current study. Adopt the ILO list as well as its future amendments. In addition, re-formatting the schedule, in a similar way the ILO list is organized in three categories of occupational diseases: 1) Diseases caused by agents (chemical, physical, biological) ; 2) Diseases of target organ systems (respiratory, skin and mucous membranes, musculoskeletal, liver, kidney, endocrine, etc.) ; and 3) Occupational cancer. Restructure the basic occupational health services (BOHS) to insure provision of comprehensive and continuous benefits for every worker in his workplace. A series of guidelines and codes of practice should be issued to facilitate adoption of BOHS with detailed required procedures.

The study recommended continued improving the Egyptian schedule, with establishment of proper guidelines and codes of practice to lead surveillance of the worker's health and the workplace, an important item in basic occupational health services (BOHS).

Key words: Occupational Diseases, List, Schedule, ILO, Egypt.

Introduction

At the beginning of the 21st century, the ILO/WHO Burden of occupational disease – Worldwide – amount 1.9-2.3 million deaths attributed to occupation, 1.6 million deaths attributed to work-related diseases, and 217 million cases of occupational disease [ILO, 2013].

An occupational disease is any chronic ailment that occurs as a result of work or occupational activity. An occupational disease is typically identified when it is shown that it is more prevalent in a given group of workers than in the general population, or in other worker populations. The first such disease to be recognized, squamous-cell carcinoma of the scrotum was identified in chimney sweep boys by Sir Percival Pott in 1775 [Thompson, 1914]. Donald Hunter in his classic history of occupational diseases discussed many examples of these diseases. They include: Phossy jaw among the London match-girls; Radiation sickness among some persons who had been working in the nuclear industry; and Radium jaw among the Radium Girls [Baxter et al., 2000].

Various countries are currently adopting lists of occupational diseases in order to benefit their workforces exposed to various workplace health risks. Benefits of the adopted lists are many: organize medical care and rehabilitation, provide economic and other types of compensation, afford social justice, and presenting cultural consciousness. The Occupational Diseases' list has played a key role in harmonizing the development of policies on occupational diseases and in promoting their prevention at both the national and the international levels.

The present review aims at eliciting synthesis and development of the occupational diseases concepts and lists in Egypt and internationally, in order to expect the future trends in enhancing the supportive activities targeting health and wellbeing of millions of Egyptian workers.

Historical Perspective

Egypt, Greece and Rome recognized, in ancient times, some forms of occupational diseases affecting miners who were engaged in one of the oldest industries. It is known that miners used bags, sacks, animal bladders as masks to decrease dust exposure. During the middle ages, feudalism emerged in Central Europe with appearance of feudal enterprises especially in mining activities with consequent need of serf unskilled labour. At late middle ages, growth of trade with increased need for money and capital for mines at the Central Europe with consequent need for skilled labour in order to mine deeper with worsened conditions (Linn, 2010).

Throughout the 16th and 17th century, mining, metal work and other trades

were flourished with some improvement in ventilation happened and a shift from feudalism to capitalism. This was followed by establishment of guilds, artisans who announced some sickness and funeral benefits. In the meantime, awareness of health hazards due to mined metals was recognized by Agricola, a town physician in Bohemia, who published in 1556 his treatise: De Re Metallica – hazards of metal mining. Eleven years later, Paracelsus, a town physician in Austria published his treatise on occupational diseases of mine and smelter workers. During the subsequent years, health hazards of some chemicals were documented: lead (1572), carbon monoxide (1575), and arsenic (1630) (Baxter et al., 2000).

During the 18th century, Bernardino Ramazzini, a physician, professor of medicine in Modena and Padua published in 1700 his treatise on: "De Morbis Artificum Diatriba or Diseases of Workers" at which he wrote a systematic study of trade diseases. By this work, Ramazzini is considered the "Father of Occupational Medicine". He anchored the famous question: "what is your occupation?" At mid and late 18th century, Hale (1743) pointed to the importance of ventilation and Von Humboldt (1790's) designed the Gas mask and safety lamps for miners. During 1750's, the concept of insurance began to develop in the form of payments of medical care and replacement of income lost as result of disability. These were sponsored by "Friendly Societies" that started to appear in the UK. Similar organizations sponsored by workers, employers, townspeople, religious groups, physicians appeared in Scandinavia, Netherlands and Germany (Occupational Diseases in 18th Century: A Classic of Science, 1930).

During the 19th century, Europe witnessed a continual series of legislation related to working conditions. The "Factory Acts" in the United Kingdom (1878 to 1895) organized hours of work, age of work, education for children, physician exams, safety inspectors, as well as other measures. This established principle of government intervention. As a part of the UK Factory Acts, statutory medical service for factory workers was introduced in addition to factory inspectors, certifying surgeons, medical certification for children. Periodic medical exams were started for workers with exposure to lead, white phosphorus, explosives, and rubber. Notification of industrial disease started for lead, phosphorus, arsenic, and anthrax. The 4 diseases, thus, constituted the first occupational diseases list set in Europe. In 1898,Thomas Legge was appointed as the first Medical Inspector of Factories in the UK (The Factory Acts, 2014).

