

Assessing occupational risk in emergency primary health care services

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CONFLICT OF INTEREST:

None

The establishment of emergency primary health care services has led to a need to evaluate risk factors for this specific setting as opposed to other emergency care sites, such as hospitals or clinics. Risks must be identified, assessed, and corrective measures proposed. In compliance with legislation for prevention of occupational risk, we evaluated the exposure to risk of emergency primary health care staff to identify threats to hygiene, bring existing hazards under control to prevent occupational injury, identify adverse psychosocial conditions, determine the level of risk and intervention needed for each identified risk factor, and plan corrective steps. [Emergencias 2009;22:445-450]

Key words: Emergency health services. Occupational safety.

Magnitude of the problem

The Law on Prevention of Occupational Risks (LPRL)^{1,2}, Law 31/1995 of November 8, and amendments introduced by Law 50/1998, governs legislation on occupational risk prevention and preventive measures regarding possible hazards in the workplace.

The primary healthcare emergency service (PCES, or SUAP in Spanish) was created in 2005 in Cantabria, with the objective of improving out-of-hospital coverage of health emergencies, and optimizing material and human resources to meet the needs of the population. The appearance of this service calls for an evaluation of the occupational risks, inherent to the specific activity and common to other health sectors, and proposals on corrective measures. PCES is staffed by teams of doctor and nurse who respond to emergency calls from 5 pm to 9 am during weekdays and 24 hours on weekends and holidays; they also provide complete call coverage throughout the year. Working conditions vary since patients may be attended in the health center, at home, and even in public places.

The objective of the present work was to evaluate, pursuant to the law, the risks to safety and

health of the PCES staff in carrying out their work³. More specifically, we aimed to determine risk factors including adverse hygienic factors and possible work hazards (accidents), the presence of adverse psychosocial conditions in health centers and the degree of harm or danger, the level of risk and intervention for each risk factor, and then to make proposals on what corrective measures should be taken.

Methods

Risk assessment consists of:

- Identification of risks: based on observed working conditions and information provided by the employer^{4,5}, risk factors are identified and added to those previously identified and evaluated.

- Risk analysis: this was performed according to the system of Accident Risk Assessment NTP 330 of INSHT.

1. Level of probability (Table 1).

2. Level of consequences (Table 2).

- Extremely harmful: accidents producing death, multiple injuries, amputation, major fracture, intoxication, chronic disease that severely

Table 1. Probability level

Significance of the different levels of probability	
High probability (P3)	Risk will always or almost always manifest.
Intermediate probability (P2)	Risk will manifest occasionally.
Low probability (P1)	Risk will manifest rarely.

Table 2. Level of consequences

Significance of different levels of severity	
High (S3)	Extremely harmful.
Intermediate (S2)	Harmful.
Low (S1)	Slightly harmful.

shortens life, and serious injuries that may be irreparable.

- Harmful: accidents producing minor fractures, burns, lacerations etc that involve temporary disability.

- Slightly harmful: accidents producing superficial damage, cuts, bruises, eye irritation. Small lesions not require hospitalization.

3. Determination of risk level (number of consequences x probability) (Table 3).

4. Determination of intervention level.

There are 4 levels that indicate priority for action (Table 4). The recommended timeframe for implementing corrective measures is based on the probability and severity of the risk (Table 5).

Results: Identification and assessment of risk

1. Risk of falls due to the absence of non-slip floors and corridors, the presence of steps or a step between different work areas, incorrect use

Table 3. Determining the level of risk

	Low Severity (s1)	Intermediate Severity (s2)	High Severity (s3)
Low Probability (p1)	Negligible	Tolerable	Moderate
Intermediate Probability (p2)	Tolerable	Moderate	Important
High Probability (p3)	Moderate	Important	Intolerable

Table 4. Determining the level of intervention

Meaning of the level of intervention	
I	Critical situation. Urgent intervention.
II	Correct and adopt control measures.
III	Improve if possible. Ideally, justify intervention and accruing benefit
IV	Do not intervene unless justified by a more precise analysis.

Table 5. Determining the timeframe for intervention

Timeframe	Estimated Time Period
Immediate	Within the shortest possible time, as from date of communication (less than 2 months).
Short	Up to 6 months from the date of communication.
Medium	Six months to 1 year from the date of communication.
Long	Between 1 and 2 years from the date of communication.

