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ORIGINAL

Integration of epidemiological surveillance into the institutional preventive culture: Case study in a Venezuelan military component

Integración de la vigilancia epidemiológica en la cultura preventiva institucional: Caso de estudio en un componente militar venezolano

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ABSTRACT

The present study aimed to: Analyze epidemiological surveillance as an action strategy for the prevention of accidents and occupational diseases in a Venezuelan military component. A study was conducted, framed in the quantitative, field, non-experimental and descriptive paradigm. The sample consisted of 101 military workers from the military component. The survey was used as a data collection technique and the self-administered questionnaire as an instrument. The research was carried out in four phases. The data was analyzed from descriptive statistics, being ordered, classified, tabulated and presented in percentage graphs of columns grouped in 3D. As a result, it was obtained that the representation of 50 % of a proportion of military workers considers that they are exposed to risks in the work environment; also, 60 % indicates that they never or almost never have adequate breaks. In conclusion, it was shown that there are no permanent medical care controls, in addition to the fact that there is no epidemiological program, so the application of a coherent and structured epidemiological surveillance system was recommended, which carries out continuous monitoring of existing risks, through the application of preventive action strategies.

Keywords: Epidemiological Surveillance; Work Accidents; Occupational Disease; Prevention.

RESUMEN

El presente estudio, tuvo como objetivo: Analizar la vigilancia epidemiológica como estrategia de acción para la prevención de accidentes y enfermedades ocupacionales en un componente militar venezolano. Se realizó un estudio, enmarcado en el paradigma cuantitativo, de campo, no experimental y descriptivo. La muestra estuvo conformada por 101 trabajadores militares del componente militar. Como técnica de recolección de datos, se utilizó la encuesta y como instrumento el cuestionario autoadminisqtrado. La investigación se llevó a cabo en cuatro fases. Los datos se analizaron a partir de la estadística descriptiva, siendo ordenada, clasificada, tabulada y presentada en gráficos porcentuales de columnas agrupadas en 3D. Como resultados se obtuvo, que la representación del 50 % de una proporción de los trabajadores militares, considera que están expuestos a riesgos en el entorno laboral; también, un 60 % indica que nunca o casi nunca tienen descansos adecuados. Como conclusión, se demostró que no hay controles de atención médicas que sean permanentes, además que no existe un programa epidemiológico, por lo que se recomendó, la aplicación de un sistema de vigilancia epidemiológica coherente y estructurado, que realice un monitoreo continuo de los riesgos existentes, mediante aplicación de estrategias de acción preventivas.

Palabras clave: Vigilancia Epidemiológica; Accidentes de Trabajo; Enfermedad Ocupacional; Prevención.

INTRODUCTION

Preventive culture is defined as the set of proactive attitudes and shared beliefs held by all members of an organization regarding prevention measures, health, occupational risks, accidents, and occupational diseases. [1] In the military, where operational demands increase exposure to occupational hazards, the culture referred to is articulated and contextualized with epidemiological surveillance, which, when applied to the workplace, can be defined as the systematic monitoring of health-related events in the working population to prevent and control occupational risk factors and the diseases and injuries associated with them. It is a pillar of prevention that requires the continuous collection, analysis, and interpretation of health data and its determinants, which enables preventive action to be taken.[2] The synergy between these two concepts enables not only the detection of patterns of occupational accidents and diseases but also the standardization of evidence-based protocols, thereby promoting sustainable prevention tailored to military contexts.

It is no exaggeration to say that a culture of prevention in military environments is a fundamental element in ensuring the operational effectiveness and well-being of personnel, especially in contexts where occupational risks are inherent in the operational activities of their profession. In this sense, epidemiological surveillance emerges as a strategic pillar, both for the early identification of occupational accidents and diseases and for promoting practices that strengthen preventive attitudes. In the military component studied, where physical and environmental demands increase vulnerability to occupational hazards, integrating both cultural and technical approaches could optimize occupational safety and health management.

