Dimensional assessment of biological risk in nursing staff in a hospital in Armenia – Colombia

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Abstract

Risk perception is a concept that must become increasingly important in the planning of interventions that a Health and Safety professional must carry out in the workplace. **Objective.** To evaluate the perception of biological risk in nursing staff working at a hospital in the city of Armenia-Colombia. **Methods.** The study applied the Dimensional Evaluation of Risk Perceived in Workplace (DERP-W) to evaluate risk attributes, with a descriptive, quantitative, cross-sectional approach on a sample of 116 nurses and nursing assistants working at a hospital in the city of Armenia, Quindío. **Results.** When performing a mean analysis of each of the attributes, it was found that the majority of the sample perceives a high (33.6%) and medium high (29.3%) degree of knowledge of biological risk, as well as very high degree of fear of it (50.9% of those evaluated), and a very high degree of perception (30.2) to high degree of perception (23.3%) of being able to avoid a negative situation when exposed to biological risk. **Conclusion**. The workers of the hospital perceive that they have a good knowledge, while providing a perception of control of the circumstances surrounding biological risk, which could become overconfidence because many of the activities carried out at an institutional level are very frequent and can predispose to the mechanization of tasks and familiarity with risk, which are indispensable elements in managing unsafe actions that normally result in unwanted work events, such as work accidents.

Key words

Nurses, nursing assistants, risk management, occupational risks, perception. (*Source: DeCS, BIREME*)

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Evaluación dimensional del riesgo biológico en el personal de enfermería de un hospital de Armenia, Colombia

Resumen

La percepción de riesgo es un concepto que debe cobrar cada vez más importancia en la planificación de las intervenciones que debe realizar un profesional de Seguridad y Salud en el lugar de trabajo. **Objetivo.** Evaluar la percepción sobre riesgo biológico en el personal de enfermería que labora en una clínica de la ciudad de Armenia-Colombia. **Métodos.** El estudio aplicó la Evaluación Dimensional del Riesgo Percibido en el Lugar de Trabajo (DERP-W) para evaluar los atributos de riesgo, con un abordaje descriptivo, cuantitativo y transversal sobre una muestra de 116 enfermeros y auxiliares de enfermería que laboran en una institución hospitalaria de la ciudad de Armenia Quindío. **Resultados.** Al realizar un análisis de medias para cada uno de los atributos, se encontró que la mayoría de la muestra percibe un grado alto (33,6%) y medio alto (29,3%) de conocimiento del riesgo biológico, así como un grado muy alto de miedo al mismo (50,9% de los evaluados), y muy alto grado de percepción (30,2) a alto grado (23,3%) de poder evitar una situación negativa ante la exposición al riesgo biológico. **Conclusión.** Los trabajadores de la institución hospitalaria perciben tener un buen conocimiento, a la vez que brindan una percepción de control de las circunstancias que rodean el riesgo biológico, lo que podría convertirse en exceso de confianza porque muchas de las actividades que se realizan a nivel institucional son muy frecuentes y pueden predisponer a la mecanización de tareas y familiaridad con el riesgo, que son elementos indispensables en la gestión de acciones inseguras que normalmente dejan como consecuencia eventos laborales no deseados, como los accidentes de trabajo.

Palabras clave

Riesgos Laborales, enfermeras, Asistentes de Enfermería, Percepción. (*Fuente: DeCS, BIREME*)

Avaliação dimensional do risco biológico em profissionais de enfermagem de um hospital na Armênia – Colômbia

