

HYGIENE OF OCCUPATION: RISK OF OCCUPATIONAL DISEASES IN HEALTHCARE WORKERS

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Abstract: Occupational hygiene in healthcare settings addresses the identification, evaluation, and control of risks that can cause occupational diseases among healthcare workers (HCWs). This narrative review synthesizes prevalence data on injuries, infections, chemical exposures, ergonomic hazards, and psychosocial stressors in HCWs worldwide. Data sources included PubMed, WHO, OSHA, and NIOSH databases. Findings show that 39–60% of HCWs experience occupational injuries annually or over their careers; bloodborne infections remain a critical risk; chemical and ergonomic hazards contribute substantially to disease burden; and psychosocial risks are rising. Effective control measures—engineering controls, administrative policies, personal protective equipment (PPE), and training—are discussed. Two tables summarize prevalence rates and control strategies. Recommendations call for strengthening occupational hygiene programs through risk assessments, surveillance, and policy enforcement.

Keywords: Occupational hygiene, healthcare workers, occupational diseases, bloodborne pathogens, musculoskeletal disorders, chemical exposures, ergonomic hazards, psychosocial risks

INTRODUCTION

Healthcare workers (HCWs) are essential to patient care but face diverse occupational hazards that can lead to professional diseases and injuries. WHO estimates that HCWs are exposed to infections, unsafe patient handling, hazardous chemicals, radiation, heat, noise, psychosocial hazards, and workplace violence, all of which pose risks to their health and safety.

Bloodborne pathogens (e.g., hepatitis B, hepatitis C, HIV) are among the most significant infectious hazards, with sharps injuries and mucocutaneous exposures leading to transmission events in up to 3.5 per 100 sharps injuries per year in some settings. Ergonomic hazards—including patient lifting and repetitive tasks—are linked to musculoskeletal disorders in 39–60% of HCWs over their careers. Chemical exposures (e.g., disinfectants, latex) contribute to occupational asthma and dermatitis, affecting 10–30% of exposed workers. Psychosocial stressors, including burnout and workplace violence, additionally compromise worker well-being and performance.

Recognizing these risks, occupational hygiene employs systematic approaches—anticipation, recognition, evaluation, and control—to protect HCWs. This review aims to (1) quantify the prevalence of occupational diseases among HCWs, (2) characterize major hazard categories, and (3) describe control measures and policy frameworks.

METHODS

Search Strategy - A narrative review was conducted using searches on PubMed, WHO, OSHA, and NIOSH websites for publications from January 2019 to April 2025. Search terms included “occupational hygiene healthcare workers,” “occupational diseases,” “healthcare occupational risk,” and “HCW injuries prevalence.” Key databases searched: PubMed/MEDLINE, WHO Fact Sheets, OSHA healthcare pages, and NIOSH topic pages.

Inclusion and Exclusion Criteria - Studies were included if they reported quantitative data on occupational injuries, infections, chemical exposures, ergonomic hazards, or psychosocial risks among HCWs. Reviews, original research articles, and organizational fact sheets in English were eligible. Studies focusing solely on non-healthcare sectors or lacking quantifiable outcomes were excluded.

Data Extraction and Synthesis - From each source, data on prevalence, hazard types, and control measures were extracted. Two summary tables were created: Table 1 on prevalence rates and Table 2 on control strategies. A qualitative synthesis discusses major findings.

Table 1.

Prevalence of Key Occupational Hazards among Healthcare Workers

Hazard Category	Prevalence (%)
Occupational injuries	39 (annual); 60 (career)
Sharps injuries	25
Bloodborne exposure risk	0.3–30 per 100 incidents
Musculoskeletal disorders	≥50
Chemical sensitization	10–20
Workplace violence	50–75

Table 2. Occupational Hygiene Control Measures

Control Level	Examples	Effectiveness (%)
Engineering	Mechanical lifts; needleless systems	Up to 60
Administrative	Safe staffing; shift rotations; reporting	30–50
PPE	Gloves; gowns; N95 respirators	>90 (infection control)
Training	Competency-based workshops; simulations	40–70
Mental health	Counseling; zero-tolerance violence policies	–

RESULTS

Prevalence of Occupational Injuries and Diseases - A cross-sectional study in a developing-country hospital reported that 39% of HCWs experienced an occupational injury in the past year and 60% over their careers, with sharps injuries (25%), needlesticks (18%), and slips/trips (12%) most common. In Turkey, nationwide data indicate that sharps injuries account for 48% of reported incidents and falls for 22% over five years.

Infectious Hazards - HCWs face substantial risk from bloodborne pathogens. WHO notes that before widespread hepatitis B vaccination, transmission risk per needlestick was as high as

30% for HBV; current global seroconversion rates after exposure are 0.3% for HCV and 0.3% for HIV per incident without prophylaxis. OSHA highlights tuberculosis, influenza, and emerging coronaviruses as persistent airborne threats, with annual incidence rates among HCWs up to 5 times those of the general population in high-burden regions.

Chemical and Physical Hazards - Exposure to latex and disinfectants is linked to occupational asthma, dermatitis, and sensitization in 10–20% of exposed HCWs. Waste anesthetic gases, formaldehyde, and antineoplastic drugs pose additional toxicological risks, with evidence of reproductive effects and carcinogenicity in uncontrolled settings. Radiation workers (e.g., radiology technologists) show cumulative dose-related cataracts and potential long-term cancer risks

Ergonomic Hazards - Musculoskeletal disorders (MSDs) affect over 50% of nurses, primarily involving the lower back (35%) and shoulders (28%) due to patient handling. Engineering controls (e.g., mechanical lifts), administrative policies (e.g., safe patient handling programs), and training reduce injury rates by up to 60% when properly implemented.

Psychosocial Risks and Violence - Recent data indicate that 50–75% of hospital staff experience workplace violence annually, including verbal abuse and physical assaults, with higher rates in emergency and psychiatric units. Burnout prevalence reaches 55% among physicians and 40% among nurses, driven by workload, staffing shortages, and emotional stressors.

DISCUSSION

This review confirms that HCWs worldwide are at high risk for a spectrum of occupational diseases and injuries. The high prevalence of sharps injuries and MSDs underscores the need for sustained investments in engineering controls and training programs. Bloodborne infections remain a critical concern despite vaccination and prophylaxis; comprehensive infection control must be prioritized. Chemical and radiation hazards require robust monitoring and PPE adherence. Rising psychosocial risks suggest that occupational hygiene programs must broaden to encompass mental-health interventions and violence prevention policies.

Policy implications include:

Strengthening Surveillance: Mandatory reporting of occupational injuries and exposures to inform prevention strategies.

Enhancing Engineering Controls: Wider adoption of no-needle IV systems and patient lifts.

Improving Administrative Measures: Implementing safer staffing models and shift rotations to reduce fatigue.

Expanding Training: Regular, competency-based training in infection control, chemical safety, and ergonomic techniques.

Integrating Mental Health: Providing counseling services and zero-tolerance policies for workplace violence.

Limitations of this review include heterogeneity in study designs and regional focus, which may limit generalizability. Future research should examine long-term outcomes of emerging hazards (e.g., nanomaterials) and evaluate cost-effectiveness of control interventions.

CONCLUSION

Occupational hygiene in healthcare is vital to safeguarding HCWs from diverse hazards. High rates of injuries, infections, chemical exposures, ergonomic disorders, and psychosocial stressors demand comprehensive risk management. By integrating engineering controls, administrative policies, PPE, training, and mental health support, healthcare organizations can substantially reduce occupational disease burdens and improve worker well-being.

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