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PERCEPTION OF RISK IN WORK AT HEIGHTS IN TELECOMMUNICATIONS COMPANIES IN ECUADOR AND COLOMBIA (AUGUST-DECEMBER 2018)

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Abstract. The article is aimed at presenting in a scientific manner the existing correlation between the magnitude of the risk in relation to the sociodemographic variables, the prevention actions carried out by the contractor, the behavior of the personnel and the perception of risk when executing work at heights in operations and maintenance of telecommunications towers in Ecuador and Colombia. This issue is of vital importance because it is a high-risk activity, which must be executed quickly and accurately due to the constant need for the world to be communicated through technology. To obtain the results of this research a measurement instrument was used consisting of 4 blocks of questions, with a total of 35 questions. It was applied to a sample that was established statistically in 251 workers of companies providing service operations and maintenance that perform work at heights in telecommunications towers in Ecuador and Colombia. The SPSS version 25 program was used for statistical analysis. The responses collected were the analysis of Kruskall Wallis resulting in four variables influencing the perception of the magnitude of the risk: the severity of the consequences, the catastrophic potential, personal vulnerability and verification of the status of protective equipment that each collaborator must carry.

Keywords: Danger, Perception of risk, Telecommunications, Works in heights

PERCEPCIÓN DEL RIESGO EN TRABAJOS EN ALTURAS EN EMPRESAS DE TELECOMUNICACIONES DE ECUADOR Y COLOMBIA (AGOSTO-DICIEMBRE 2018)

Resumen. El artículo está encaminado a presentar de manera científica la correlación existente entre la magnitud del riesgo con relación: a las variables sociodemográficas, a las acciones de prevención que realiza la empresa contratista, al comportamiento del personal y a la percepción del riesgo al ejecutar trabajos en alturas en actividades de operación y mantenimiento de torres de telecomunicaciones. El

estudio fue realizado en Ecuador y Colombia. Este tema es de vital importancia por ser una actividad de alto riesgo que debe ser ejecutada con rapidez y precisión debido a la necesidad constante de que el mundo se encuentre comunicado a través de la tecnología. Para obtener los resultados de esta investigación se utilizó un instrumento de medición que consta de 4 bloques de preguntas, con un total de 35 preguntas. El mismo fue aplicado a una muestra que se estableció estadísticamente en 251 trabajadores de empresas proveedoras de servicios de operación y mantenimiento que realizan trabajos en alturas en torres de telecomunicaciones en Ecuador y Colombia. Para el análisis estadístico se utilizó el programa SPSS versión 25. A las respuestas recopiladas se les aplicó el análisis de Kruskall Wallis obteniendo como resultado que cuatro variables influyen en la percepción de la magnitud del riesgo: la gravedad de las consecuencias, el potencial catastrófico, la vulnerabilidad personal y la verificación del estado de los equipos de protección que cada colaborador debe llevar.

Palabras clave: Peligro, Percepción del riesgo, Telecomunicaciones, Trabajos en alturas

Introduction

The telecommunications industry has developed exponentially in recent years. That is why, nowadays, it is essential to be constantly connected through technology. Due to the speed with which it is necessary to act when a problem arises, it is necessary for the service to be restored in an agile and timely manner. Thus, workers who perform operation and maintenance tasks on telecommunication towers must be willing and able to perform these tasks because working in heights involves inherent risks.

The term “risk” is used on a daily basis by humans who make a preventive effort so that no situation involving material or human losses occurs. Risk can be assessed by an induced stimulus that is caused by the number of times it can lead to human or material losses, in this case we are talking about an objective risk; on the other hand, there is also the subjective risk, which from the psychosocial point of view has a special interest since this type of "intuitive assessment takes into account both the level of knowledge or ignorance of the danger and the degree of control that the individual exercises over it" (Bayés, Portell and Riba 1997, quoted by Martínez, Morillejo, Pozo, 2002).

In this context we can say that in order to consider certain activity as risky, people must be analyzed as cognitive beings seeking logical information. In this field, psychology investigates the motivation of human beings to carry out dangerous actions, either because they feel an uncontrollable attraction or an exaggerated optimism towards it.