Resumo

A percepção de risco é um conceito que deve se tornar cada vez mais importante no planejamento das intervenções que um profissional de Saúde e Segurança deve realizar no ambiente de trabalho. **Mirar.** Avaliar a percepção de risco biológico na equipe de enfermagem que trabalha em uma clínica na cidade de Armênia-Colômbia. **Métodos.** O estudo aplicou a Avaliação Dimensional de Risco Percebido no Trabalho (PRSP-W) para avaliação de atributos de risco, com abordagem descritiva, quantitativa e transversal, em uma amostra de 116 enfermeiros e auxiliares de enfermagem que atuam em uma instituição hospitalar. Cidade da Armênia Quindío. **Resultados.** Ao realizar uma análise das médias para cada um dos atributos, constatou-se que a maioria da amostra percebe um alto grau (33,6%) e um médio alto (29,3%) de conhecimento do risco biológico, bem como um altíssimo grau de medo (50,9% dos avaliados), e muito alto grau de percepção (30,2) em alto grau (23,3%) de poder evitar uma situação negativa diante da exposição ao risco biológico. **Conclusão.** Os trabalhadores da instituição hospitalar percebem que possuem um bom conhecimento, ao mesmo tempo que proporcionam uma percepção de controle das circunstâncias que envolvem o risco biológico, o que pode se transformar em excesso de confiança, pois muitas das atividades desenvolvidas no nível institucional são muito frequentes e podem predispor à mecanização das tarefas e à familiaridade com o risco, elementos essenciais na gestão de ações inseguras que normalmente resultam em eventos de trabalho indesejados, como os acidentes de trabalho.

Palavras chave

Riscos Ocupacionais, Enfermeiras, Assistentes de Enfermagem, Percepção. *(Fonte: DeCS, BIREME*)

Introduction

During the last decade, Colombia has issued a good amount of norms and reforms regarding Health and Safety at work, highlighting among them Legislation 1562 of 2012 (1), Decree 1072 of 2015 (2), and Resolution 0312 of 2019 (3) that establish the minimum standards that must be considered by companies to establish their occupational safety management and health system at work (OSHSW), which has the purpose of applying continuous improvement processes. Notwithstanding the above mentioned, national indicators related to work accidents show that the impact of strategies implemented through OSHSW should include new tools, processes or procedures that allow a greater impact on the health of workers, promoting their well-being and reducing accidents and diseases as a result of work.

The Colombian context lacks tools that allow individual risk assessment, under the assumption that entrepreneurial populations may have different perceptions of the same risk as a result of the socio-cultural diversity in the national territory. Economic activities, such as the provision of health services, must generate great interest among professionals responsible for managing risks within companies, especially, given events affecting the world population, as the COVID-19 pandemic, where personnel involved in the above mentioned economic activity may be directly affected by exposure to this pathology and, in general, to biological risk (BR).

Among health workers, the nursing staff are one of the most exposed to this type of risks, which, depending on the form of intervention, can lead to serious health problems for the workers, putting at risk not only their own health, but also the health of those around them. This is how nursing staff in any hospital, but specially in high level of care hospitals, can be exposed to Baseline Risk (BR) as a result of patients with infectious-contagious diseases who frequently visit these places and which leads to the need to raise collective awareness about adequate risk management, where the evaluation of workers perception can become a valuable tool to improve the chances of success in the interventions that should be proposed to improve the institutional welfare. In this context, the objective of this research is to evaluate the perception of biological risk in nursing staff working in a hospital in the city of Armenia-Colombia, to identify the main attributes and the main components of the risks in order to be able to propose more effective preventive or interventional procedures.

In the work carried out by Cruzet (4) and Ribeiro (5), it is possible to see the high frequency of exposure to Biological Risk presented by health workers, including nursing staff, who can suffer unwanted work events such as accidents due to cuts or punctures, or diseases that may occur in this work context. In his study, García (6) mentions that exposure to biological risk is the main factor that influences occupational accidents in health personnel, where a low perception or lack of awareness, experience and self-care during exposure to risk is evident. In other studies related to Biological Risk, Díaz (7), Tolentino *et al* (8) and Halatoko *et al* (9) mention that knowledge about risk plays an important role in the target population of their work, taking into account even more that said population had a significant level of education in health and yet, evidence was obtained of a significant conceptual lack of knowledge, and, perhaps, an attitudinal component, which may have influenced the occurrence of accidents or diseases. It is very clear that exposure to biological risk in different work contexts, but mainly in that of health workers, should be a focus of intervention so that the adoption of

new methods generates greater control during exposure, and greater effectiveness in the efforts made to reduce occupational accidents and diseases.

Therefore, the Dimensional Assessment of Perceived Risk at Work (DAPR-W) (10), could become a very useful tool, as well as flexible and low cost, which would provide a significant knowledge of the human factor risk that is one of the principal factors involved in the managing of unsafe actions and occurrence of accidents at work. As suggested by Morales *et al* (11) and Rodriguez *et al* (12), the application of this method could allow professionals involved with Occupational Safety and Health at work (OSH) to implement strategies with greater objectivity to intervene in the unwanted work events mentioned above to contribute fundamentally to the promotion of health and well-being of workers through prevention mechanisms.