By the 20th century, continual modifications to the "Workman's Compensation" law necessitated additional

benefits and more coverage. By 1913 the UK Schedule of "Industrial" diseases had 6 illnesses. More occupational diseases were consequently added: silicosis, pneumoconiosis (1926), cancer (1932). By 1947, a generic definition of industrial disease was issued, accompanied by a list of diseases appeared in the UK Schedule (Seaton, 2010).

The International Labour Organization (ILO), declared anthrax an occupational disease at 1919, the same year of its creation (ILO: R003, 1919). In 1925, Workmen's Compensation (Occupational Diseases) Convention No. 18 (C18), which was established as the first ILO List of Occupational Diseases, comprising two industrial poisonings (lead and mercury) and one infection (anthrax) [ILO: C18, 1925], emphasized the workers' right to compensation. Then, years later, the convention was revised to Convention No. 42 (C42) [ILO: C42, 1936]. The new list of occupational diseases added 7 additional diseases to the previous list of lead poisoning, mercury poisoning, and anthrax infection. The newly added diseases included 4 types of poisoning; phosphorus poisoning, arsenic poisoning, poisoning by benzene, and poisoning by halogen derivatives of hydrocarbons of the aliphatic series, and 3 diseases; silicosis, diseases due to radiation, and skin cancer (Table 1).

Table 1: Early Occupational disease list of the ILO

ILO legislation	R03, R04 (1919)	C18 (1925)	C42 (1934)
Chemical	1) Lead	2) Mercury	3) Phosphorous, 4) arsenic, 5) Benzene or its homologues, their nitro- and amino-derivatives, 6) halogen derivatives of hydrocarbons of the aliphatic series
Physical			1) Radium and other radioactive substances, 2) X-rays
Biological	1) Anthrax	No change	No change
Pulmonary			1) Silicosis with or without pulmonary tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.
Cancer			1) Primary epitheliomatous cancer of the skin.

ILO: International Labour Organization, R03: ILO recommendation No.3, R04: ILO recommendation No. 4, C18: ILO convention No. 18, C42: ILO convention No. 42.

The 10-item list was maintained for 30 years, until it was revised as Employment Injury Benefits Convention No. 121 (C121) in 1964 [Kim and Kang, 2013], adding 4 more poisoning items (manganese, chromium, beryllium, and carbon bisulfide) and rephrasing X-rays and radon to "ionizing radiation" (Table 2). Until then, the ILO List of Occupational Diseases was composed of obvious occupational diseases, such as the poisoning of a few obvious chemicals in large modern industries, the classic lung disorder of the mining industry (pneumoconiosis), and occupational skin cancer first identified in 1775 [Gawkrodger, 2004], because the ratifying countries shall, at minimum, recognize the occupational origin of all the diseases in this list [Niu, 2002]. Although the ILO List of Occupational Diseases up to C121 (1964) has the disadvantage of covering a limited number of occupational diseases, it has the advantage of listing only diseases for which there can be a presumption that they are of occupational origin. Specifically, paragraph 6-(2) of Recommendation No. 121 provides that "unless proof to the contrary is brought, there should be a presumption of the occupational origin of such diseases." [Niu, 2010] Because of this presumption, the ILO List has a paragraph mentioning the condition by which a specific disease is recognized, such as "silicosis causing the resultant incapacity or death." The revision of C121, at 1980, not only added 7 more types of chemical poisoning, respiratory disease, and disorders caused by physical agents, but also expansion its scope to skin disease and infectious disease (Table 2). The causal relationship of most cases of poisoning is relatively strong, such that non-occupational factors can be excluded. On the other hand, non-poisoning diseases, such as noise-induced hearing loss, most broncho-pulmonary diseases, or infectious diseases, are common in the general population; hence, it is difficult to differentiate these occupational diseases from non-occupational ones, except for in a few cases. Further, most cases are related to chronic, long-term exposure (ILO: C121, 1967).

Table 2: New items on the occupational disease list in Convention No

ILO legislation		C121 (1964, revised 1980)
Chemical	'64	6) Beryllium, 7) Chromium, 8) Manganese, 9) Carbon disulfide
	'80	10) Toxic halogen derivatives of aliphatic or aromatic hydrocarbon, 11) Cadmium, 12) Arsenic, 13) Fluorine, 14) Nitroglycerin or other nitric acid esters, 15) Alcohols, glycols or ketones, 16) Asphyxiants: carbon monoxide, hydrogen cyanide, or its toxic derivatives, hydrogen sulfide
Physical	'64	1) Ionizing radiation
	'80	2) Hearing impairment caused by noise, 3) diseases caused by vibration, 4) diseases caused by work in compressed air
Biological	'80	1) Infectious or parasitic diseases contracted in an occupation where there is a particular risk of contamination (health or laboratory work, veterinary work, animal handling work, other work with contamination risk)
Pulmonary	'80	1) Pneumoconiosis caused by sclerogenic mineral dust (silicosis, anthracosilicosis, asbestosis) and silicotuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death, 2) Bronchopulmonary diseases caused by hard-metal, 3) Bronchopulmonary diseases caused by cotton dust (byssinosis), or flax, hemp, or sisal dust, 4) Occupational asthma, 5) Extrinsic allergic alveolitis and its sequelae caused by the inhalation of organic dusts, as prescribed by national legislation
Skin	'80	1) Skin diseases caused by physical, chemical, or biological agents
Cancer	'80	2) Lung cancer or mesotheliomas caused by asbestos

ILO: International Labour Organization- ILO convention No. 121 (C121).