This is why it is important to study the perception of risk that people who work in heights in operation and maintenance tasks in telecommunication towers have, since it will lead to an understanding, on the one hand, of the causes of their behavior and, on the other, to the establishment of preventive measures against work accidents and occupational diseases.

Theoretical Framework

In the literature review that follows, five specific topics are addressed, such as work in heights, behavior, attitudes, danger, and perception of risk.

Work in heights

Working in heights can be one of the most dangerous jobs out there, because it is easy to fall. In Latin the concept of "fall" is known as "casus", which is the participle of the verb "cadere" (Salvador, 2015).

This in turn is related to the Indo-European root Kad (to fall), which represents the movement of an object from a higher to a lower level caused by the action of its own weight and by the attraction that the earth exerts on it.

"The free fall movement of a body is a uniformly accelerated rectilinear movement. 'Fall' can be defined, then, as an act of falling or collapsing" (Salvador, 2015, p.1).

In order to determine the injuries that a fall can produce, it is important to analyze the general factors such as the height of the fall, the impact surface, the position of the body in the fall and other individual factors such as age, body weight, pre-existing diseases and, above all, the force of gravity whose impulses increase the complexity of the injuries (Salvador, 2015).

Behavior

Behavior is a physical process, "which can be registered and verified, and which consists in being the activity by which a living being develops his life in relation to his environment, responding to it and modifying it" (Galarsi, Medina, Ledezma and Zanin, 2011, p.99). (Galarsi, Medina, Ledezma and Zanin, 2011, p.99).

Behavior also includes "comprehensibility of the action and legality of the psycho-organic processes by which it is performed" (Chauchard, 1961, quoted by Galarsi et al., 2011).

The human being, through the prefrontal cortex, plans a cognitively complex behavior, makes decisions and adapts his social behavior in all situations, however, the most important thing he does is the connection between his thoughts and his actions, being able to prevent instinctive behaviors (Galarsi et al., 2011).

Human behavior is under the individual's control and is born from a processing of available information that allows making behavioral decisions. However, behavior is not always the result of a rational thought or a decision-making process, since, in a risk situation, behavior can be a reflection of an instinctive or impulsive action (Puyal, n.d.).

On the other hand, behavioral psychology is heading toward a neutral position in the traditional conflict of personalism versus situationism. "The most recent perspective of behavioral psychology clearly distinguishes the historical analysis of the individual, the evolutionary process and the synthesis of the different experiences of the current determinants of human behavior" (Adarraga, Hernández, Márquez and Santacreu, 2002, p. 181).

Attitudes

"They are schemas or mental models from which people perceive the surrounding world. These models are shaped by cognitive (knowledge) and affective (feelings) elements that the individual incorporates throughout his or her life" (Espulga, 1196, cited by Armengou and López, 2006).

A study by Chisvert, Melià and Pardo (2001) analyzes the causal factors of occupational accidents through explanations of why they occur and how accident attributions influence workers' safety attitudes and behaviors.

There is a complex relationship between behavior and attitude. The immediate determinant of the behavior is intention. This behavioral intention is fixed by the attitude towards the behavior "(positive or negative evaluation of the person to execute this behavior) and by the subjective norm (the individual's perception that others close to him, such as friends, colleagues, etc., think that he/she should or not perform a certain behavior)" (Chisvert, Meliá and Pardo, 2001, p.6).

Risk

The term risk is used on a daily basis by the human being who makes a preventive effort so that no situation that leads to material or human losses occurs. Risk can be assessed by an induced stimulus that is caused by the number of times it can lead to human or material losses, in this case we are talking about an objective risk; on the other hand, there is also the subjective risk, which from the psychosocial point of view has a special interest since this type of "intuitive assessment takes into account both the level of knowledge or ignorance of the danger and the degree of control that the individual exercises over it" (Bayés, Portell and Riba 1997, quoted by Martínez, Morillejo, Pozo, 2002).