This study provides an opportunity to apply the EDRP-T methodology to a nursing staff population, a group for which there is limited evidence of the positive impact of such approaches (R1, R2). In low and middle-income countries, where this population may face greater exposure, the study highlights the urgent need to adopt alternative interventions or methodologies. This methodology includes others, such as GTC45 (11), which facilitated the assessment of biological risk as one of the most significant in the hospital, justifying this assessment based on the unacceptable level of risk. This finding is consistent with other similar studies, such as the one conducted by Perez et al (13).

In line with the above, bellow is shown how the EDRP-T methodology is based on Principal Component Factor Analysis (PCFA). This approach allows the most relevant aspects to be extracted from all the attributes evaluated (A1 – G1) (7), which allows the identification of the most significant combinations to guide decision-making. This, in turn, gives the person responsible for implementing the methodology the opportunity to propose more effective interventions, thus optimizing the resources available for prevention of occupational risks.

Materials and Methods

Descriptive, cross-sectional study aimed at 116 workers who are part of the nursing staff at a third level hospital in the city of Armenia, department of Quindío, population composed of Nurses and nursing assistants from different areas of the hospital. The Technical Notes for Prevention (TNP) 578 (10) from the National Institute of Hygiene and Safety at work, attached to the Ministry of Labor and Social Affairs of Spain were used in this study. It consists of 10 questions and scores range from 0 to 7, with 0 being very low possibility and 7 being very high possibility. If the opinion is strongly or slightly reflected by what is expressed on the left side of the scale, it will be in 1, 2, or 3, as considered. If the opinion is slightly, very much, or totally reflected by what is expressed on the right side, it will be in 5, 6, or 7, as considered. If the opinion is in a middle term between two extremes of the scale, 4 for each source of risk, there will be a final more general question, which asks to assess the magnitude of the risk by using a scale from 0 to 100, with 0 being very low and null risk, and 100 being very high or extreme risk. This method is theoretically based on the Psychometric Paradigm (14), the Cultural theory of risk (15), and the Social theory of risk (16).

To carry out the study, it was initially necessary to resort to the methodology used by the institution to identify hazards and assess and

evaluate the previous and more dangerous risks for nursing staff. The most used methodology by the majority of companies in Colombia for this purpose is the Colombian Technical Guide (CTG) 45 (17) through which the identification of hazards, the evaluation and assessment of risks, and their management can be carried out. When verifying this matrix, it was established that one of the risks representing the greatest danger and most exposure for the nursing staff is the BR.

The TNP 578 intervenes the qualitative elements of risks, which are then quantified through scales that assign a value to the perception of the worker. The qualitative elements include the available scientific knowledge, the knowledge by the exposed subject, the novelty/familiarity, the delayed effect of the consequences, the volunteering of the exposure, the control/avoidance capacity, the lethality of the consequences, the fear it produces, the catastrophic potential, and the magnitude of the risk. The aforementioned elements take as a reference the risk of greater exposure of the population group focus of this study. The TNP 578 application will assign a code to the attributes, as shown in Table 1.

Table 1 Attribute Coding

Code	Attribute
A1	Perception of the level of knowledge about the risk by those exposed
A2	Perception of the level of knowledge of the risk presented by those responsible for prevention in the company
A3	Perception of risk fear
A4	Perception of the possibility of experiencing damage when exposed to risk
A5	Perception of the severity of the damage that the risk could cause
A6	Perception of evitability of an unwanted situation due to exposure to risk
A7	Perception of control over risk
A9	Perception of the time of development of consequences after exposure to risk
G1	Perception of the possibility of suffering an accident or serious disease due to exposure to risk

Source: own elaboration.

This methodology has a special characteristic since it is of easy access for all preventionists who wish to use it, and it is low cost and relatively easy to manage and interpret for health professionals with knowledge or who have ventured into the field of HSW.