(running etc), inadequate access to public places or homes in order to attend to patients. After assessment of this risk as tolerable, the plan of action includes the use of non-slip obstacle-free floor spaces and stairways, adequate lighting, signs indicating changes of floor level and warnings against running in the work area except in a life-threatening emergency.

2. Risk of contact with solid or liquid toxic substances or gas, via the eyes, mucosa or skin lesions; mainly chemicals (disinfectants, antiseptics, solvents) or biological fluids with pathogens.

Classified as moderate risk, the preventive measures to be adopted include: the use of a work uniform or overalls to avoid splashing personal clothing, eye protection and use of a mask to protect mucous membranes of the eyes, nose and mouth when performing activities that may generate aerosols or blood splatter, and the use of gloves to reduce the risk of contamination of health staff and patients.

3. Exposure to flammable substances could entail the risk of explosions caused by chemical gas (oxygen) reactions with certain substances (oil, grease, organic materials), or risk of fire or explosions from leaks (oxygen).

The risk was considered moderate, and the recommended plan of action included banning smoking in areas near oxygen cylinders, moving the gas cylinder in an upright position, inclined (15 °) and rolling it on the edge of the base, maintaining good ventilation, with normal temperatures and floors clean of oils and fats, avoidance of falls or blows, ensuring the valve is fully threaded and closed, and careful opening to avoid sudden gas release.

4. Biohazards⁸, mainly due to skin puncture (contact with blood or body fluids by use of piercing and cutting material, needles, catheters, scissors), or due to inhalation of infectious aerosols from undiagnosed patients. The level of risk was considered important. The recommended measures included handling any sharp health material with great care; no re-capping of needles; use of rigid hermetic disposal containers with "one-hand" mechanisms, no disposal of material

in anything but designated disposal containers, conscientious placement of material (not uncontrolled areas like couches, tables etc., and use of sanitary masks when dealing with suspected contagious disease (or maintaining a distance of at least 1m from the patient).

5. Risk of overexertion, including inadequate posture, sitting and standing for long periods, or lifting loads (moving patients, packs or enclosed material). The risk in this case was considered as tolerable. Recommended preventive measures included: 1) for screen viewing, inform employees about correct posture (back support, straight back, screen at a distance of 50 - 90 cm, avoid twisting the spine, intermittent stretching or walking etc. 2) for patient mobilization, recommended measures included use of cranes, and when this is not possible, two members of staff should participate; use of the leg muscles is recommended, and for carrying heavy medical supplies, use of backpacks properly positioned (12 Kg) on the back, so that the weight is properly distributed.

6. Risk of mental fatigue or work overload. There may be diminished perception and interpretation of sensations, impaired performance and capacity for observation and diagnostic judgment, caused by excessive pace of work without the necessary rest periods, breaks, meal times etc. often due to 24-hour work shifts and high demand for attention, without the power to alter work tasks or times. This risk was considered as tolerable. The recommended plan of action included attempts to modify responses to stressful situations by training and the use of known techniques such as relaxation and reinterpretation of the most stressful situations to make them appear less menacing. Another possibility is to introduce or increase theoretical and practical training in emergencies, planning appropriate work rates and set breaks when workload permits such changes.

7. Risk of exposure to chemical agents. This may involve anesthetics, certain medication (during preparation and / or administration), disinfectants, sterilizing gases, compounds such as latex or solvents (acetone, methyl alcohol); also, organophosphate pesticides used in urban settings and affecting staff working in conditions without adequate ventilation in the center (lack of air renewal and absence of appropriate filtering mechanisms, resulting in the concentration of undesirable, unhealthy substances in the air). In a PCES center, this risk mainly involves exposure to commonly used disinfectants (alcohol, iodinated agents, hydrogen peroxide, bleach and other products like ammonia), latex exposure, inhala-

tion or direct contact with certain chemicals. Also, this includes exposure to products used by the cleaning staff in the work area, since the work of attending emergencies is continuous. This risk was considered as tolerable. The recommended plan of action included using cleaning methods appropriate for the specific situation (when cleaning liquids are used, preferably during periods of least activity, the area must be properly signposted), and providing information on the products used (tagged and labeled containers, material safety data sheets) to disinfect rooms, as well as rat poison, by qualified personnel, warning the staff about the risk and respecting the periods needed for cleaning and the use of pesticides. Sterilizing equipment must be installed in a separate sealed room, ensuring no entry during the process and elimination of gas at the end of the sterilizer cycle. In all cases it is most important to ensure adequate ventilation, not only through windows, but using mechanical techniques that provide a continuous flow of filtered air and humidity, at a suitable temperature and pressure.