Although the majority of ILO member states adopted the broad structure of the ILO List in R194, each country's list contains some specific occupational disease items not included in ILO List of R194 (Table 3). Phenol derivatives are representative chemical items not presented in the ILO List. Several carcinogenic agents, such as aflatoxin, anticancer drugs, and silica, and well-known occupational biological pathogens such as rickettsia, malaria, and ameba are also not included in the ILO List. The most prominent difference of ILO 194 from some countries mentioned in Table 3 involved items regarding cardio-cerebro-vascular disorders induced by psychological stress, neurosis, and low back pain [Kim, 2012] (Table 3).

Table 3: Examples of occupational disease from each country that is not included in the ILO's List of Occupational Diseases R194 (kim, 201

Categories	Items (countries)
Chemical agents	Phenol derivatives (Austria, Belgium, China, Costa Rica, El Salvador, Finland, Romania, Swiss, Turkey, France)
Carcinogenic agents	Aflatoxins (Denmark, Finland), Aliphatic aromatic and alicyclic hydrocarbons (Finland), lead (Denmark), trichloroethylene (Denmark), benzidine dye (France), ortho-toluidine (France), anticancer drugs (Finland), Aluminum production process (Denmark), 4-nitrodiphenyls (Canada, Japan), trichloroethylene (Denmark), tetrachloroethylene (Denmark), 2,3,7,8,-TCDD (Denmark), silica (German, United Kingdom, Romania, Taiwan), formaldehyde (Denmark, Malaysia, Taiwan), lead (Denmark, Saudi Arabia), leather (Ireland, Italy, Saudi Arabia, United Kingdom), iron mining with radon exposure (Denmark)
Biological agents	Rickettsia (United Kingdom, Russia, Philippines, Mexico, Nicaragua, Portugal, Saudi Arabia, Spain, Austria), Streptococcus (Algeria, Angola, France, Mexico, Portugal, Romania, Saudi Arabia, United Kingdom, New Zealand, Hong Kong), Thermophilic actinomycetes (Bulgaria, El Salvador, France, Ireland, Italy, Mexico, Romania, United Kingdom), Malaria (Turkey, Swiss, Spain, Portugal, Philippine, Nicaragua, Mexico, Ireland Finland, Belgium, Angola), ameba (Algeria, Angola, France, Hungary, Nicaragua, Poland, Portugal, Romania, Saudi Arabia, Spain, Turkey)
Skin disorders	Onychodystrophy by humidity (Romania, Colombia, Mexico), dermatitis by sunlight (Costa Rica), scleroderma by silica or solvents (Canada, Bulgaria)
Cardio-cerebro-vascular disorders	Ischemic heart disease by increased strain and other physical and neuropsychological burdens (Romania, Korea), myocardial infarction, dissection aneurysm, subarachnoid hemorrhage, and cerebral hemorrhage by psychological stress (Korea, Japan), sudden death by severe psychological stress (Korea, Japan), hypertension by neuropsychological stress (Romania), cardiovascular disorder by psychological stress (Philippines)
Mental, behavioral disorders	Neurosis by long-term direct service to people (Russia, Romania, Mexico)
Disorders of the digestive system	Peptic ulcer and intestinal hernia by psychological stress (Philippines)
Congenital disorders	Congenital viral infection, hydrocephalus, microcephalia, retarded development, skin change, premature birth, inflammation, low weight at birth (Denmark)
Neurological disorders	Toxic autonomic neuropathy by esters, vinyl chloride, unsaturated aliphatic hydrocarbons, carbon monoxide, and vibration (Bulgaria)
Eye disorders	Ophthalmia by electrical light (China), chemical burn of eyes (China), occupational cataracts (31 countries)*, snow blindness (India)
Musculoskeletal disorders	Chronic low back pain (Bulgaria, Denmark,) chronic disorders of the lumbar spine (France, German, European Union, Spain, Belgium), herniated lumbar disc (Italy), intervertebral disc displacement (Taiwan), vertebral degeneration and back pain and neck and disc changes (Saudi Arabia)

2,3,7,8-TCDD: 2,3,7,8-tetrachlorodibenzodioxin, *: Algeria, Angola, Australia, Austria, Bangladesh, Bulgaria, Belgium, Canada, Costa Rica, Colombia, Denmark, El Salvador, France, Hong Kong, Hungary, India, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Philippine, Poland, Portugal, Romania, Singapore, Slovakia, Turkey, United Kingdom.