Prior to the execution of the survey with the attributes of the PTN 578 and the variables of interest for the researchers, the focal population was informed of the objectives of the research and the risks involved in it, and then, they carried out the respective review and signed the informed consent that configured the acceptance of the worker to participate in the study. Subsequently, the study executed the method of information collection through a chronogram designed to establish intervention times in the different services (work areas) of the hospital, which guaranteed coverage and collection of information from the 116 workers, and gave way to the phase of information analysis.

Sociodemographic Characterization of the Population

When analyzing the distribution of the workers who participated in the research, it was found that the population sample carried out their usual work as follows: 23.3% in surgical hospitalization; 22.4%, in the Internal medicine area; 19.8% in the emergency service; 12.1% in the intensive care unit (ICU); 11.2% in the maternity area; 6%, in the administrative area; 2.6% in outpatient consultation; and 9% in the renal unit, physiotherapy, and surgery area respectively. The distribution of the individuals who participated in this research, according to their place of work, shows that there were 28 men and 88 women, corresponding to 24% and 76%, respectively, showing once again that the vast majority of workers in nursing continue to be female. Additionally, in the analysis of the age variable, a mean of 32.51 years was found, standard deviation

9.55, being the minimum age 19 years and the maximum age 57 years. Additionally, the age distribution of the sample by decennials, shows that the majority of individuals are between 21 and 30 years of age with 49.1% of the population, followed by the population between 31 and 40 years with 28.4% of the population, and workers between 41 and 50 years of age with 11.2% of the sample., The lower proportion was for the workers between 51 and 60 years of age and individuals with 20 or less years of age, with proportions of 6.9% and 4.3%, respectively.

When analyzing the average ages of the participating workers, according to their usual place of work, it was found that the service with the lowest age average is the emergency department with 29.69 years, and the service with the highest age average was the maternity department with 33.85 years. It was also found that the service that provided the largest number of participants in this research was the surgical hospitalization service with 23.3% of the population sample, and the services that provided the least number of individuals were surgery, physiotherapy and the renal unit, each with 0.9% of participants.

On the other hand, it was found that the majority of the participants in this research reported belonging to the mestizo ethnic group in 92.2% of the cases, followed by 6% of the individuals who reported being of white ethnicity, and one person who stated being of Afro-descendant ethnicity and another of indigenous Yanacona ethnicity (with 0.9%, respectively).

According to data obtained through the information collection tool of the workers participating in this research, the minimum time of work experience was close to 1 year, and the maximum time of work experience was 30 years, with an average of 8 years and standard deviation of 7.16.

The different means of each of the attributes evaluated in the population sample addressed by this work are analyzed below. Attribute A1 has a mean of 5.60, which means that the most exposed workers perceive that they have a high level of knowledge about the BR factor, with a variance of 1.33. Attribute A2 has a mean of 4.66, which means that the workers perceive that the person in charge of HSW at the institutional level has medium, close to medium high knowledge about BR, with a variance of 4.56, which shows a little more dispersion of the concept yielded by the sample. Attribute A3 indicates a mean of 6.13, suggesting that the individuals referenced in this study perceive a high degree of fear to BR, with a variance of 1.19. Attribute A4, with a mean of 5.28, means that workers perceive that when exposed to BR, they have a medium high possibility of experiencing harm as a consequence of said exposure, with a variance of 2.74. Attribute A5 has a mean of 5.96, which means that the nursing staff in this hospital perceives that, when exposed to BRs, the severity of the damage that can be produced is medium high, with 1.26 standard deviation. Attribute A6 shows a mean of 5.96, indicating that the nursing staff mentioned perceives that in a medium high to high degree, they can avoid BRs, with a mean of 2.38. Attribute A7 has a mean of 5.26, which means that the nursing staff perceives they have a medium-high control of the damage that can occur as a consequence of exposure to BRs. Attribute A8 shows a mean of 4.34, which means that the sample population perceives that BRs could cause immediate and group damage in a medium degree, with a variance of 4.03. Attribute A9 has a mean of 4.93, indicating that the nursing staff perceives that the consequences of exposure to BRs could occur

in the mid-term, with a mean of 2.31. Finally, attribute G1_rec presents a mean of 4.16, which means that the nursing staff perceives that, being exposed to BRs, puts them at high risk of suffering an accident or serious disease, with a variance of 1.008.