But this it is only an ideological division between those for whom “risk is a quantifiable attribute of technologies and hazards of natural origin”, and those for whom “risk is a subjective experience which can be thought, felt and judged” (Puy, 1994, p.35).

There are different types of risks that can affect workers, Díaz (2015) mentions the following:

- Those caused by workplace conditions, that is, they depend on how safe and equipped the facilities are,
- Those coming from physical agents, classified in: mechanical risks (noise, vibration), risks related to lighting, temperature, and energy type risks (radiations, ultra-high frequencies),
- Those caused by chemical agents, which can be exposure to toxic, noxious or corrosive substances,
- Those originated by biological agents, including viruses, bacteria, parasites, among others,
- Risks of adaptation to the workplace, which are given by the organization itself, for example, machinery used, display screen, chair, poor distribution of work shifts, among others,
- Those of psychological type refer to the influence that work has on the individual and depend heavily on his or her personal characteristics. Work overload can cause stress and psychological problems.
- The risks derived from the human factor, related to the worker's attitude, unsafe practices or inappropriate behavior at work.

Perception of Risk

The first studies on perception of risk appeared in the 1960s in the discussion about the uses and consequences of atomic energy.

Subsequently, several researches have been carried out that play an important role in decision making in fields such as political science, industrial security, personal security, business, and social development, among others (Macía, Varela, Vera, 2010).

The first steps in the conceptualization of risk were mainly of a technical nature and were related to statistics with a strictly predictive approach (Fischhoff et al., 1978).

Nowadays, with the progress made in philosophy, technology and globalization, there is an evolution in the way of living and deciphering everything that happens to us, for example the notion of risk.

It is claimed that there are tangible risks and social and cultural constructed risks, and that no risk is a risk in itself, so that any situation, condition or circumstance could become a risk for individuals or for society in general (Macía et al., 2010).

In this context we can say that in order to consider a certain activity as risky, people must be analyzed as cognitive beings seeking rational information. In this field, psychology investigates the motivation of human beings to carry out dangerous actions, either because they feel an uncontrollable attraction or an exaggerated optimism towards it.

"This obstinate over optimism in relation to negative events is called the illusion of invulnerability, and the positive perception bias that the individual makes towards himself and his social environment is called illusory optimism" (Blanco, Paez, Rubio, Sanchez, 1998, cited by Martínez et al., 2002).

The fact that psychosocial and cognitive variables are involved indicates that perception of risk is under the influence of cultural patterns, previous knowledge and factors of the environment in which people live (González, 2015).

There are two cognitive-based models that are worth pointing out as they can be extrapolated to the prevention of occupational accidents, the "Health Belief Model (HBM) by Maiman and Becker (1974) and the Theory of Reasoned Action (TRA) by Fishbein and Azjen (1975)" (Martínez et al., 2002, p. 19).

The HBM explains preventive behavior based on a perceived threat and perceived severity, which can come from internal and external sources, such as prior information, colleague accidents, among others. But what stands out about this model is that "demographic, personality, structural and social factors influence the probability of executing healthy action through people's subjective beliefs and perceptions" (Martínez et al., 2002, p. 19).

On the other hand, the TRA model considers people as rational beings and whose preventive behavior is based on the intention determined by social pressures or beliefs of what other people may think about preventive behavior; this model does not consider demographic factors or personality traits (Martínez et al., 2012).

Both are cognitive theories, and it is essential to include social, cultural and sociological factors such as the role that a person plays, since in order to understand or act before a risk, it can vary, for example, if he is an entrepreneur or worker.

In this context, it is suggested to consider a psychosocial model of risk behavior that eliminates the deficiencies of strictly cognitive models, and which includes individual psychology variables, as well as micro and macrosocial factors (Martínez et al., 2002, p. 20).

Puy (1994) highlights four approaches related to the study of perception of risk; the psychological approach, the psychosocial approach, the cultural approach and the psychometric paradigm.

The psychological approach has a reductionist nature, since it is based on focusing the problem within a psychological, individual and cognitive scope, that is to say, when making decisions under uncertainty conditions, people's perceptions are considered as cognitive errors or biases.