Of particular importance is the risk of carbon monoxide poisoning as an occupational hazard for PCES, as the work involves home care visits. Occasionally, one may be exposed to this odorless, tasteless, non-irritating gas in the air, from incomplete combustion in commonly used heating devices such as gas stoves, heaters and boilers not properly ventilated or maintained. Preventive action is primarily based on suspicion of this risk, especially in cases of fires or assisting patients with certain symptoms in their homes.

8. Risk of dermatitis due to direct contact with irritants (soap used for repeated washing, latex glove powder), or risk of allergic dermatitis (produced by chemical additives used in manufacturing latex gloves), or hypersensitivity reactions or allergy to latex. This risk was considered as moderate. The recommended plan of action included using powder-free gloves (in cases of allergy, synthetic vinyl or neoprene gloves), skin moisturizers and hand washing with pH neutral soap followed by thorough drying.

9. Psychosocial risks (which include stress, mobbing and burnout). These risks may be due to lack of support from managers /directors or team coordinators, or the degree of ethical, social and legal responsibility attached to each action, and the lack of recognition for good performance at work. Stress may be aggravated by the possibility that small errors result in serious consequences, poor relationship between team-members and the conflict between the demands of

work and private relationships. A compounding factor is being permanently locatable by mobile phone. These psychosocial risks were considered to be tolerable to moderate. They may be addressed by counseling, adjusting professional expectations to the reality of work, increasing the scope of decision-making on the operation and organization of work, defining the content of tasks and responsibilities associated with each position, prioritizing tasks, and providing adequate support of the worker faced with problems or taking the initiative, as well as improving communication skills.

10. Risks associated with shift and night-shift work. This stems from inability to schedule cycles of work and rest, interruptions during rest and meal periods, alteration of circadian biological rhythms and social relations. Possible manifestations include irritability, gastrointestinal disorders, nervous disorders, and a lifestyle that differs from the rest of society.

This was considered a tolerable risk. Corrective measures include advance notice of shift times to help medical staff organize their activities outside the workplace, maintaining the same members in a group to facilitate stable relationships, respecting days of rest, or using adaptation strategies (choosing silent spaces for sleeping on rest days, maintaining a regular schedule of meals, healthy diet and regular exercise).

11. Risk of violence at work. This includes verbal and physical aggression, threats, insults, slander, emotional blackmail and threats of lawsuits by users dissatisfied with the service provided by the health system. This was considered a tolerable-moderate risk. Preventive measures include providing medical staff with protection, support and legal advice on how to act and cope with verbal or physical aggression by users, training in handling such problems, guidelines or protocols of action, CCTV cameras and security guards in health centers, doubling staff in known trouble spots, in order to reduce the pressure and improve healthcare and user satisfaction. In addition to instructing health professionals to be alert to users with a history of violence, and if possible attend such users with the support of another team member, the staff should be encouraged to avoid reacting emotionally, to show empathy to dispel anger, and not to respond if violent behavior materializes. In cases of uncontrolled risk, the health professional should leave the room and request help, call the police if necessary, inform the Coordinator and notify the Management.

12. Risk of commuting accidents, while travel-

ing to/from work or on assignment. A commuting accident is one suffered while traveling for professional reasons at the relevant times and following the usual routes. The risk may be due to unsafe actions (negligent or reckless behavior, fatigue, stress, alcohol, impaired sight or hearing) or unsafe conditions (mechanical failure of a vehicle or road conditions). This was considered a moderate risk. Preventive measures include continuous information on road conditions, danger spots, traffic, awareness of the importance of such accidents and proper periodic vehicle maintenance (especially the state of tyres) and financial support from the employer for such maintenance, or the use of a company car.