Factorial Analysis of Principal Components

According to the methodology proposed by the NTC 578, taken as a reference in this study, factorial analysis of principal components, which is a descriptive statistics technique that has as its main basis the attributes evaluated in the population sample under study and uses tools such as correlations to establish whether there is a strong relationship between any of the attributes, was carried out. The SPSS computational tool (18) was used to develop the correlation matrix and establish that there is not a sufficient relationship between the attributes evaluated in this study, since most of the correlations between different attributes are less than 0.5. Table 2 show de correlation matrix.

The Kaiser Meyer Olkin - KMO test yields, as a result, a value of 0.558, which suggests that the variables were well selected because the result mentioned is > 0.05. Likewise, the Bartlett's test has as reference a result < 0.05, indicating the possibility of working with the present design.

Table 2. Correlation matrix

		A1	A2	A3	A4	A5	A6	A7	A8	A9	G1
Correlation	**A1**	1.000	-0.035	0.199	-0.033	0.107	0.282	0.237	-0.103	0.202	0.330
	A2	-0.035	1.000	0.008	-0.273	-0.014	0.063	-0.014	-0.275	-0.265	-0.155
	A3	0.199	0.008	1.000	0.298	0.267	0.118	-0.039	-0.020	0.089	0.208
	A4	-0.033	-0.273	0.298	1.000	0.236	0.044	-0.167	0.069	0.077	0.344
	A5	0.107	-0.014	0.267	0.236	1.000	0.144	0.113	0.041	0.197	0.161
	A6	0.282	0.063	0.118	0.044	0.144	1.000	0.096	-0.116	0.121	0.259
	A7	0.237	-0.014	-0.039	-0.167	0.113	0.096	1.000	0.321	0.218	-0.004
	A8	-0.103	-0.275	-0.020	0.069	0.041	-0.116	0.321	1.000	0.087	0.134
	A9	0.202	-0.265	0.089	0.077	0.197	0.121	0.218	0.087	1.000	0.107
	G1	0.330	-0.155	0.208	0.344	0.161	0.259	-0.004	0.134	0.107	1.000
a. Determinant = 0.258											

Source: own elaboration.

Commonalities

From the statistical analysis of the common points (19), the attributes with the highest importance or close to 1 are reported as follows: A7 (Damage control) is found with 0.743, followed by A4 (Possibility of experiencing damage due to exposure to BR) with 0.708. Subsequently, there is A5 (Severity of damage) with 0.691, and A2 (Knowledge of those in charge of HSW on BR) with 0.684 and, finally, attribute A1 (Knowledge of the exposed worker about BR) with 0.659. From the above, it can be deduced that a significant number of the individuals who were approached in this study perceive that when faced with a situation of exposure to biological risk, they can intervene to avoid or reduce the damage that could occur.

Table 3 shows the total variance explained, in which the components that, can provide the greatest explanation for the variability of the data or for what is happening with the problem can be selected. Thus, it can be found that component 1 can provide a better explanation for the focal problem of this study with 21.934%.

Table 3. Total variance explained

Component	Initial eigenvalues			Sums of squared extraction loads			Sums of squared rotation loads		
	Total	% of variance	% accumulated	Total	% de variance	% accumulated	Total	% of variance	% accumulated
1	2.193	21.934	21.934	2.193	21.934	21.934	1.614	16.142	16.142
2	1.503	15.031	36.966	1.503	15.031	36.966	1.550	15.501	31.643
3	1.455	14.554	51.520	1.455	14.554	51.520	1.530	15.303	46.945
4	1.018	10.179	61.699	1.018	10.179	61.699	1.475	14.753	61.699
5	0.931	9.310	71.009						
6	0.785	7.847	78.856						
7	0.646	6.461	85.317						
8	0.567	5.669	90.986						
9	0.527	5.270	96.255						
10	0.374	3.745	100.000						

Extraction method: principal components analysis.

Source: own elaboration.

Table 3 shows that the first four components are the most important because they are > 1 and, in addition, they largely explain the total variability of the data and can be taken into account to solve the problem. These components can also be obtained and validated using a sedimentation chart.

Component Matrix

Table 4 shows the component matrix, which includes the four components obtained that can be considered if their value exceeds 0.5.