This perspective is valid, however, it is questionable "the pretension to use this type of theories to blame people for the irrationality or bias of their responses to certain risks, ignoring other factors of a more psychosocial, sociological and cultural nature" (Puy, 1994, p.81).

The psychosocial approach is based on the perception of risk as an attitude of the person and their responses are related to beliefs, values and socio-demographic variables.

The sociological and cultural approach seeks more humane responses to risk, which are directly influenced by the beliefs, attitudes and values of a group of people who seek to avoid aspects that could endanger their relationship with society (Puy, 1994).

The psychometric approach refers to how people perceive risks from different sources by considering qualitative attributes "that affect the perceived risk rather than the mere unbiased probability of causing harm or death" (Puy, 1994, p.91).

In summary, perception of risk is a factor that determines behavior "in potentially dangerous situations in the multiple contexts that the individual faces, especially with regard to the work environment" (Martínez et al., 2002, p. 18).

Concerning specific studies, in 2002, an article entitled "Perception of risk: A psychosocial approach to the work environment", in which it is stated that in addition to the perception of risk that each individual has, it is necessary to consider psychosocial factors, attitudes of the individual, norms to follow, peer pressure, among others, that can modify perceptions about risk (Martínez et al., 2002).

Likewise, in 2010 a research was carried out on perception of risk and occupational health focused on risk paradigms (Macía et al., 2010).

In 2012, the article called "Occupational hazard determination workforce with work at height by measuring serum markers" is published, determining with a medical approach the risks involved in working in heights according to the worker's state of health (Lozano and Mazenett, 2012).

On the other hand, in 2015, a study was carried out on occupational accidents at heights in the agricultural sector, which made it possible to understand their consequences, analyze injuries and highlight the dangers that exist in this sector [15]. In the same year, a summary of the paper entitled "Risk assessment of work accidents during the installation and maintenance of telecommunication networks" was published although it was not possible to obtain detailed information (Dragoi, Pavalouis, Rosu, 2015).

Most recently, in 2017 a research was carried out on the bus drivers of a public transport company in Colombia, where it was possible to relate the traffic accidents that occurred in the company with the unsafe behavior of the workers determined in the study (Torres, 2017).

Thanks to the state-of-the-art, it has been found evidence of studies carried out on the behavior of workers analyzing their perception of risk, and in the same way there are also studies related to work in heights that have been carried out in various industries.

Method

The study is part of a transverse or transectional non-experimental research and its approach can be exploratory, descriptive, correlational or causal (Hernández et al., 2014).

The study was initiated applying the exploratory concept, which allowed to know the current situation of the companies that provide operation and maintenance services for telecommunications companies in Ecuador and Colombia, in relation to the monitoring and follow-up of work procedures.

Subsequently, a descriptive approach was used to identify the workers' behavior and their perception relative to the risk of work in heights in telecommunications towers, applying a survey type research instrument that was previously validated by experts and that uses the Likert scale from one to five, with the exception of the last question that uses a scale from zero to 100 in intervals of five.

The questionnaire consisted of four parts, the first corresponding to sociodemographic variants, described in table 1.

Table 1
Socio-demographic variables

Variables	Description
S1	Age
S2	Country
S3	Position
S4	Gender
S5	Marital status
S6	Number of children

Note: Source: Author's own creation, 2019

The second part corresponds to variants related to the prevention activities carried out by the company in which the employee works, and they are represented in table 2.

Table 2
Variables associated with prevention activities of the supplier company

Variables	Description
A1	Does the company you work for provide you all the protective equipment you need to work at heights?
A2	Do you receive training on job at heights?
A3	Does the company verify the condition of the personal protective equipment assigned to you?
A4	Before working at heights, do you go through a prior check of drug or alcohol use by your employer?
A5	Do you receive a permit for work at heights form your company prior to performing the task?

Note: Source: Author's own creation, 2019, based on Rodriguez et al (2013).