In Egypt, workers' rights towards workplace health risks was recognized for the first time in 1936 upon issuing the "Trade and industrial workers' social benefits Law". In 1944, the first group of occupational diseases was issued, including: lead, mercury, anthrax, and silicosis. Two years later, a list of 21 occupational diseases were amended to the Law 279/ 1946. In 1959, the social Insurance Act No. 92 added three occupational diseases to the schedule: glanders, tuberculosis and infections fevers. In May 10th, 1960, Egypt ratified the ILO convention No. 18 (C18) on "Workman's Compensation due to Occupational diseases" (ILO, 1995). In 1964, the Social Insurance Law No. 63 added three more occupational diseases: beryllium poisoning, selenium poisoning, and Caisson's disease. In 1966, Caisson's disease was modified to compression and decompression sickness by the presidential decree No.2704 which also added "diseases and pathological manifestation due to hormones and their derivatives" as the 28th occupational disease. In 1968 "Occupational Deafness" was added to the schedule to be the 29th occupational disease. The social insurance minister's decree No. 235 for 1981 added flax dust to causes of pneumoconioses. In 1983, a presidential decree No.167 added talcosis to the group of pneumoconioses. It also added laboratory workers and those in concerned research centers to hospital workers in cases of compensable infectious occupational diseases. By this way, a lot of infectious diseases were added including brucellosis (Emara et al., 1985; Abdel-Latif, 1991). In January 2004, the Social Affairs Minister's Decree No.1 added 6 occupational diseases: Cadmium poisoning, non-ionizing radiation (e.g. UV, IR), poisoning with Alcohols/ Glycols/ Ketones, Pesticide poisoning, poisoning with Nitrates/ Nitrites/ Nitroglycerine, and musculo-skeletal manifestations due to segmental body vibration (Social Insurance Minister's Decree No. 1 for 2004).

Table (4): The Present Egyptian Schedule of Occupational Diseases (Schedule of Occupational Diseases, 2013)

