



Secondary Traumatic Stress and Resilience in Peruvian Volunteer Firefighters

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ABSTRACT:

Firefighters perform laudable work for the benefit of society, they are immersed in situations that can produce and develop a series of alterations such as secondary traumatic stress, which can deteriorate their physical, mental, and emotional health, which is why they need to have the necessary tools to cope with all these tense events that occur constantly. It is also necessary that these people develop resilience, the ability to overcome critical situations and cope without this in their normal lives.

On the other hand, the purpose of this article is to determine how secondary traumatic stress is related to the resilience of volunteer firefighters in the city of Tacna in Peru. It is based on a quantitative approach, of a cross-sectional substantive type, correlational level, non-experimental design, descriptive correlational; being its population 133 firefighters and its sample 99, which were selected through a probabilistic sampling, to whom two scales were applied, one to evaluate secondary traumatic stress and the other to evaluate resilience. Regarding the descriptive statistics of the variable secondary traumatic stress, it was found that 16,2% had a very high level, 48,5% high, 29,3% regular, 5,1% low, and 1,0% very low; for resilience, 43,4% were in the very high level, 8,1% regular, 3,0% low. Finally, it is concluded that traumatic stress is significantly related to resilience having obtained a p-value = 0.000, as for Spearman's Rho correlation value this was -0,766 being strongly negative.

1. Introduction

The courageous work of volunteer firefighters involves facing highly challenging and potentially traumatic situations in their service to the community, which is not without psychological consequences. One of the fundamental challenges they face is the phenomenon of secondary traumatic stress, which can profoundly affect their emotional and mental well-being. In turn, resilience becomes a crucial element in maintaining the mental health of these volunteer firefighters. Resilience, which refers to the ability to adapt and recover from difficult and traumatic situations, plays a vital role in their well-being and coping with the stresses inherent in their work.

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Resilience is a concept that has been on everyone's lips for the last 15 years. It has allowed us to understand that the personal resources and potential we possess must be used to succeed in difficult and critical situations. For this reason, it opens new possibilities to look at old



problems and find an alternative solution to the old defeatist positions in crisis situations [1].

In Ecuador, resilience is a construction that requires preparation; the objective is to prepare the actors for a crisis by reducing the surprise effect, and care must be taken to ensure that this preparation work is not unsettling. The resilience of rescue services in this country is essential, however, it is necessary to consider that it not only consists of ensuring the proper functioning of the collaborators within the fire station, but it must be an inclusive process that encompasses their integral well-being and that this allows them to develop their activities in the work, family and social spheres [2].

In Argentina, it was argued that, in stressful situations, the capacity for resistance and resilience comes into play. Many situations in a person's life have these characteristics of traumatic impact, for example, rape, sexual abuse, physical violence, and mistreatment, the unexpected death of a loved one, terminal illness, emotional abandonment, separation, failure, natural disasters, wars, political persecution, extreme poverty, etc [3].

In a study of 73 people belonging to the operational level of the fire department, post-traumatic stress as a consequence of the 16-A earthquake was described in firefighters of the city of Portoviejo, the results showed that, of the total, 32 subjects were diagnosed with PTSD, mostly males; with an average age of 39.5 years. They had wrong behaviors and coping strategies. A better chance is denoted following a psychosocial intervention program implemented by the researchers [4].

At the national level, the work of Peruvian firefighters is involved in the constant exposure to emotional manifestations of people who have suffered some trauma, thus, this continuous overexposure generates a process of emotional exhaustion, also known as compassion fatigue. In addition to this, in the last five years, the citizens of Peru have endured several natural disasters (floods, landslides, earthquakes, etc.), as well as man-made events (vehicular accidents, fires, traffic accidents, etc.) [5].

Given the critical and potentially traumatic events that firefighters face in their daily work, amplified by the

health emergency and the additional risk of becoming infected and infecting their families, the General Volunteer Fire Department of Peru (CGBVP) requires research to ensure the mental health of its volunteers, who perform an altruistic service to society, and avoid complications due to their work. Particularly in the framework of prevention, stress inoculation has shown significant effects on the performance of military, health, and student personnel [6].

Firefighters nationwide were exposed to potentially traumatic events, the effects of which can affect firefighters for the rest of their lives. Nazari details that, in 2020, out of 390 firefighters, 96.4% had been exposed to critical events, where 90% faced one or more fatalities in their service [7].

Traumatic stress disorder is defined as a psychological condition that is affected by a disturbance of a fact either external or internal at the level of mental and physical health that is associated with events that generated traumas characterized by the appearance of symptoms that affect the development and development with a discomfort in the person that is observed differentiating by the affectation within work, social, family life [8].