The third block represented in table 3 corresponds to personal behavior variables, i.e. actions performed by workers before and during work at heights.

Table 3

Variables associated with personal behavior

Variables	Description
B1	Are you familiar with the procedures you must follow to perform work at heights?
B2	Do you go up to work at heights carrying your cell phone or tablet with you?
B3	Do you review the equipment that you need to carry when working at heights?
B4	Do you check that personal protective equipment is in good condition before working at heights?
B5	Do you think that in order for an accident to occur, the health state of the person influences it?
B6	Do you consider it fun to smoke or eat when you work at heights?

Note: Source: Author's own creation, 2019, based on Rodriguez et al (2013).

The fourth block represented in table 4 corresponds to perceived risk variables, as well as the risk factor explored for each of them.

Table 4

Variables associated with perceived risk

Variables	Description	Explored Factor
C1	Do you understand the risk associated with working at heights?	Knowledge of the worker him/herself
C2	Do you think that those responsible for prevention in your company are aware of the risk associated with working at heights?	Knowledge of the person in charge of Health and Safety
C3	How much do you fear the damage that may occur while working at heights?	Fear
C4	What chance do you have of experiencing harm as a result of doing your job?	Personal vulnerability
C5	What are your chances of preventing this activity from triggering a risky situation?	Preventive action (fatality control)
C6	In a risky situation that may occur when working at heights, what possibility do you	Protective action (damage control)

	have to intervene to control it?	
C7	Is it possible that risk situations may arise in which more than one person is affected when working at heights?	Catastrophic potential
C8	In the event of a risky situation when working at heights, how serious is the damage it can be caused?	Severity of the consequences
C9	When do you think work-related health problems may appear at high altitudes?	Delaying the consequences

Note: Source: Author's own creation, 2019, based on Rodriguez et al (2013), Fischhoff et al. (1978).

Using the variables in tables 1, 2, 3 and 4, a correlative statistical analysis was performed in the SPSS 25 program with the variable (D1) "magnitude of risk" obtained in the last question of the survey.

The population considered for this study was 216 workers in Ecuador and 500 workers in Colombia, i.e. the total population was 716 workers.

Simple random sampling was used to establish the sample size, determining that for a population of 716 workers, it is required to apply the research to 251. However, it was applied to 273 workers to prevent lost data. This survey was conducted between August and December 2018. In the case of Ecuador, 62 workers answered the survey physically and in Colombia, 211 workers did it digitally.

Results

For this study, the answers obtained show that 88% of those surveyed have more than three years working at heights; 88% of those surveyed receive four or more job training at heights per year and 69% have finished third level studies, so the sample reflects that the workers are staff with extensive experience, training and preparation to perform work at operating heights and maintenance in telecommunication towers.

In order to demonstrate whether there is any type of correlation between the socio-demographic variables in table 1 and the variable D1 "magnitude of risk", this variable (D1) was subjected to a normality test by Anderson Darling and Kolmogorov-Smirnov, in which it was verified that the variable does not have a normal distribution, therefore, to make the correlations the statistical analysis called Kruskall Wallis was used for non-normal data, the same that represents the non-parametric alternative to the ANOVA test and that is reflected in table 5.

Table 5

Comparison between magnitude of risk and socio-demographic variants

Varaibles	**P**
S1	.867
S2	.070
S3	.713
S4	.115

S5	.709
S6	.129

Note: Pvalue < .05, the difference between the medians is not statistically significant.
Source: Author's own creation, 2019

Table 5 shows that variable S4 has a value of P Value less than .05, therefore its median is statistically significant in relation to variable D1 "magnitude of risk". For all other variables there is no significance.

Table 6 shows the results of the central tendency measure called arithmetic mean, the dispersion measures: variance and standard deviation and finally the correlation between variable D1 "magnitude of risk" and the variables associated with the prevention activities carried out by the company in which the collaborator works, which were indicated in table 2.