No.	Exposure/ Disease	Affected jobs/ occupations
	Lead poisoning and its sequelae	**Any process involving the use or handling of lead, its preparations or compounds, *inter alia*, the handling of ore containing lead, the casting of old lead and zinc in ingots, the manufacture of articles made of cast lead or scrap lead, the manufacture of lead compounds, the smelting of lead, the preparation and use of enamels containing lead, polishing by means of lead fillings or powder containing lead, the preparation and use of paints, coating substances or coloring substances containing lead, etc. Any process involving exposure to dust or fumes given off by lead, its compounds or preparations.**
	Mercury poisoning and its sequelae	**Any process involving the use or handling of mercury, its preparations or compounds, and any process involving exposure to dust or fumes given off by mercury, its compounds or preparations, *inter alia*, the manufacture of mercury compounds, the manufacture of measuring and laboratory apparatus containing mercury, the preparation of raw material for the hat-making industry, gilding, the extraction of gold, the manufacture of mercury primers, etc.**
	Arsenic poisoning and its sequelae	**Any process involving the use or handling of arsenic, its compounds or preparations and any process involving exposure to dust or fumes given off by arsenic, its compounds or preparations *inter alia*, operations in which arsenic or its compounds are liberated or manufactured.**
	Antimony poisoning and its sequelae	**Any process involving the use or handling of antimony, its compounds or preparations and any process involving exposure to dust or fumes given off by antimony, its compounds or preparations.**
	Phosphorus poisoning and its sequelae	**Any process involving the use or handling of phosphorous, its compounds or preparations and any process involving exposure to dust or fumes given off by phosphorous, its compounds or preparations.**
	Poisoning by benzene, its homologues or their amide- or nitro- derivatives, and its sequelae	**Any process involving the use or handling of such substances, its compounds or preparations and any process involving exposure to dust or fumes they give off.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Manganese poisoning and its sequelae	**Any process involving the use or handling of manganese, its compounds or preparations and any process involving exposure to dust or fumes given off by manganese, *inter alia*, any operations in the extraction, preparation, grinding and packing of manganese or its compounds, etc.**
	Sulphur poisoning and its sequelae	**Any process involving the use or handling of sulphur, its compounds or preparations and any process involving exposure to dust or fumes given off by sulphur, its compounds or preparations, *inter alia*, exposure to gaseous and non- gaseous sulphur compounds, etc.**
	Chrome ulceration and its sequelae	**Any process involving the preparation, production, use or handling of chrome, chromic acid or sodium, potassium or zinc chromate or bi-chromate, or their preparations.**
	Affections caused by nickel and resultant complications and ulcers	**Any process involving the preparation, production, use or handling of nickel, its compounds or preparations, *inter alia*, exposure to nickel carbonile gas**
	Poisoning by noxious gases as Carbon Monoxide, Hydrogen Sulfide, Hydrogen Cyanide, and their poisonous derivatives, and their sequelae.	**Any process involving exposure to these gases, inter alia, any operation involving the preparation, use or liberation of these gases, e.g. in garages, brick and lime kilns, working in sanitary waste disposal stations.**
	Poisoning by hydrocyanic acid and its compounds, and its sequelae	**Any process involving the preparation, production, use or handling of hydrocyanic acid and its compounds, and any process involving exposure to the fumes or emanation of the acid, its compounds, dusts or preparations.**
	Poisoning by chlorine, fluorine and bromine and their compounds, and sequelae	**Any process involving the use or handling of chlorine, fluorine and bromine or their compounds, and any process involving exposure to such substances or the fumes or dusts they give off.**
	Poisoning by petroleum, its gases or derivatives , and its sequelae	**Any process involving the handling or use of petroleum, its gases or derivatives, and any process involving exposure to such substances, whether solid, liquid or gaseous.**
	Poisoning by chloroform and carbon tetrachloride, and its sequelae	**Any process involving the handling or use of chloroform and carbon tetrachloride, and any process involving exposure to fumes given off by or containing such substances.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Poisoning by tetrachloroethylene, trichloroethylene, and other halogen derivatives of hydrocarbons of the aliphatic series	**Any process involving the handling or use of such substances and exposure to the fumes given off by or containing them.**
	Diseases and pathological manifestations due to radium, radioactive substances or X-rays.	**Any process involving exposure to the action of radium and radioactive substances or X-rays.**
	Cancer of the skin and chronic inflammation or ulceration of the skin and eyes.	**Any process involving the handling or use or handling of or exposure to tar, pitch, bitumen, mineral oils (including paraffin) or asphalt, or any compound, product or residue of such substances, and exposure to any other irritant substance, whether solid, liquid or gaseous.**
	Affection of the eye due to heat and light and their sequelae. As well as diseases occur due to extreme cold	**Any process involving frequent or continuous exposure to glare or rays from molten glass or red-hot or molten metals, or exposure to strong light, intense heat causing injury to the eyes or impairment of vision. As well as jobs/ occupations necessitates exposure to extremely high temperature or extreme cold as in food cold stores.**
	Pneumoconiosis due to: a) silica dust (silicosis); b) asbestos dust (asbestosis); c) cotton dust (byssinosis); d) flax dust; e) talc dust (talcosis)	**Any process involving exposure to dust recently produced by a silica substance, or substances containing more than 5% of silica, *inter alia*, work in mines or quarries, the hewing and grinding of stones, the manufacture of stone grinding machines, the polishing of metals by means of sand and any other process involving such exposure, and any process involving exposure to asbestos dust, cotton dust, talc dust, to an extent causing disease.**
	Anthrax	**Any operation involving contact with animals infected with anthrax or the handling of their carcasses or any parts thereof, such as hides, hoofs, horns and hair, including the loading, unloading and transport of such parts.**
	Glanders	**Any process involving contact with animals suffering from glanders or the handling of their carcasses or parts thereof.**
	Tuberculosis	**Work in hospitals for the treatment of tuberculosis.**
	Infectious fevers	**Work in hospitals for the treatment of such fevers, as well as work in laboratories or research centers specialized in those types of diseases. As well as work in health care facilities, sanitary waste disposal and dealing with animals, insects and rodents.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Beryllium poisoning	**Any process involving the handling or use of the metal, its compounds or any substance containing such metal.**
	Selenium poisoning	**Any process involving exposure to dust, vapor, compounds or substances containing such metal**
	Diseases and manifestations due to subjection to atmospheric pressure variations	**Every job necessitating sudden exposure or working under high atmospheric pressure or exposure to sudden drop of pressure or working under low atmospheric pressure for long periods.**
	Diseases and pathological manifestations due to hormones and their derivatives	**Every job necessitating exposure to the hormones and their derivatives.**
	Occupational deafness	**Work in industries or operations where workers are exposed to noise or drugs and chemicals which affect hearing.**
	Pathological symptom and signs affecting the upper limbs due to exposure to localized (segmental body)-vibration, accompanied by radiographic musculo-skeletal changes in bones of both hands and small joints.	**Any job/ occupation necessitates exposure of the upper limbs to vibration, especially when accompanied with coldness in work process like drilling, riveting, foundry work, mining, quarrying, heavy machinery operations, as well as others.**
	Poisoning by nitrates, nitrites, and nitroglycerine, as well as the other organic salts of nitric acid	**Any job/ occupation necessitate exposure to one of these chemicals especially in military industries, e.g. explosive ammunition, pharmaceuticals and chemical industries and others. Used in manufacturing nitric acid, nitrogenous fertilizers, that is generated / effluent during incineration and combustion, welding, degreasing process from metal surface, during opening silos of various use.**
	Poisoning by cadmium and its sequelae	**Any job/ occupation necessitates exposure to, use, or handling cadmium or its compounds, or materials containing its compounds, as in metals' electroplating, manufacturing planes, auto-motives, dyes, paints, plastics, alkaline batteries, and others.**
	Poisoning by alcohols, glycol and ketones, with their various types, and sequelae	**Any job/ occupation necessitates exposure to, use, or handling these chemicals or their compounds and materials containing them, including dyes, detergents, printing, artificial silk, leather, rubber and others.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Diseases resulting from exposure to non-ionizing radiations, as: a) ultraviolet rays; b) infrared rays.	**Any job/ occupation necessitate exposure to these rays.**
	Poisoning by pesticides	**Any job/ occupation necessitates exposure to, use, or handling, or manufacturing these chemicals, as well as any job or occupation necessitates exposure to them.**
	Diseases caused by acrylamide and acrylonitrile	**Any work necessitates dealing with acrylamide and acrylonitrile, as: a) production polyacrylamide and related organic chemicals; b) dental labs and compensatory aids' labs; c) paper mills; d) processes involving raw metallic, dyes and gluing materials; e) oil extraction processes in oil industries; f) construction chemicals; g) production of polymer compounds for acrylics in textile industry; h) rubber manufacturing that involve styrene and butadiene compounds; i) plastic and acylonitride industry; j) fumigants' industry.**
	Diseases caused by pharmaceutical substances	**Manufacturing and preparation of pharmaceutical materials and compounds, as: a) antibiotics, and sulfa compounds and disinfectant compounds; b) drugs for cancer therapy and anti-neoplastic substances; c) morphine and derivatives and sedatives, as well as substances used in anesthesia and resuscitation; d) blood anti-coagulant substances; e) therapeutic nitroglycerine compounds.**
	Diseases caused by copper or its compounds	**Any work involving exposure to copper smoke, as: a) foundry, purification and welding copper; b) manufacturing copper products or that copper is its structure, as in manufacturing electric cables; c) appliances and tools that copper enter into them, and used in building and construction activities, as tubes and coppery raw materials; d) production of chemicals that copper enter into their structure as poisonous copper sulfate.**
	Diseases caused by tin or its compounds	**Any work involving exposure to smoke of tin or its compounds, as: a) extraction, purification, processing or manufacturing of tin or its compounds; b) manufacturing tin alloys with other metals; c) manufacturing of tin compounds with other materials or elements; d) use of tin in manufacturing special types of glass; e) use of tin in manufacturing some welding materials and some kinds of containers; f) manufacturing of some textile dyes; g) organic tin compounds that enter in manufacturing of some kinds of fungicides; h) tin compounds that enter into manufacture of some types of plastics, as plasticizer / fixation agent.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Diseases caused by zinc or its compounds	**Any work involves exposure to dust or fumes of zinc or its compounds, as in: a) excavation or extraction of zinc or its compounds; b) re-manufacturing the metal or its compounds; c) production of mixtures that the metal or its compounds enter into their substances.**
	Diseases caused by ammonia	**Any work that involves exposure to ammonia vapors, as in: a) fertilizers' production; b) organic fermentation; c) works that lead to ammonia effluents or its spread.**
	Diseases caused by organic solvents including n-hexane	**Any work involves exposure to organic solvents including n-hexane, as in: a) production, extraction, manufacturing and use of mixtures that organic solvents and n-hexane enter into their constituents; b) handling, storage and disposal of waste discharges of organic solvents and n-hexane.**
	Occupational asthma due to occupational exposure to: a) Isocyanates , b) antibiotics , c) formaldehyde, d) detergents that contains enzymes, e) flour and grain dust.	**Any work involves exposure to one of the defined causes of occupational asthma, as in: a) use of polyurethane in production of mattresses, cushion filling, production of industrialized sponge and their wastes; b) spraying paints and varnishes and manufacturing of isolation materials that isocyantes enter into their constituents; c) foundering sandy forms; d) use of acid anhydrides in chemical treatment for producing Alkyds, polyesters, and epoxy resins; e) spraying paints and manufacturing and use of epoxy resinous materials as well as materials for lining and covering; f) use of aliphatic amides in chemical treatment for producing polyacetate, petroleum distillation and rubber treatment; g) manufacturing, purification, preparation, storage and handling pharmaceuticals, as antibiotics, glands' extracts and their analogues, cytotoxic preparations, active fungi, disinfectant and sterilizing substances; h) work in healthcare and veterinary activities.**
	Extrinsic allergic alveolities	**Any work involves inhalation of types of organic dusts or aerosols contaminated with microbes and fungi present in work activities, as in: a) all works during which the workers are exposed to inhalable dusts evolved due to storage, milling, and packaging audible grains; b) works of raising birds and handling their wastes as feather and droppings; c) agriculture or industrial processes at which workers are exposed to dusts of straw, bagasse or alike; d) manufacture or preparation of animal fodder using any of the above mentioned materials.**