It is worth mentioning that Venezuelan legislation, specifically the Organic Law on Prevention, Conditions, and Environment at Work, establishes that among its functions is to develop and maintain a system of epidemiological surveillance of occupational accidents and diseases, as provided in the Regulations of this Law.[3] Therefore, statistical systems must be in place to obtain the minimum necessary information on work accidents, workers' illnesses, working conditions, social security, and other aspects of the worker's environment and life.[4]

In Venezuela, according to official information, 2 760 deaths occur each year as a result of occupational accidents, and according to the same source, there are still no exact figures on the number of deaths from occupational diseases. The same institute states that among the most common occupational diseases are musculoskeletal disorders, mainly of the spine, low back pain, and herniated discs, which have become the primary health problem affecting Venezuelan workers. Occupational deafness due to exposure to machine noise, dermatoses (specifically contact dermatitis), and respiratory diseases such as occupational asthma and pneumoconiosis also continue to occupy a prominent place.[5]

However, in the state of Aragua, one of the most important cities in the country, where a high percentage of military bases are located, the following has become evident in recent years: Firstly, the Venezuelan Armed Forces are not governed by the Organic Law on Prevention, Conditions and Environment at Work (LOPCYMAT), and are therefore not obliged to investigate and report accidents at work and occupational diseases to the National Institute for the Prevention of Occupational Health and Safety (INPSASEL). These reports are submitted to the Labor Inspectorate and Health Directorate (DIRESALUD) of the armed forces, indicating that there is no epidemiological surveillance program in place for the prevention of occupational diseases and accidents within the military component studied.

It is essential to note that in the military component studied, certain risks have been identified in the work areas that may be impacting the health of workers. Among the dangers detected are: manual lifting of loads, work overload, long working hours, night shifts, rigorous supervision, and high noise levels in some work areas.

Consequently, despite having state-of-the-art technology, this military component is not immune to situations that pose a risk of illness and workplace accidents, which can impact workers' health. These situations have not been prevented because the military base does not have an epidemiological surveillance program, nor does it have an Occupational Safety and Health Service (SSST) to monitor the effects of exposure of workers in areas where such risks exist, generating a negative impact from a comprehensive point of view, not only for the organization but also for its most important part: the health of its workers.

In this regard, the objective of this study was to analyze epidemiological surveillance as a strategy to strengthen the preventive culture and reduce occupational accidents and diseases among workers in a Venezuelan military unit.

METHOD

The research was framed within the quantitative paradigm, within the so-called field research under a non-experimental and descriptive design. The research was carried out directly in a military unit located in Maracay, Aragua state, Venezuela.

Population and Sample

The population consisted of 564 workers employed in eleven units of the base studied, which was composed

as follows, (table 1).

Table 1. Distribution of the Working Population

Units	No. of workers
Air Groups	1
AMB Savings Bank	6
Base command	50
Aeronautical firefighters	10
Air Police Group	50
Aeronautical Training Center	48
Technical Academy	64
Armament Service	40
Food Service	40
Medical Service	12
Transportation Service	40
Total	564

The sample size was estimated using Patella & Martins' formula for finite populations, resulting in 101 subjects.

Data collection techniques and instruments

For this research, a survey was used as the technique and a self-administered questionnaire was used as the instrument, which contains twenty (20) statements referring to working conditions and the work environment, as well as occupational hazards and accident rates, to be answered on a Likert scale ranging from never, rarely, sometimes, almost always, to always. The author developed the questionnaire. Reliability was calculated using Cronbach's alpha coefficient. Given that α = 0,78, the instrument has acceptable reliability, indicating that it is suitable for this study. The author developed it. Reliability was calculated using Cronbach's alpha coefficient. Given that α = 0,78, the instrument exhibits acceptable reliability, indicating that the items consistently measure the same construct.

