Analysis of the Professional Burnout Syndrome in Times of Pandemic by COVID-19, an Approach to Practice using Artificial Intelligence

Natali Atachagua [a], Orlando Orihuela [a], Lucas Herrera [a], Wilver Auccahuasi [a] and Miguel Antezana [a]

[a] *Universidad Continental, Huancayo, Perú*

Abstract

In times of pandemic as a result of Covid-19, many of the services provided by the Peruvian state are subject to the parameters of working from home, which is why many of the services are performed in a minimal way, in the case of the syndrome of professional exhaustion, applied to the workers of Line 100, which is dedicated to helping people who are affected by family violence, due to confinement, emergency calls have increased in such a way that workers are subjected to a pressure product of being able to attend to those affected. In this work, the burnout syndrome is analyzed in workers on line 100 for emergency care, which indicates that this syndrome exists in most of the workers, as a result of the same work and the same emotional situation as a result of the Covid- 19, likewise a method is proposed to be able to use Artificial Intelligence in the analysis and prediction of the professional burnout syndrome.

Keywords

Burnout, syndrome, artificial intelligence, method, emergency.

1. Introduction

In the article entitled Burnout syndrome, it is considered that this syndrome has been well known with the implementation of Maslach's studies, these diseases were made known in the elderly along with the consequences, this test was also applied to 60 dental surgeons who work at the Central Hospital FAP, were given a file from the Maslach Burnout Inventory adapted by N. Seisdedos, ID Department of TEA Ediciones, SA Madrid, obtaining results that currently have professionals with this syndrome and other risks being the risk of dental surgeons in hospitals with a similarity of 25% under the performance at work, where it is concluded that the Burnout Syndrome has been increasing in the various work areas that provide services to third parties [1].

In the present research we analyze about the emotional exhaustion syndrome considered as an existing emotional condition among social service employees which present signs such as chronic fatigue, emotional exhaustion and cynicism towards colleagues, patients and work, for which The Maslach Burnout Inventory questionnaire is applied with which the exhaustion condition and its intensity can be detected with which a machine learning approach was applied in order to predict the prerequisites to exhaustion, where the initial data set has been processed and labeled with which it has been possible to obtain a 70% correct prediction of the cases [2] [3].

In this research we analyze the Burnout syndrome (BOS) defined by WHO as a syndrome conceptualized as the result of chronic stress in the workplace, for which the objective is to generate a

WINS-2022: Workshop on Intelligent Systems, April 22 – 24, 2022, Chennai, India.
EMAIL: wilver.auccahuasi@upn.edu.pe (Wilver Auccahuasi)
ORCID: 0000-0001-8820-4013 (Wilver Auccahuasi)

Korean version of the burnout syndrome scale (KBOSS) having made adjustments in coordination with the WHO where the cut-off points for detection were presented, an online survey was carried out that was applied by a company dedicated to online research, for which 444 workers have been recruited, KBOSS [4] [5].

In this research, we analyze the options for the group of female workers in order to deliberate burnout among doctors in Spain, where a document has been generated with the responses of the members who are part of the group that elaborates the questions related to the subject making conclusions where Burnout is considered as an entity with a high incidence of doctors that cause serious labor, personal and economic repercussions with an acknowledgment of the diseases that have been affecting some specialties especially with those who work in Primary Care, Oncology, Intensive Medicine and Palliative Care with a common factor about the qualitative or quantitative demand of the professional, which are related to extrinsic factors of work and occupational risk management [6] [7] [8].

In the present investigation we analyze about exhaustion, a state of physical or mental collapse caused by overwork of residence in patient care during the COVID-19 pandemic, so that the burnout syndrome and exhaustion became more pronounced Therefore, a review of the literature and presentation about the consideration of activities regarding the resident doctors is carried out, from which the answers obtained in the questionnaire are based on where the prevalence of burnout is not the same in different specialties, for So we analyze the impact and imagine what are the potential steps in order to reduce the increasing rate of burnout syndrome in pandemics [9] [10].