13. Risk of visual fatigue due to continuous viewing of data display screens. This was considered a tolerable risk. Preventive measures include adjusting screens so as not to reflect natural or electric light, use of large curved screens, correctly tilted and placed at the correct distance from the viewer. Also the seat used should allow adjustment of height, with a backrest and stable, non-slip footrests.

14. Risks deriving from inadequate work-wear, including uniforms and medical coats made of thin material unsuitable for use in cold weather, which is inappropriate for attending patients in open spaces (with low reflective marking, poorly visible at night). Also, the footwear commonly provided (clogs) is totally inappropriate for this work since it entails the risk of tripping and falls. This risk was considered tolerable to moderate. Corrective measures include modification of work-wear: reflective markers on pants and sweater, made of appropriate material for use outside while attending emergencies, warm clothes and jackets for cold conditions, and safe, closed-heel footwear with anti-slip soles for rapid mobility on any sort of ground.

For all these reasons, we conclude that such work in the health sector involves exposure to a wide variety of occupational hazards: biological risks^{9,10}, contact with infectious fluids, ergonomic risks, especially when moving patients, psychosocial risks due to shift work and night activity, or the requirement to also provide patients and their families with emotional support, and others like the use of equipment, machinery or apparatus and toxic agents. In addition, there are risks associated with the physical characteristics of the building its environmental conditions¹¹, given that the majority of healthcare facilities pay little attention to air renewal. Air filtration and ventilation systems should be installed at any health institu-

tion, as the transmission of infectious disease can occur at any point of the patient care chain.

Although some of the above occupational hazards are common to the healthcare sector in general and have been reported previously 3-5, the novelty of this study is the detection of certain risks that are specific to primary healthcare emergency services and the type of work performed, which are not found in hospital work or in primary care centers.

Apart from these common health risks (falls, contact with chemical or biological agents, exposure to flammable substances, risk of dermatitis etc.), in the case of PCES we can add the risks associated with inadequate work-wear, increased psychosocial risks (stress, mobbing, burnout), increased risk for violence by patients, and those derived from night and shift work. The most serious and frequent risk in this area is biological risk due to contact with infected material or patients. No less important is the mental risk of work overload, which in our case is compounded by participation in emergency situations that are stressful, requiring speed and accuracy, sometimes several at the same time, obliging us to prioritize some and relegate others, and of course, constant mobile phone contact to receive emergency calls from the coordinating center.

Of the non-common risks we face, that of road accidents is important, not in itinere or commuting to and from work, but on assignments, since emergency assistance outside the center involves transfers in our own private vehicles, with the necessary material and attempting to reach the scene as rapidly as possible.

In summary, the law (LPRL) stipulates that it is the duty of public authorities to ensure health and safety at work. Therefore, the objective of risk

assessment in a SUAP is to identify all deficiencies and risks relating to health and safety, hygiene, ergonomic and psychological well-being, for proper planning of preventive measures and to initiate a continuous process of improving working conditions. The design of this assessment included attempts to establish a plan to manage and coordinate preventive action, to prioritize prevention activities and monitor their effectiveness, to provide information and adequate training of workers, and in general contribute to the prevention of occupational health risks in primary healthcare emergency services, a field with no published comparative data in other communities.

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Evaluación de riesgos laborales para el personal sanitario de los servicios de urgencias de atención primaria

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A raíz de la aparición de los servicios de urgencias de atención primaria (SUAP) se hace necesario el diseño de una evaluación de riesgos específica, que contemple la actividad desarrollada, distinta a la de otros ámbitos existentes (hospitalario, consultas...), identifique sus riesgos, los evalúe y proponga acciones correctoras.

En cumplimiento de la Ley de Prevención de Riesgos Laborales, se evalúan los riesgos a que está expuestos los trabajadores del SUAP como consecuencia de su actividad, de forma que permita conocer los factores higiénicos adversos, controlar los riesgos existentes para evitar los daños a la salud derivados del trabajo, valorar la presencia de condiciones psicosociales adversas, determinar el nivel de riesgo e intervención en cada uno de los factores y proponer medidas correctoras. [Emergencias 2010;22:445-450]

Palabras clave: Servicio de urgencias de atención primaria. Prevención de riesgos laborales. Personal sanitario.