RESULTS

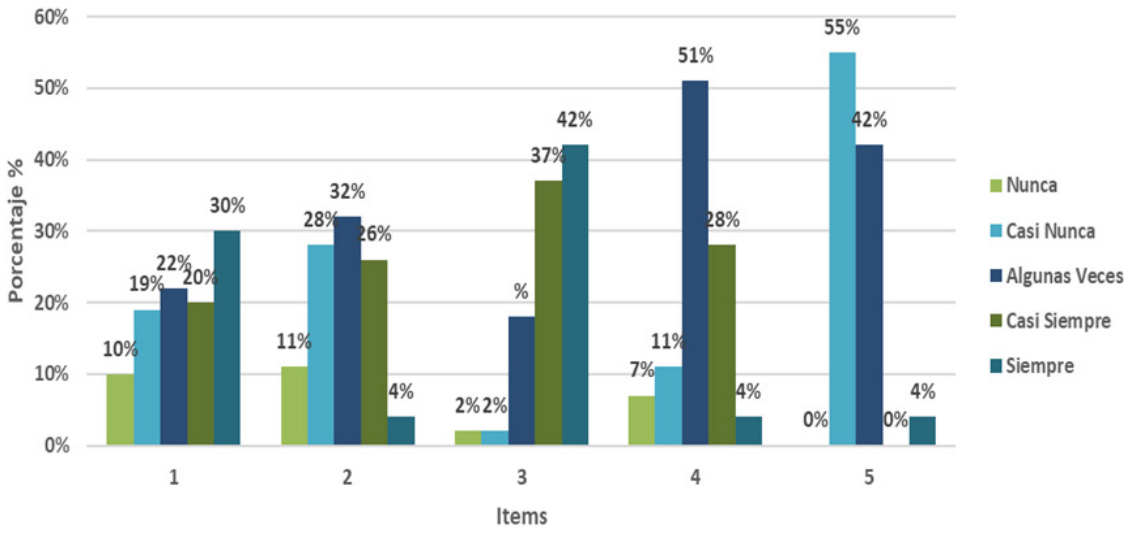

Figure 1. Percentage of responses per item in the working environment conditions category

In general terms, the results for this category indicate a balanced distribution of responses in terms of percentage, suggesting that, although some workers perceive favorable conditions, there are areas that require attention. Of the total responses for the category, the distribution is as follows: Never (10 %), Rarely (19 %), Sometimes (22 %), Almost Always (20 %), and Always (30 %). This distribution indicates that a significant proportion

of workers consider themselves exposed to risks in the workplace, although a considerable percentage does not consistently perceive such risks. The category as a whole reflects that, although there are positive aspects such as the use of personal protective equipment, there are several areas that require immediate attention. Exposure to hazardous materials, the organization of the physical environment, and workload management are key areas that require review to reduce associated risks and enhance working conditions. The responses indicate a clear need to improve safety policies and optimize work organization to create a healthier and safer environment for workers.