Secondary Traumatic Stress (STS) affects the profession of helping others in distress, results from prolonged exposure to the pain of others, and is configured as a spontaneous reaction experienced by the professional after the other goes through a stressful experience; it comes from stress in its acute phase, from emotional exhaustion, which eventually leads to losses in the professional's life. [9]

Secondary Traumatic Stress refers to the effects present in support networks, caregivers, and/or caretakers of those who experienced or directly experience emotionally impactful events [10].

There are three response components: Re-experiencing, avoidance, and persistent activation. Re-experiencing symptoms may include recall of the event, daydreaming, sudden experiencing, and distress at the recall of the event. Avoidance symptoms include deliberate efforts to avoid thoughts, feelings, or activities related to the situation, psychogenic amnesia, or decreased interest in activities. Finally, persistent arousal symptoms include difficulty falling asleep,



irritability or anger outbursts, difficulty concentrating, hypervigilance, and exacerbated startle response [10].

The psychological and symptomatological damage related to the experiences of subjects with secondary traumatic stress are presented at three levels: Intrusive symptoms, work-related emissions that invade the professional's personal time; Avoidant symptoms, tendency to avoid exposure to stimuli that remind them of work-related issues; Symptoms of increased physiological activation, linked to increased anxiety, impulsivity and reactivity, in addition to a state of over-alertness in relation to the perception of demands or threats coming from the environment, sleep disorders and difficulties in concentration, among other symptoms [11].

There are factors that predispose to the appearance of this disorder, such as personality traits, gender, low academic level, repetitive exposure to traumatic experiences, or the severity of the events, among others. Factors such as social support and coping strategies contribute to modifying the experience [12].

Resilience is a term that refers to the ability of a person or group to resist and recover from shocks or stress [2], it is also related to optimistic attitudes, satisfaction with one's life, and perceived well-being [13].

Resilience is an important and vital state in relation to overcoming situations of high emotional impact. It consists of people's abilities to cope with crises, to resist them, and to learn from these situations [1].

The aim is to prepare the actors for a crisis by reducing the surprise effect, and care must be taken to ensure that this preparation work is not unsettling. Resilience in rescue services is essential, however, it is necessary to consider that resilience is not only about ensuring the good functioning of the collaborators within the fire station, but it must be an inclusive process that encompasses their integral well-being and that this allows them to develop their activities in the work, family and social spheres [2].

The components proposed by Wolin and Wolin are the fundamental basis of resilience, the first one being introspection, which refers to the observation that the individual can make on his own thoughts, emotions, and actions, also allowing to sharpen the vision of who the person is and, therefore, enables him to make better

decisions and present a better knowledge of his abilities and limitations. In relation to independence, this affects the individual's ability to establish limits between himself and the adverse factors of the environment, that is, to maintain an appropriate emotional distance that does not result in social isolation. Regarding relational capacity, this quality is linked to people's competence to establish effective links and interactions with other individuals. This would allow the development of empathy and social skills. With regard to initiative, this implies that the individual himself sets increasingly demanding tasks that test him and lead him to overcome them [14].

Here the psychoanalytic theory of resilience is present, which according to Zukerfeld, the psychoanalytic perspective on resilient development, refers to a process of subjective transformation. From the psychoanalytic point of view, we define resilience as a subjective metamorphosis resulting from the activation of a potential that implies functioning with the necessary plasticity for the creation of psychic conditions that capture and transform the traumatic effect allowing the development of new resources, with the indispensable existence of intersubjective links. The theory also states that the basis for resilience and other factors depend on self-esteem, based on the bond of love from the mother during the child's development, i.e. the child's resilience is built in the relationship with the other, through the knitting of the bond [15].

Likewise, this study answers the general question: What is the relationship between Secondary Traumatic Stress and Resilience in Peruvian Volunteer Firefighters? Therefore, the general objective of the study is to determine the relationship between Secondary Traumatic Stress and Resilience in Peruvian Volunteer Firefighters. The general hypothesis is as follows: There is a significant relationship between Secondary Traumatic Stress and Resilience in Peruvian Volunteer Firefighters.

2. Math

The present study revolves around the quantitative approach, according to its purpose the type of research is basic also called pure, theoretical, or dogmatic; taking into account its temporality it is cross-sectional so that data collection was performed at a single time [16], so it is also located within the correlational level, so it seeks



to establish the relationship between the study variables [17], [18]; the design to which it belongs is non-experimental, so that there is no manipulation of the study variables, so that the researchers will not have any inference [19], [20]. The population consisted of 133 firefighters from seven companies in the city of Tacna (Peru), and the sample consisted of 99 firefighters, this number being established through the finite population formula, to select those who would participate in this study we worked with a probability sampling, so that allow us to know the probability that each individual under study has to be included in the sample through random selection [21], being exactly a simple random.