Table 6

Comparison between the risk magnitude and the prevention actions carried out by the supplier company

Variables	P	Mean	σ^2	σ
A1	.509	4.392	.775	.979
A2	.19	3.839	1.517	1.226
A3	.18	2.586	2.732	1.600
A4	.821	4.143	1.231	1.259
A5	.297	4.505	.345	.928

Reference value Pvalue < .05, the difference between the medians is not statistically significant. σ^2= Variance
σ= Standard deviation
Source: Author's own creation, 2019

The P value obtained in table 6 shows that the median of the variables of actions that the company carries out to prevent risks in the execution of work at heights of table 2, are not significant in relation to variable D1 "magnitude of risk".

The arithmetic mean analysis shows that only A3 variable, which refers to whether the company carries out the verification of personal protective equipment, is below three, indicating that workers perceive that the person in charge of the company does not always carry out this action. Similarly, the variance in presenting a high value for variable A3 shows a high dispersion of the values obtained.

Continuing with the results, table 7 presents the comparison between the perception of risk and the personal behavior variables indicated in table 3, which refer to the actions carried out by the employee prior to his/her work at heights in telecommunications towers.

Table 7

Comparison between magnitude of risk and personal behavior

Variables	P	Mean	σ^2	σ
B1	.868	4.784	.236	.486
B2	.178	4.341	1.107	1,053
B3	.129	4.780	.326	.571
B4	.013	4.813	.270	.519
B5	.818	4.527	.706	.840
B6	.131	1.300	.659	.812

Reference value Pvalue < .05, the difference between the medians is not statistically significant. σ^2= Variance; σ= Standard deviation

Source: Author's own creation, 2019

The result of table 7 shows that the median of variable (B4) "Do you check that personal protective equipment is in good conditions before working at heights?" is significant in relation to variable D1 "magnitude of risk". In other words, workers consider it important to verify the status of EPPS before performing work at heights on telecommunication towers.

For its part, the analysis of the arithmetic mean shows that B6 variable, which refers to whether it is fun to smoke or eat when working at heights, is at value below two, indicating that workers do not find it fun to do so. The results of the variance show a slight dispersion in the data obtained in variable B2, which refers to whether the worker goes up to carry out work at heights with his cell phone or tablet.

The analysis carried out in table 8 indicates the comparison between variable D1 "magnitude of risk" with the variables associated with perceived risk, indicated in table 4.

Table 8

Comparison between the magnitude of risk and the perceived risk

Variables	P	Medium	σ^2	σ
C1	.295	4.788	.64	.513
C2	.420	4.275	.891	.944
C3	.005	4.396	.961	.980
C4	.005	3.817	1.613	1.27
C5	.191	4.267	.932	.965
C6	.413	4.077	.931	.965
C7	.006	4.051	1.151	1.073
C8	.000	4.586	.640	.800
C9	.359	2.813	1.561	1.250

Note: Reference value Pvalue < .05, the difference between the medians is not statistically significant. σ^2= Variance
σ= Standard deviation
Source: Author's own creation, 2019

The result from table 8 shows that the medians of two variables in table 4 are significant in relation to the magnitude of the risk (D1). The variants are: (C7) that consults whether it is possible that risk situations may occur in which more than one person is affected when performing work at heights, i.e. that the magnitude of the risk is related to the factor known as catastrophic potential.

Finally, the variable (C8) that asked: In the event of a risky situation happening when carrying out work at heights, what is the severity of the damage that can be caused? This result shows the relationship between the magnitude of the risk and the factor known as the severity of the consequences.

The analysis of the arithmetic mean presents a value below three for the variable (C9) that refers to: "when do you consider that health problems related to work may appear at high altitudes?" that is to say that workers think that a disease caused by work does not appear immediately but in the long term.

The variance presents scattered values in variables C4 "possibility of experiencing harm"; C7 "possibility of risk situations in which more than one person is affected" and C9 "when it considers that illnesses appear because of work".

Discussion and Conclusions

The study provides important information on the risk perception that workers performing telecommunication tower operation and maintenance tasks have when doing work at heights.