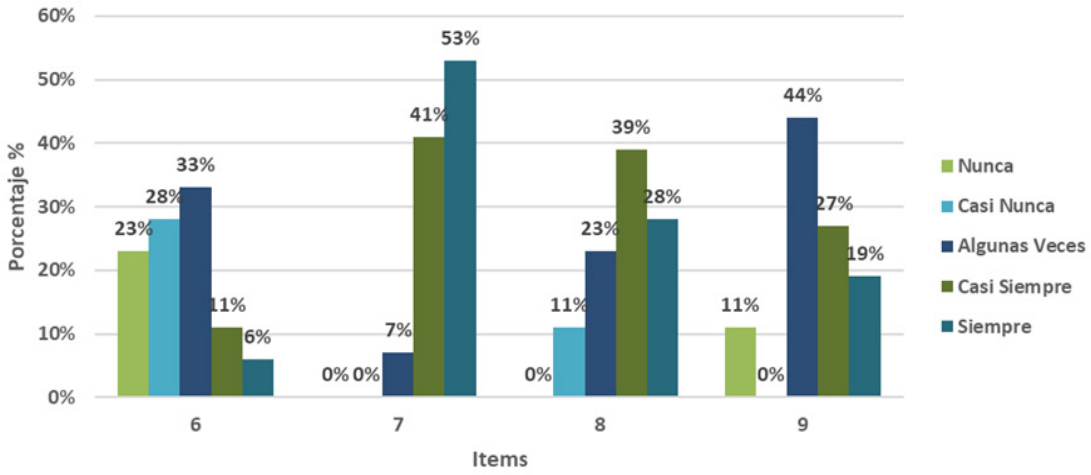

Figure 2. Percentage of responses by items in the Physical Risks category

The results for the physical risk category indicate that some aspects of the work environment are perceived positively, such as adequate lighting. However, some areas require urgent attention. The distribution of responses shows that a significant percentage of workers believe that risks related to heat, fatigue, noise in the work area, and the layout of tools to minimize fatigue are not adequately minimized. The distribution of responses is as follows: Never (23 %), Rarely (28 %), Sometimes (33 %), Almost Always (11 %), and Always (6 %). This distribution indicates that while some workers perceive favorable conditions regarding physical risks, a significant proportion do not consider that risks associated with fatigue, heat, and noise are adequately managed. The physical risk category shows that, although there are positive aspects, such as adequate lighting and heat management in certain areas, there are several areas for improvement. The distribution of responses reveals that workers experience an environment where physical risks, such as fatigue, high temperatures, and noise, are not always effectively managed.

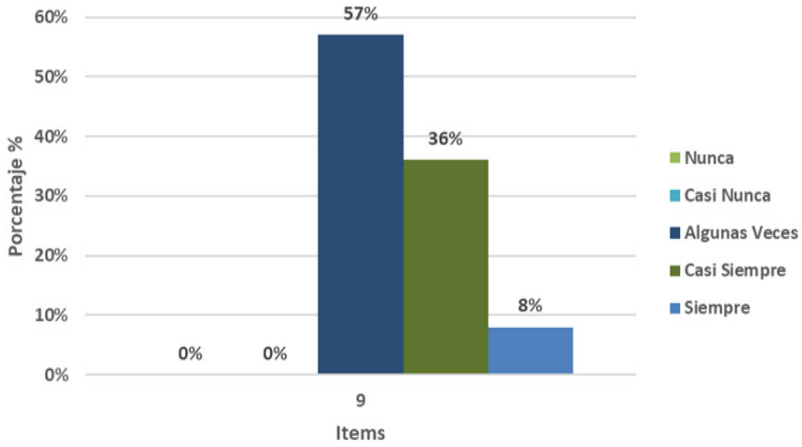

Figure 3. Percentage of responses by items in the Chemical Risks category

The results for the chemical risk category show a positive perception of the implementation of preventive measures to minimize exposure to hazardous chemicals in the workplace. The distribution of responses shows that most workers (92 %) perceive that preventive measures to reduce exposure to chemicals are sometimes or almost always implemented. This result is positive, but 57 % of workers consider that measures are only applied

sometimes, suggesting that these preventive measures are not entirely consistent. Despite the absence of negative responses, such as 'never' or 'rarely', the fact that 8 % of workers consider that measures are always applied also reflects that not all areas meet the same standards.