No.	Exposure/ Disease	Affected jobs/ occupations
	Diseases caused by aluminum or its compounds	**Any work involves inhalation of the Aluminum fumes or its compounds, as in: a) Aluminum foundry processes from Aluminum raw materials, e.g. bauxite; b) adding Aluminum powder to resistant types of painting materials, as well as in lining and packaging processes; c) manufacturing and production processes for Aluminum alloys, engines, components of vehicles, planes, window frames, surfaces, food utensils and containers, as well as production of cables and electric wires.**
	Carpal tunnel syndrome of occupational causes	**Works that necessitate repetitive movements or severe exertion or uncomfortable positions last for long periods, as in: a) packing and packaging involving repeated raping, cutting, un-raping or composing; b) clerical works like typing of keyboard; c) works in clothing, spinning, weaving; d) works involving loading, unloading, transporting and moving; e) works in building and construction; f) works involving vibration that affect the whole body; g) drivers of trucks, heavy vehicles and heavy construction tools; h0 nursing attendants.**
	Post- traumatic stress disorder	**Presence in the spectrum of fatal accident**
	Occupational cancer caused by carcinogens included in the list determined by the International Agency for Research on Cancer as definite human carcinogens, as: benzidine and its salts, di-chloro-methyl-ether, coal tar and pitch, beta-naphthylamine, vinyl chloride, dioxins, types of wood dust, beryllium.	**Works at which workers are exposed to occupational carcinogens, as: a) workers in coal distillation; b) workers in processes involve fuel combustion and in garages; c) workers in manufacturing poly vinyl chloride from vinyl chloride monomer; d) workers in manufacturing, preparation or addition of any of the specified carcinogens.**

Newly added exposures/ diseases (30th May, 2013) are bold-marked (22).