Table 4. Component matrix

	Component			
	1	2	3	4
G1	0.664	0.129	-0.121	-0.377
A1	0.530	0.200	0.510	-0.281
A3	0.515	0.345	-0.187	0.373
A9	0.493	-0.312	0.200	0.026
A6	0.433	0.365	0.381	-0.219
A8	0.212	-0.743	-0.093	0.107
A2	-0.360	0.532	0.370	0.367
A4	0.516	0.086	-0.659	0.010
A7	0.249	-0.493	0.616	0.241
A5	0.523	0.104	-0.033	0.636
Extraction method: principal components analysis.				
a. Four components extracted.				

Source: own elaboration.

By obtaining the rotated component matrix, using the Kaiser Varimax (20) normalization rotation method, the component conformation can be carried out as follows:

- Attributes A1, A6, and G1 belong to component 1.
- Attribute A4 belongs to component 2.
- Attributes A7, A8, and A9l belong to component 3.
- Attributes A2, A5, and A3 belong to component 4.

Discussion

From the results obtained by applying the method presented, interesting results are obtained for professionals and people interested in the application of strategies related to Occupational Health and Safety. It is worth highlighting in this study that the knowledge of workers about the risks to which they are exposed is an attribute of high importance when assessing risk perception. This can be evidenced in the research presented by Soler *et al.* (21), where the need to estimate the understanding (knowledge) of the risks to properly address a training system is presented, understanding it as one of the most important attributes in this type of work.

It should be noted that the population targeted by this research has a level of education that allows it to have a basic knowledge of the risks evaluated, as it is the case of biological risk. However, the application of the perception evaluation method suggests focusing attention precisely on the attribute that includes knowledge about the risk evaluated, as a part of the main components. From the above, the question about the results that can be obtained in populations with low

or no levels of education remains. Thus, the educational activities promoted by the companies for the intervention of risks and dangers, and the ways in which they are developed, are important in the process of strengthening the knowledge of workers.

On the other hand, attribute A6, which refers to the perception of the evitability of an unwanted situation, can be considered as one of the attributes that influences the appearance of human errors during the development of the work activity, possibly making part of the group of characteristics that configure overconfidence. This behavior commonly results in accidents at work, or other unwanted situations in the work context. This is evidenced in the study presented by Soria, *et al.* (22).

The results show that the workers in this study perceive that exposure to this type of risk can result in serious diseases or accidents, which indicates that they recognize this type of phenomenon and the dangers it may involve.

Conclusions

From the results found when evaluating the perception on biological risk (BR) in the nursing staff working in a hospital in the city of Armenia, the following assessments can be made: *i)* There is no significant relationship between the sociodemographic variables and the different attributes evaluated through the DERP-W tool. *ii)* A close relationship is established between the perception of fear and the magnitude of the risk, which is also evidenced in the studies presented by González (23), Fajardo *et. al* (24) and Alrawad, Lutfi *et. al* (25). *iii)* Knowledge and fear of biological risk are essential attributes in the application of BR assessment methodologies. These attributes favor the appearance of accidents resulting from unsafe acts, such as overconfidence derived from work routine, knowledge about the risk obtained through institutional training and acquired work experience. *iv)* The application of this type of methodology in the evaluation of BR, can be considered as a valuable input, within the strategies for the adequate communication of the important risks in the processes that have the intention of intervening effectively to the risks present within the work context. The above confirms what was presented by Velázquez and Medellin (26), Rivera (27) and Armas and Avram (28). *v)* However, the analysis carried out in this work, which obtains results that suggest educational and training processes that the institution regularly carries out aimed at a population of relatively young nursing workers, must be also carried out in work areas and individuals with inappropriate perceptions on BR, intervening directly the attributes most compromised in the assessment process of perceived risk. *vi)* The DERP-W method, once again, proves to be a flexible tool of easy application and use in a multidisciplinary setting which aims to identify biased perceptions by workers in the provision of health services, although it is necessary to continue with applications in other health professions different from nursing, searching for significant differences in the way of perceiving risks and as a fundamental and indispensable tool for their effective intervention, based on the understanding of the differences present in the workplace.

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Conflicts of interest

None declared.