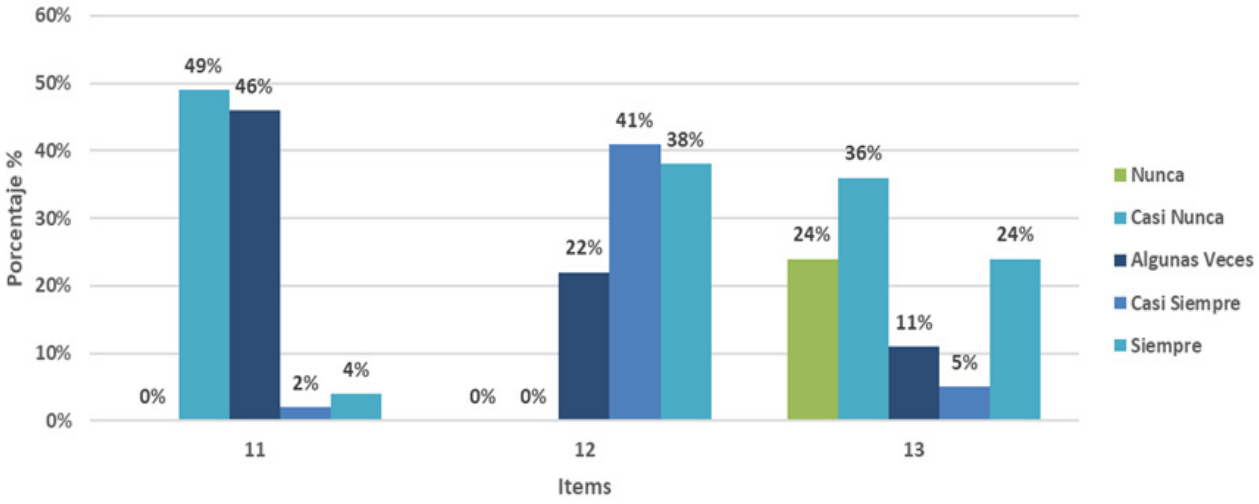

Figure 4. Percentage of responses by items in the Psychosocial Risks category

The workload is appropriate and allows for a balance between productivity and well-being. Forty-nine percent of workers report that the workload is almost never adequate, which points to a critical area for improvement. Although 46 % say that the workload is adequate sometimes, the lack of positive responses implies that many workers feel overloaded.

The work environment fosters a positive organizational climate and respect among colleagues. Seventy-nine percent of workers perceive that there is almost always or always a climate of respect and collaboration, which is positive and reflects a strong organizational culture.

Workers have access to adequate breaks and rest periods to prevent fatigue and stress. This item shows a worrying result, as 60 % of workers indicate that they never or almost never have adequate breaks, which can lead to fatigue and stress, affecting productivity and overall well-being.

The psychosocial risk category reveals important areas that require urgent attention. Workload, although managed in some cases, remains a major concern, as a large proportion of workers feel that their workload is excessive. In addition, access to breaks and rest periods is insufficient for a significant portion of the workforce, which can lead to negative consequences for employees' physical and mental health. Although the organizational environment is mostly positive, breaks and the balance between productivity and well-being are areas that need to be reviewed and improved.

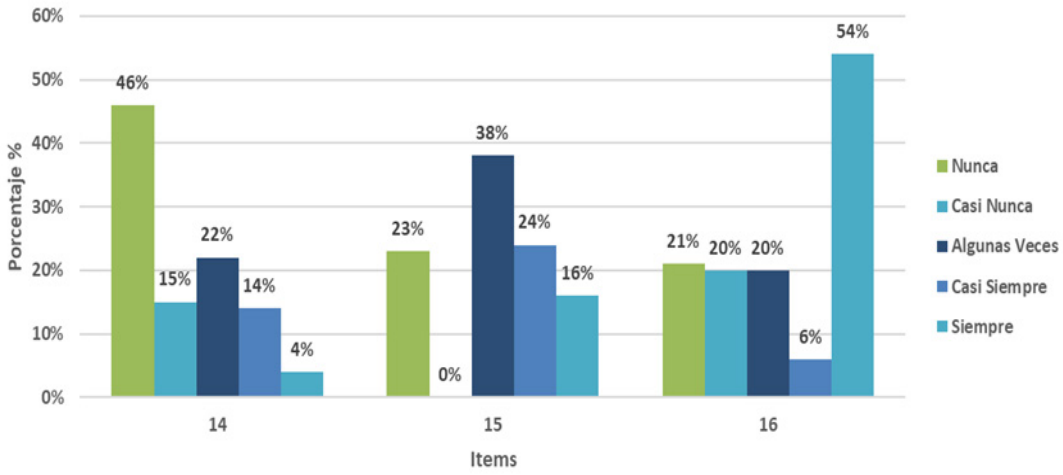

Figure 5. Percentage of responses by items in the Disergonomic Risks category

The results in the Disergonomic Risk category indicate the presence of significant deficiencies in the