The study was carried out in Ecuador and Colombia, as they are Latin American countries with similar economic, socio-cultural and labor legislation variables, in addition to geographical proximity, which facilitated the information collection and comparison of results under an analogous context, initially concluding that there is no difference between the perception of risk when performing work at heights in collaborators of both countries.

Regarding the level of studies, 69% of the workers surveyed have completed their studies at the third or fourth level, 28% have a high school education and only 3% have a basic level of education, so we can say that the sample reflects that the workers surveyed are staff with important technical knowledge for the execution of the task.

In terms of training, 94% of those surveyed state that they receive one or more job training at heights per year and only 6% state that during the year they do not receive training, which leads to the conclusion that companies providing operation and maintenance services are concerned that their personnel are trained and trained in knowledge and skills when performing work at heights.

In relation to the experience in performing operation and maintenance tasks in telecommunication towers, the results of the survey show that 88% of respondents have more than three years performing this type of work, which means that, in the sample analyzed, collaborators have extensive experience performing work at heights.

In analogy with the position they occupy, among the collaborators who completed the survey, it is found that 73% are workers of height that is to say those who properly execute the work in the tower, while 27% correspond to bosses, who supervise the tasks of these workers. This ensures that the results correspond to the perception of the workers who perform these tasks on a permanent basis.

In case of accidents occurring while working at heights, only the 6% of those surveyed say that they have ever suffered an accident at work, if it was calculated that 73% of them are bullfighters, of these only 3% have ever suffered an accident, therefore, it can be assured that the staff is highly trained, has experience and is especially cautious when performing work at heights.

Of the workers who have suffered work accidents, all assure that they have received at least one training in heights per year, as well as all have between 1 or more years of experience which proves that accidents are sudden events that can occur at any time and to anyone.

96% of workers claim that the risk of performing work at height on telecommunication towers is high; 85% fear damage and 67% think they may experience damage as a result of the work.

75% of workers say they can control a risk situation that can occur when working at heights; 74% think the risks can affect more people and 90% say the severity of the damage is very high.

The results of the variables that have a correlation with the magnitude of risk in operation and maintenance work at heights in telecommunication towers are: variable (B4) the verification of the state of the equipment that each collaborator must carry out prior to carrying out work at heights; (C7) the probability that more people will be affected by the risk, called catastrophic potential; (C8) called the severity of the consequences; and (C4) called personal vulnerability.

With these results, it is considered that the companies should carry out a communication plan for all the employees of the companies that provide operation and maintenance services, which includes the three variables that will allow the reduction of work accidents and professional illnesses when working at heights in telecommunications towers.

Likewise, companies providing operation and maintenance services for telecommunications towers should reinforce the importance of the use of personal protective equipment in their work equipment, even if the task to be performed is of short duration, as well as reinforce the fact that experience does not guarantee that accidents at work do not occur.

From the results section, the theoretical part mentions Maiman and Becker's Health Belief Model (HBM), which explains preventive behavior based on perceived severity and perceived threat, this was proven in this study by finding a correlation between the magnitude of the risk and the variable (C8) that refers to the severity of the damage it can cause when working at heights in telecommunication towers and the correlation with the variable (C3) that refers to how much the worker fears the damage that may occur while working at heights.

For its part, the Reasoned Action Theory (TAR) of Fishbein and Azjen considers preventive behavior based on social pressures or on what other people think about preventive behavior. This is verified in the analysis of the arithmetic mean of table 7, which shows that the variable (B6) "seems fun to smoke or eat when doing work at heights" is at a value below two, which indicates that workers do not find it fun to do so.

The theory also shows that there is research done on risk perception at work at heights in several industries, but there is no research done for work at heights in telecommunications companies, so this research is an important contribution including this industry that is constantly growing and changing.

Regarding limitations, despite the fact that the applied research instrument was anonymous, there is a possibility that the answers have a bias originated by the fear that workers may have of being dismissed due to non-compliance with work procedures or

by reporting the company's errors, which would demonstrate a lack of safety and health culture in the company.

The results of the study have not been able to be compared with other similar ones, since there is no free access to information so far.

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