References

1. Congreso de la República de Colombia. Ley 1562 del 11 de julio de 2012.pdf [Internet]. [cited 2022 Oct 5]. Available from: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/Ley-1562-de-2012.pdf
2. República de Colombia. Ministerio de Trabajo. Decreto 1072 de 2015 [Internet]. [cited 2022 Oct 5]. Available from: https://www.mintrabajo.gov.co/documents/20147/0/DUR+1072+Sector+Trabajo+Actualizado+a+Diciembre+20+de+2021.pdf/f1f86400-2b37-0582-5557-87a5d3ea8227?t=1640204850717
3. República de Colombia. Resolucion 0312 de 2019.pdf [Internet]. [cited 2022 Oct 5]. Available from: https://www.mintrabajo.gov.co/documents/20147/59995826/Resolucion+0312-2019-+Estandares+minimos+del+Sistema+de+la+Seguridad+y+Salud.pdf
4. Cruzet Fernández F. Las consecuencias derivadas de los accidentes biológicos y su prevención. Experiencia práctica del Hospital Clínico San Carlos de Madrid. Revista de Administración Sanitaria Siglo XXI [Internet]. 2004;2(4):633–52. Available from: https://www.elsevier.es/es-revista-revista-administracion-sanitaria-siglo-xxi-261-articulo-las-consecuencias-derivadas-accidentes-biologicos-13070129
5. Ribeiro WA, Souza CEA de L, Conceição VLD da, Evangelista D da S. Enfermeiro do trabalho na prevenção de riscos biológicos ocupacionais: uma revisão de literatura no âmbito hospitalar. RSD [Internet]. 2020 May 3 [cited 2024 Aug 21];9(7):e174973873–e174973873. Available from: https://rsdjournal.org/index.php/rsd/article/view/3873
6. Garcia LM. Riesgos Biologicos en los Trabajadores de la Salud, Una revision documental [Internet] [Monografía]. [Medellín, Colombia]: Universidad CES; 2020 [cited 2022 Jul 24]. Available from: https://repository.ces.edu.co/handle/10946/4908?show=full
7. Diaz T. AM. Conocimiento en riesgo biológico y prácticas de bioseguridad en el personal docente de la facultad de salud de una institución de educación superior de la ciudad de Cali [Internet] [Tesis de Maestría]. [Santiago de Cali, Colombia]: Universidad del Valle; 2013 [cited 2022 Jul 25]. Available from: https://bibliotecadigital.univalle.edu.co/bitstream/handle/10893/8406/CB-0494546.pdf;jsessionid=493FEEB7AF7553A2754ED0930B071E55?sequence=1
8. Tolentino AJ, Austria RD, Atienza KZ, Magdaraog MA, Jocom RT, Hapan MF. Knowledge, Attitudes, and Practices on Biosafety among Filipino Registered Medical Technologists: A Comparative Study. IJPRSE [Internet]. 2021 Aug 20 [cited 2024 Aug 21];2(8):300–9. Available from: https://journal.ijprse.com/index.php/ijprse/article/view/383
9. Halatoko WA, Sondou E, Sopoh GE, Kassegne A, Katawa G, Salou M, et al. Knowledge, attitudes and practices in biosafety and biosecurity in medical biology laboratories in Togo, 2021. Front Environ Health [Internet]. 2024 Apr 16 [cited 2024 Aug 21];3:1387476. Available from: https://www.frontiersin.org/journals/environmental-health/articles/10.3389/fenvh.2024.1387476/full
10. Ministerio de trabajo y Asuntos sociales, Instituto Nacional de Seguridad e Higiene en el trabajo. NTP 578: Evaluación Dimensional del Riesgo Percibido en el Trabajo (EDRP-T). [Internet]. 2001 [cited 2022 Sep 13]. Available from: https://www.insst.es/documents/94886/327064/ntp_578.pdf/545878eb-7e16-43fa-a4b6-b3dc18be7a14
11. Morales FJ, Sánchez-Tovar L, Hernandez-Runque E. La percepción del riesgo para la salud en trabajadores de una empresa agroquímica venezolana. Revista Cubana de Salud y Trabajo [Internet]. 2023 May 23 [cited 2024 Aug 21];24(2). Available from: https://revsaludtrabajo.sld.cu/index.php/revsyt/article/view/389
12. Rodriguez Sandoval ER, Perea Garcia PC. Eficacia de la programación neurolingüística para la mejora de la percepción del riesgo de los trabajadores de TRANSGRUPVILL S.R.L. Moquegua 2023. Repositorio Institucional - UTP [Internet]. 2024 [cited 2024 Aug 21]; Available from: http://repositorio.utp.edu.pe/handle/20.500.12867/8951
13. Pérez Penagos JJ, Regalado IA, Alvarado JMR. Percepción del riesgo biológico y condiciones de seguridad en auxiliares de enfermería de la Asociación de Comunidades Indígenas del Norte del Cauca (ACIN) 2015. Revista Colombiana de Salud Ocupacional [Internet]. 2016 [cited 2024 Aug 21];6(3):72–6. Available from: https://dialnet.unirioja.es/servlet/articulo?codigo=7890188
14. Slovic P. Perceptions of Risk: Reflections on the Psychometric Paradigm. 1990.