layout of tools and equipment, the design of the work environment, and the adaptation to workers' physical capabilities. A considerable percentage of workers report that machinery and tools are arranged in a way that requires forced movements to operate them. In turn, although some aspects related to ergonomics, such as adjusting the design of work areas to meet the ergonomic needs of workers, show some progress, there is considerable room for improvement in terms of the layout of tools and equipment.

The Disergonomic Risk category highlights significant areas for improvement, particularly in the layout of tools and machinery, as well as the design of workspaces to meet workers' needs better. Although there are positive aspects, such as the adaptation of tools to workers' physical abilities, a large proportion of workers consider that tools and the work environment are not sufficiently optimized to minimize physical effort and ensure greater comfort. Ergonomic policies and tool layout should be reviewed and adjusted to prevent musculoskeletal injuries and other problems related to excessive physical effort.

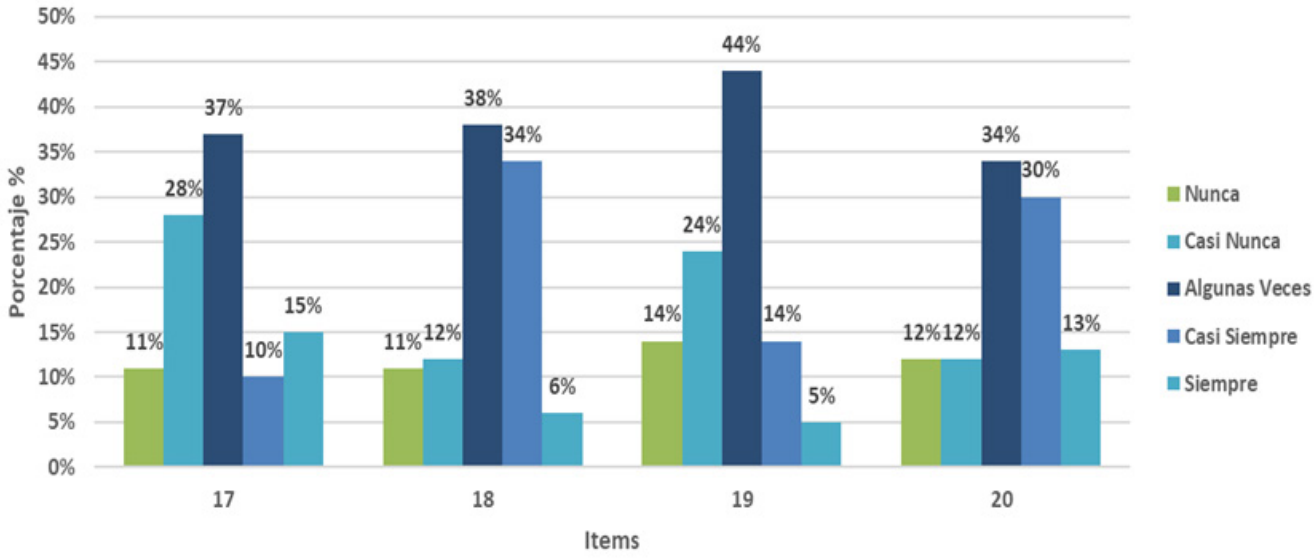

Figure 6. Percentage of responses by items in the Work Accident category

The organization maintains up-to-date records of occupational illnesses. Thirty-seven percent of workers indicate that records are sometimes kept up to date, while 28 % consider that adequate records are rarely kept up to date. Only 15 % of workers think that records are always kept up to date, indicating that occupational disease monitoring systems need to be installed or improved to ensure that a reliable and accessible database is maintained.