Present Situation

Based on the work of two meetings of experts, the ILO Governing Body approved a new list of occupational diseases on 25 March 2010 during its 307th Session. This new list (see annex) replaces the preceding one in the annex of Recommendation No. 194 which was adopted in 2002. The new list includes a range of internationally recognized occupational diseases, from illnesses caused by chemical, physical and biological agents to respiratory and skin diseases, musculoskeletal disorders and occupational cancer. Mental and behavioral disorders have for the first time been specifically included in the ILO list. This list also has open items in all the sections dealing with the afore-mentioned diseases. The open items allow the recognition of the occupational origin of diseases not specified in the list if a link is established between exposure to risk factors arising from work activities and the disorders contracted by the worker. The criteria used by the tripartite experts for deciding what specific diseases be considered in the updated list include that: there is a causal relationship with a specific agent, exposure or work process; they occur in connection with a specific work environment and/or in specific occupations; they occur among the groups of workers concerned with a frequency which exceeds the average incidence within the rest of the population; and there is scientific evidence of a clearly defined pattern of disease following exposure and plausibility of cause (ILO, 2013).

In May 30th, 2013, the Egyptian Government has agreed to allow 17 new occupational diseases to be covered under Egypt's social health insurance law 79 passed in 1975. This came in response to demands made by a group of experts from diverse disciplines, as well as the ministers of Manpower and Migration, and Health and Population, after the decision was ratified by the Board of Directors of the National Authority for Social Insurance (Social Insurance Minister's Decree No. 54 for 2013). Thus, the present Egyptian Schedule contains more or less similar occupational exposures and/ or diseases present in the ILO 2010- new list (Table 4).

Future Ambition

Adopt the ILO list as well as its future amendments. In addition, re-formatting the schedule, in a similar way the ILO list is organized in three categories of occupational diseases: 1) Diseases caused by agents (chemical, physical, biological) ; 2) Diseases of target organ systems (respiratory, skin and mucous membranes, musculoskeletal, liver, kidney, endocrine,

etc.) ; and 3) Occupational cancer. Restructure the basic occupational health services (BOHS) to insure provision of comprehensive and continuous benefits for every worker in his workplace. A series of guidelines and codes of practice should be issued to facilitate adoption of BOHS with detailed required procedures.

Conclusion

Synthesis and development of the Egyptian schedule of occupational diseases are, more or less, concomitant with the international advancement in concepts and lists, especially those created by the ILO and UK. Still, there are many efforts to accomplish in order to provide the Egyptian workers with a comprehensive set of guidelines and codes of practices, endorsing prevention, management/ treatment and compensation purposes of the recently amended schedule.

Recommendations

Continue improving the Egypt schedule, with establishment of proper guidelines and codes of practice to conduct surveillance of the worker's health and the workplace, an important item in BOHS. Observe application of the full-fledged BOHS and generation of periodic reports with progress indicators.

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Annex: The new 2010- ILO list of occupational diseases

(In the application of this list the degree and type of exposure and the work or occupation involving a particular risk of exposure should be taken into account when appropriate.)

1. Occupational diseases caused by exposure to agents arising from work activities

1.1. Diseases caused by chemical agents

1.1.1. Diseases caused by beryllium or its compounds
1.1.2. Diseases caused by cadmium or its compounds
1.1.3. Diseases caused by phosphorus or its compounds
1.1.4. Diseases caused by chromium or its compounds
1.1.5. Diseases caused by manganese or its compounds
1.1.6. Diseases caused by arsenic or its compounds
1.1.7. Diseases caused by mercury or its compounds
1.1.8. Diseases caused by lead or its compounds
1.1.9. Diseases caused by fluorine or its compounds
1.1.10. Diseases caused by carbon disulfide
1.1.11. Diseases caused by halogen derivatives of aliphatic or aromatic hydrocarbons
1.1.12. Diseases caused by benzene or its homologues
1.1.13. Diseases caused by nitro- and amino-derivatives of benzene or its homologues
1.1.14. Diseases caused by nitroglycerine or other nitric acid esters
1.1.15. Diseases caused by alcohols, glycols or ketones

1.1.16. Diseases caused by asphyxiants like carbon monoxide, hydrogen sulfide, hydrogen cyanide or its derivatives
1.1.17. Diseases caused by acrylonitrile
1.1.18. Diseases caused by oxides of nitrogen
1.1.19. Diseases caused by vanadium or its compounds
1.1.20. Diseases caused by antimony or its compounds
1.1.21. Diseases caused by hexane
1.1.22. Diseases caused by mineral acids
1.1.23. Diseases caused by pharmaceutical agents
1.1.24. Diseases caused by nickel or its compounds
1.1.25. Diseases caused by thallium or its compounds
1.1.26. Diseases caused by osmium or its compounds
1.1.27. Diseases caused by selenium or its compounds
1.1.28. Diseases caused by copper or its compounds
1.1.29. Diseases caused by platinum or its compounds
1.1.30. Diseases caused by tin or its compounds
1.1.31. Diseases caused by zinc or its compounds
1.1.32. Diseases caused by phosgene
1.1.33. Diseases caused by corneal irritants like benzoquinone
1.1.34. Diseases caused by ammonia
1.1.35. Diseases caused by isocyanates
1.1.36. Diseases caused by pesticides
1.1.37. Diseases caused by sulphur oxides
1.1.38. Diseases caused by organic solvents
1.1.39. Diseases caused by latex or latex-containing products
1.1.40. Diseases caused by chlorine
1.1.41. Diseases caused by other chemical agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these chemical agents arising from work activities and the disease(s) contracted by the worker