For data collection we worked with the psychometric technique, evaluating Secondary Traumatic Stress through a scale, which was adapted from Moreno [22], designed according to its three dimensions having a total of 14 items with response options on a Likert scale ranging from 1 to 5 points (Strongly disagree, disagree, neither disagree nor agree, agree, strongly agree); the second instrument was adapted from Wagnild and Young [23], structured according to its five dimensions having a total of 25 items, also with response options on a Likert scale ranging from 1 to 7 points (Strongly disagree, disagree, slightly disagree, indifferent, slightly agree, agree, strongly agree); Both instruments have undergone a content validity process carried out by experts in the area, who were informed of the purpose of the instrument and were able to evaluate each of the items in terms of relevance and clarity, demonstrating the relevance of all the items; the second process is reliability, for which a pilot sample was used, obtaining a Cronbach's Alpha of 0.778 for the first instrument and 0.903 for the second instrument. Based on these two processes, it can be said that the instruments were reliable and can be applied.

Authorization for the application of the instruments was requested from the VIII Fire Headquarters Command. The instruments were then transferred online using Google Forms.

Online by means of Google Forms, being anonymous, which helps to guarantee their veracity. The identity of the participants and the confidentiality of the data were safeguarded in accordance with the ethical principles of Helsinki.

3. Results

Descriptive statistics

Table 1. Sociodemographic data of firefighters in the city of Tacna.

		Frequency	Percent
Genre	Male	76	76,8%
	Female	23	23,2%
Age	Less than 25 years old	13	13,1%
	From 26 to 40 years old	55	55,6%
	From 41 to 55 years old	28	28,3%
	From 56 years and older	3	3,0%
Academic level	Secondary	10	10,1%
	University	52	52,5%
	Technical studies	37	37,4%
Years of service	Less than 1 year of service	7	7,1%
	1 to 3 years of service	13	13,1%
	3 to 6 years of service	12	12,1%
	6 to 10 years of service	14	14,1%
	10 to 20 years of service	26	26,3%
	More than 20 years of service	27	27,3%
Years attending emergencies	Less than 1 year of service	13	13,1%
	1 to 3 years of service	9	9,1%
	3 to 6 years of service	14	14,1%
	6 to 10 years of service	14	14,1%



		Frequency	Percent
	10 to 20 years of service	25	25,3%
	More than 20 years of service	24	24,2%
Hours of service in the fire company	Less than 10 hours per month	16	16,2%
	From 11 to 20 hours per month	25	25,3%
	From 21 to 30 hours per month	22	22,2%
	31 hours or more per month	36	36,4%
Emergencies per month	Less than 10 emergencies per month	66	66,7%
	11 to 20 emergencies per month	27	27,3%
	From 21 to 30 emergencies per month	3	3,0%
	From 31 emergencies or more per month	3	3,0%
Total		99	110,0%

According to the table of socio-demographic data, 76.8% of firefighters are male and 23.2% are female; with respect to age, 13.1% are under 25 years old, 55.6% are between 26 and 40 years old, 28.3% are between 41 and 55 years old, 3.0% are 56 years old or older; with respect to academic level, 10.1% have completed secondary school, 52.5% have university studies and 37.4% have technical studies. Regarding years of service, 7.1% have less than 1 year of service, 13.1% have 1 to 3 years of service, 12.1% have 3 to 6 years of service, 14.1% have 6 to 10 years of service,

26.3% have 10 to 20 years of service and 27.3% have more than 20 years of service; regarding hours of service in the fire company, 16.2% have less than 10 hours per month, 25.3% work 11 to 20 hours per month, 22.2% work 21 to 30 hours per month. Finally, 66.7% work less than 10 emergencies per month, 27.3% from 11 to 20 emergencies per month, 3.0% from 21 to 30 emergencies, and the same percentage of firefighters have 31 or more emergencies.

Table 2. Secondary Traumatic Stress in Volunteer Firefighters

	Frequency	Percent
Very low	1	1,0%
Low	5	5,1%
Regular	29	29,3%
High	48	48,5%
Very High	16	1,2%
Total	99	100,0%

Table 2 shows that 1.0% of firefighters have a very low level of secondary traumatic stress, 5.1% a low level, 29.3% a regular level, 48.5% a high level and 1.2% a very high level.

Table 3. Dimensions of traumatic stress in volunteer firefighters.