Workers have access to medical services for the prevention and treatment of occupational diseases. Thirty-four percent of workers report that they almost always have access to medical services for the prevention and treatment of occupational diseases, while 38 % say they sometimes have access to these services. A small 6 % consider that they always have access, reflecting that, although there is a perception of access, there are opportunities to improve coverage and ensure that all workers have consistent access to these services.

There are clear protocols for the prevention and treatment of workplace accidents. Forty-four percent of workers report that clear protocols for preventing workplace accidents sometimes exist, suggesting that their implementation is not consistent across the organization. Meanwhile, 24 % of workers believe that clear protocols rarely exist, highlighting the need to review and strengthen safety and accident prevention procedures throughout the company.

Corrective measures are implemented following a workplace accident. Thirty percent of workers report that corrective measures are almost always implemented after a workplace accident, while 34 % indicate that measures are sometimes taken. However, 12 % of workers believe that corrective measures are never implemented. This highlights the need to review and ensure the effective implementation of corrective measures to prevent repeat accidents and improve workplace safety.

CONCLUSIONS

Overall, the results of this study show that, despite some isolated efforts by the organization to manage occupational risks, no adequate and consistent epidemiological surveillance system has been implemented that covers all critical aspects of occupational safety and health. Exposure to hazardous materials, inadequate provision of tools and equipment, insufficient workload management, and inadequate control of physical, chemical, and psychosocial risks are areas that require intervention. The absence of a coherent and structured

epidemiological surveillance system that continuously monitors these risks and their consequences contributes to the persistence of situations that could affect the health and safety of workers.

A robust epidemiological surveillance system involves the continuous identification of risks, the systematic collection of data on occupational diseases and work-related accidents, and the implementation of preventive and corrective measures. However, in this context, the organization has shortcomings in updating occupational disease records, consistently applying protocols for managing occupational accidents, and responding to accidents. Furthermore, the lack of a comprehensive approach to addressing risks reflects the absence of a structured system that allows for early and effective intervention in these areas. As these areas are improved, with an appropriate approach to epidemiological surveillance, the organization could achieve a significantly safer and healthier work environment for its workers.

In short, epidemiological surveillance as an action strategy is essential for consolidating a robust preventive culture at the School Base studied, by integrating aspects such as the collection, analysis, and dissemination of occupational health data. This tool not only enables the timely identification of occupational risk patterns and diseases but also facilitates the development of timely interventions, promoting safe behaviors. In this military component, where daily work demands increase exposure to risks, its implementation strengthens the collective adoption of safe practices, transforming reactive management into a sustainable preventive model.

RECOMMENDATIONS

The implementation of an effective epidemiological surveillance system in the military workplace is recommended, using the following strategies:

- Conduct risk assessments in the workplace to identify potential sources of occupational diseases or accidents.
- Use specific indicators, such as occupational disease incidence rates, workplace accidents, and absenteeism due to health reasons.
- Conduct regular inspections to assess hygiene and safety conditions in the workplace.
- Implement periodic medical examinations to detect work-related diseases early in all military personnel.
- Train workers and employers on occupational risks and prevention measures.
- Establish a mandatory mechanism for reporting occupational diseases and accidents within the military component.
- Ensure access to occupational health services for all military personnel.

Review Venezuelan legislation on occupational health and safety in the workplace to consider incorporating the various military components and ensure they align with occupational health and safety standards.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR CONTRIBUTION

Conceptualization: Julisabel Pérez Clermont; Estela Hernández-Runque.
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Formal analysis: Julisabel Pérez Clermont; Estela Hernández-Runque.
Research: Julisabel Pérez Clermont; Estela Hernández-Runque.
Methodology: Julisabel Pérez Clermont; Estela Hernández-Runque.
Project management: Julisabel Pérez Clermont; Estela Hernández-Runque.
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Supervision: Julisabel Pérez Clermont; Estela Hernández-Runque.
Validation: Julisabel Pérez Clermont; Estela Hernández-Runque.
Visualization: Julisabel Pérez Clermont; Estela Hernández-Runque.