1.2. Diseases caused by physical agents

1.2.1. Hearing impairment caused by noise
1.2.2. Diseases caused by vibration (disorders of muscles, tendons, bones, joints, peripheral blood vessels or peripheral nerves)
1.2.3. Diseases caused by compressed or decompressed air
1.2.4. Diseases caused by ionizing radiations
1.2.5. Diseases caused by optical (ultraviolet, visible light, infrared) radiations including laser
1.2.6. Diseases caused by exposure to extreme temperatures
1.2.7. Diseases caused by other physical agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these physical agents arising from work activities and the disease(s) contracted by the worker

1.3. Biological agents and infectious or parasitic diseases

1.3.1. Brucellosis
1.3.2. Hepatitis viruses
1.3.3. Human immunodeficiency virus (HIV)
1.3.4. Tetanus

1.3.5. Tuberculosis

1.3.6. Toxic or inflammatory syndromes associated with bacterial or fungal contaminants

1.3.7. Anthrax

1.3.8. Leptospirosis

1.3.9. Diseases caused by other biological agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these biological agents arising from work activities and the disease(s) contracted by the worker

2. Occupational diseases by target organ systems

2.1. Respiratory diseases

2.1.1. Pneumoconiosis caused by fibrogenic mineral dust (silicosis, anthraco-silicosis, asbestosis)

2.1.2. Silicotuberculosis

2.1.3. Pneumoconiosis caused by non-fibrogenic mineral dust

2.1.4. Siderosis

2.1.5. Bronchopulmonary diseases caused by hard-metal dust

2.1.6. Bronchopulmonary diseases caused by dust of cotton (byssinosis), flax, hemp, sisal or sugar cane (bagassosis)

2.1.7. Asthma caused by recognized sensitizing agents or irritants inherent to the work process

2.1.8. Extrinsic allergic alveolitis caused by the inhalation of organic dusts or microbially contaminated aerosols, arising from work activities

2.1.9. Chronic obstructive pulmonary diseases caused by inhalation of coal dust, dust from stone quarries, wood dust, dust from cereals and agricultural work, dust in animal stables, dust from textiles, and paper dust, arising from work activities

2.1.10. Diseases of the lung caused by aluminium

2.1.11. Upper airways disorders caused by recognized sensitizing agents or irritants inherent to the work process

2.1.12. Other respiratory diseases not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the disease(s) contracted by the worker

2.2. Skin diseases

2.2.1. Allergic contact dermatoses and contact urticaria caused by other recognized allergy provoking agents arising from work activities not included in other items

2.2.2. Irritant contact dermatoses caused by other recognized irritant agents arising from work activities not included in other items

2.2.3. Vitiligo caused by other recognized agents arising from work activities not included in other items

2.2.4. Other skin diseases caused by physical, chemical or biological agents at work not included under other items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising

from work activities and the skin disease(s) contracted by the worker

2.3. Musculoskeletal disorders

2.3.1. Radial styloid tenosynovitis due to repetitive movements, forceful exertions and extreme postures of the wrist

2.3.2. Chronic tenosynovitis of hand and wrist due to repetitive movements, forceful exertions and extreme postures of the wrist

2.3.3. Olecranon bursitis due to prolonged pressure of the elbow region

2.3.4. Prepatellar bursitis due to prolonged stay in kneeling position

2.3.5. Epicondylitis due to repetitive forceful work

2.3.6. Meniscus lesions following extended periods of work in a kneeling or squatting position

2.3.7. Carpal tunnel syndrome due to extended periods of repetitive forceful work, work involving vibration, extreme postures of the wrist, or a combination of the three

2.3.8. Other musculoskeletal disorders not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the musculoskeletal disorder(s) contracted by the worker

2.4. Mental and behavioural disorders

2.4.1. Post-traumatic stress disorder

2.4.2. Other mental or behavioural disorders not mentioned in the preceding item where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the mental and behavioural disorder(s) contracted by the worker

3. Occupational cancer

3.1. Cancer caused by the following agents

3.1.1. Asbestos

3.1.2. Benzidine and its salts

3.1.3. Bis-chloromethyl ether (BCME)

3.1.4. Chromium VI compounds

3.1.5. Coal tars, coal tar pitches or soots

3.1.6. Beta-naphthylamine

3.1.7. Vinyl chloride

3.1.8. Benzene

3.1.9. Toxic nitro- and amino-derivatives of benzene or its homologues

3.1.10. Ionizing radiations

3.1.11. Tar, pitch, bitumen, mineral oil, anthracene, or the compounds, products or residues of these substances

3.1.12. Coke oven emissions

3.1.13. Nickel compounds

3.1.14. Wood dust

3.1.15. Arsenic and its compounds

3.1.16. Beryllium and its compounds

3.1.17. Cadmium and its compounds

3.1.18. Erionite

3.1.19. Ethylene oxide

3.1.20. Hepatitis B virus (HBV) and hepatitis C virus (HCV)

3.1.21. Cancers caused by other agents at work not mentioned in the preceding items where a direct link is established scientifically, or

determined by methods appropriate to national conditions and practice, between the exposure to these agents arising from work activities and the cancer(s) contracted by the worker.

4. Other diseases

4.1. Miners' nystagmus

4.2. Other specific diseases caused by occupations or processes not mentioned in this list where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure arising from work activities and the disease(s) contracted by the worker.