	Compassion fatigue		Secondary trauma		Shake of beliefs	
	f	%	f	%	f	%
Very low	0	0,0%	9	9,1%	4	4,0%
Low	2	2,0%	20	20,2%	25	25,3%
Regular	7	7,1%	35	35,4%	25	25,3%
High	8	8,1%	23	23,2%	22	22,2%
Very high	82	82,8%	12	12,1%	23	23,2%
Total	99	100%	99	100%	99	100%

Table 3 shows the dimensions of secondary traumatic stress. For the compassion fatigue dimension, 2.0% of firefighters were in the low level, 7.1% regular, 8.1% high and 82.8% very high. The results for the secondary trauma dimension 9.1% of firefighters fell in the very



low level, 20.0% low, 35.4% fair, 23.2% high and 12.1% very high. Finally, the belief shock 4.0% of firefighters have a very low level, 25.3% are in the low and regular level respectively, 22.2% high and 23.2% in a very high level.

Table 4. Resilience in volunteer firefighters

	Frequency	Percent
Under	3	3,0%
Regular	8	8,1%
High	45	45,5%
Very High	43	43,4%
Total	99	100,0%

Table 4 shows that 3.0% of firefighters ranked low in resilience, 8.1% regular, 45.5% high and 43.4% very high.

Table 5. Dimensions of resilience in volunteer firefighters

	Self-confidence		Perseverance		Personal satisfaction		Feeling good		Equanimity	
	f	%	f	%	f	%	f	%	f	%
Very low	1	1,0 %	0	0,0 %	2	2,0 %	0	0,0 %	1	1,0 %
Low	2	2,0 %	2	2,0 %	2	2,0 %	5	5,1 %	1	12,1 %
Regular	9	9,1 %	17	17,2 %	3	3,0 %	10	10,1 %	3	38,4 %
High	29	29,3 %	64	64,6 %	35	35,4 %	47	47,5 %	4	41,4 %
Very high	58	58,6 %	16	16,2 %	57	57,6 %	37	37,4 %	7	7,1 %
Total	99	100 %	99	100 %	99	100 %	99	100 %	99	100 %

Table 5 shows the dimensions of resilience in firefighters. For the self-confidence dimension, 1.0% of firefighters are very low, 2.0% are low, 9.1% are fair, 29.3% are high and 58.6% are very high. For the perseverance dimension, 2.0% of the firefighters are in

the low level, 17.2% regular, 64.6% high, 16.2% very high. Regarding personal satisfaction 2.0% of firefighters are in the very low and low level respectively, 3.0% regular, 35.4% high and 57.6% very high. Regarding the fourth dimension of feeling good, 5.15% are in the low level, 10.1% are in the fair level, 47.5% are in the high level and 37.4% are very high. Finally, the results of the equanimity dimension show that 1.0% of firefighters are in the very low level, 12.1% low, 38.4% fair, 41.4% high and 7.15% very high.

Inferential statistics

Table 6. Normality test

	Kolmogorov-Smirnov ^a		
	Statistician	gl	Sig.
Secondary traumatic stress	,072	99	,200*
Resilience	,133	99	,000

According to the Kolmogorov-Smirnov normality test, where there are values greater and less than the significance value (0.05), it can be indicated that the data do not have a normal distribution, and the correlation test to be used is Spearman's Rho.

Table 7. Spearman's Rho Correlation Test

Resilience	Secondary traumatic stress	
	Rho =	
	-0,766	
	p-value = 0,000	
	n = 99	

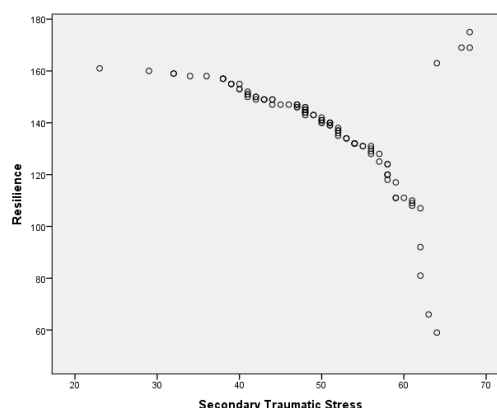


Figure 1. Scatter diagram



Table 7 shows that secondary traumatic stress and resilience had a p -value < 0.05 , showing a significant relationship, according to Spearman's Rho coefficient of -0.766 , which is strongly negative.