15. Robbins T, Douglas M, Wildavsky A. Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers. Journal for the Scientific Study of Religion. 1983;
16. Beck Ulrich. La Sociedad del Riesgo. Vasa. 1998.
17. Icontect, CCS. GTC-45: Guidance For Hazard Identification And Occupational Health And Safety Risk Assessment. Bogotá; 2020 Jun p. 40.
18. IBM SPSS Statistics GradPack and Faculty Packs - SPSS Statistics GradPack y Faculty Packs [Internet]. 2021 [cited 2022 Oct 5]. Available from: https://www.ibm.com/co-es/products/spss-statistics-gradpack
19. Nimon KF, Oswald FL. Understanding the Results of Multiple Linear Regression. Organizational Research Methods [Internet]. 2013 Jul 25 [cited 2022 Oct 5]; Available from: https://journals.sagepub.com/doi/10.1177/1094428113493929
20. Weide AC, Beauducel A. Varimax Rotation Based on Gradient Projection Is a Feasible Alternative to SPSS. Front Psychol [Internet]. 2019 [cited 2022 Oct 5];0. Available from: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00645/full
21. Soler K, Torres A. Evaluación de percepción de riesgo aplicada a trabajadores de radioterapia. In Buenos Aires, Argentina: Sociedad Argentina de Radioprotección; 2015. p. 1–10. Available from: http://www.irpabuenosaires2015.org/Archivos/tr-completos/irpa/fullpapertemplate_IRPA20153209451.pdf
22. Soria MS, Martínez IMM, Prieto LL. La relación entre el exceso de confianza y los accidentes laborales en trabajadores de la construcción: un estudio cualitativo. Gestión práctica de riesgos laborales: Integración y desarrollo de la gestión de la prevención [Internet]. 2011 [cited 2022 Oct 25];(86):8–13. Available from: https://dialnet.unirioja.es/servlet/articulo?codigo=3750415
23. González YL. Evaluación de la percepción del riesgo ocupacional en trabajadores de una empresa del sector de la construcción en Bogotá D.C. nova [Internet]. 2015 Jun 15 [cited 2022 Oct 13];13(23):93. Available from: http://hemeroteca.unad.edu.co/index.php/nova/article/view/1709
24. Fajardo Zapata Á, Hernández Niño JF, González Valencia YL, Hernández HA, Torres Pérez ML. Percepción del riesgo mediante sus atributos psicosociales en trabajadores de la industria metalmecánica en la ciudad de Bogotá, D.C (Colombia). Nova. 2019;
25. Alrawad M, Lufi A, Alyatama E, Elshaer I, Amin Almaiah M. Percepción de Riesgos y Peligros Ocupacionales y Ambientales entre los Trabajadores Mineros: Un Enfoque de Paradigma Psicométrico. International Journal of Environmental Research and Public Health. 2022;1–12.
26. Velázquez Narváez Y, Medellín Medellín Moreno J. La percepcion de riesgos como factor causal de accidentes laborales. Gestión práctica de riesgos laborales: Integración y desarrollo de la gestión de la prevención. 2012;
27. Rivera JG. Comunicación del Riesgo: Hacia un modelo efectivo y situacional. Instituto Tecnológico Metropolitano; 2013. 651 p.
28. Armas I, Avram E. Patrones y tendencias en la percepción del riesgo sísmico. Estudio de caso: Municipio de Bucarest/Rumania. Peligros Naturales. 2008;147–61.