4. Discussion

In Peru, being a firefighter is a voluntary activity for which there is no remuneration; However, they are the most exposed to danger, being the first to arrive at different disasters, whether natural (earthquake, earthquake, flood, etc.) or human (accidents, fires, etc.), so they are vulnerable to suffer secondary traumatic stress, being necessary that their levels of resilience are well developed in order to cope with all these situations so that they achieve a better control and performance during their duties, allowing that there is no deterioration in their physical and mental health. The results are in line with the general considerations already investigated, where it was found that those who work in emergency intervention have a greater possibility of psychological impact.

In the results of the levels of post-traumatic stress, a predominance in the high level was observed with 48.5%, differing from a study conducted in Ecuador in firefighters operating in the city of Ambato where 82.4% are located in the low level [24]; however, when evaluating the dimension of shaken beliefs, it turns out to be regular, indicating that sometimes firefighters have questioned or reevaluated their beliefs in relation to traumatic situations they had experienced. Along the same lines, a study carried out on Peruvian firefighters in Trujillo showed that 75.2% did not present post-traumatic stress [25], however, there are studies where similar results have been obtained in a study that worked with the III Departmental Command of La Libertad, where 64.6% are within the medium to high level of secondary traumatic stress in emergency care (46.1% and 18.5% respectively) [26], which means that those who work in emergency intervention have a greater possibility of psychological impact.

In a corresponding activation of the different levels of physiological, cognitive and emotional response that each agent must implement to cope with the demand. Linked to the unpredictability of each situation and also associated with the stress levels of those involved [27], stress plays a fundamental role in emergency systems, since by its nature the emergency never ceases to be

novel, because it cannot be anticipated in its entirety and is only known when it has manifested itself [28].

In terms of resilience, 45.5% are in the regular level, followed by 43.4% who are in the high level; This result is similar to that obtained in a study in Ecuador in the fire department of the company of Abdón Calderón where 90% presented high levels of resilience, this result being associated with the training received, the job training they have to deal with emergency situations, danger and rescue, In the same context, 41% of firefighters belonging to the V departmental command of Callao (Peru) reported medium levels of resilience as an element belonging to their behavioral pattern [29]; Thus, it is important to influence the adoption of coping strategies such as resilience, in order to preserve the physical and mental component of the firefighter [30].

Actions to improve resilience are the order of the day and are a regional and global concern, determined within a field of action that allows planning and creating initiatives to react immediately to eventualities. Consequently, it is coherent and necessary to maintain personnel with knowledge and equipment that can provide aid in an expeditious manner, in accordance with international requirements framed in humanitarian aid and the welfare of the population [31].

The relationship between secondary traumatic stress and resilience was evidenced, and there is literature and studies that reaffirm this, such as the study of Espinola [25] where he also evaluated these two variables, in another research conducted in Ecuador also managed to establish a negative relationship, noting that post-traumatic stress is a product of natural or provoked circumstances, so it is necessary to have resilience to cope with these moments. Serving members of the fire department represents a group of great importance in the community, since, due to their vocation, they perform courageous actions to protect society from threats such as fires, accidents, falls in hard-to-reach places, and natural disasters. However, they are also part of a high-risk group due to the nature of their work. Despite being a highly valued and respected profession, it carries an underlying element of danger and risk, as they constantly face situations that can trigger post-traumatic stress so there is a relationship with anxiety [32].



5. Conclusions

It was found that 48.5% of firefighters have a high level of secondary traumatic stress, due to the different episodes to which they are exposed to potentially traumatic situations due to the work they perform that tend to affect their state of mind; as it is known, secondary traumatic stress has its origin in stress factors that firefighters go through caused by natural disasters, some kind of accident or sometimes produced by the same human being. As for the dimension compassion fatigue, 82.8% of the firefighters are at a very high level, while for the dimension secondary trauma and shaking of beliefs they are at a regular level with 35.4% and 25.3% respectively.

For the variable resilience, 45.5% of firefighters are in the high level, followed by 43.4% who are in the very high level; as for the dimension self-confidence and personal satisfaction, they are in the very high level, compared to perseverance, feeling good and equanimity, where the highest percentage is in the high level.

Finally, the relationship between secondary traumatic stress and resilience was evidenced, having obtained a p -value = 0.000. The Spearman's Rho correlation coefficient was -0.766, which is negative and strong, where it can be affirmed that the higher the level of secondary traumatic stress, the lower the level of resilience and vice versa. In view of these results, it is necessary to continue strengthening the development of resilience in order to provide better tools to the firefighters of the different companies in Peru. Currently, Peruvian firefighters need the State to be more involved, not only by working on the mental health side, which is important for them to be able to better face the different situations they are exposed to but also by providing them with the appropriate clothing to be able to continue developing their work in an adequate manner.

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