In the present work, an implementation model based on computational models is carried out to evaluate the burnout syndrome, with which it can be applied to different economic sectors and with emphasis on the public sector, where we present an application example.

2. Materials and Methods

In the description of the methodology, the steps to be developed in the present work are presented through a block diagram, with the particularity of first explaining an example where the burnout test is applied, in such a way that its processes and processes can be analyzed. its implication in a very particular situation, which is the case of a service provided by the Peruvian state, as well as the results of its application, then it is described how these procedures can be automated and through the use of Artificial Intelligence results can be obtained of the test automatically and that presents a result that is consistent with the problematic situation of the organization. Next, we develop each of the components of the block diagram:

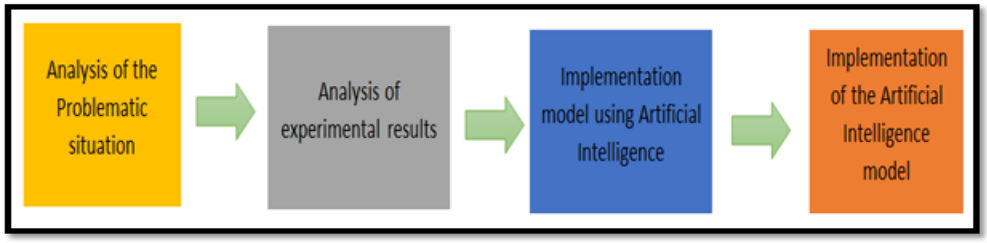

Figure 1: Block Diagram of the Proposal

3. Analysis of the problematic situation

Line 100 is a service of the National Program for the Prevention and Eradication of Violence against Women and Members of the Family Group - AURORA, a program of the Ministry of Women and Vulnerable Populations, free and with 24-hour service; specialized in providing information, guidance, counseling and emotional support to people affected or involved in acts of sexual violence

and to those who know about any case of abuse in their environment through telephone attention nationwide. It is accessible from any landline, mobile or public telephone. Currently, Line 100 has 228 operators, professionals specializing in law, psychology and social work, whose function is to assist people who are victims of violence by receiving telephone calls. These operators meet rotating schedules of four shifts per day, each of these shifts lasting 6 hours in order to ensure continuous coverage 24 hours a day. Even so, and although it seems like a comfortable working day, operators are not immune to suffering from work-related stress, which can worsen, even presenting physical or psychological alterations, which would lead to setting up a picture of Exhaustion Syndrome Professional or also known as SAP.

The year 2020 was a quite atypical year worldwide and, of course, Peru could not escape its effects. The COVID-19 pandemic put to the test all the provision of services, both public and private and the services provided by the National Program for the Prevention and Eradication of Violence against Women and Family Group Members - AURORA, was not exempt from said adversities.

Line 100 is one of the six services that the AURORA Program provides to society in its fight to eradicate family violence and interacts closely with two other of them, with the Women's Emergency Centers - CEM and with the Urgent Care Service - CAU, to which after the opening and telephone intervention stages in the attention of a case of violence, the case is referred if necessary (administrative follow-up stage) to consider the service provided as a "concluded case". However, and as a result of the mandatory social isolation decreed by the National Government since last March 16, 2020 - through Supreme Decree No. 044-2020-PCM and Emergency Decree No. 026-2020 and its successive extensions, added To this, the cases of contagion of COVID-19 in the personnel working in these services, forced a significant decrease and even the temporary suspension of services provided by the Women's Emergency Centers - CEM and the Urgent Care Service - CAU, leaving the operators of Line 100 relatively isolated in the attention of the telephone calls received, given that they could not make the respective referral of said cases, altering the attention protocols and significantly overloading the work of said operators; In addition to this, there was also the difficulty of the migration from face-to-face work to remote work of the 228 operators of Line 100.

In addition to the work complications described, the operators of Line 100 had to face their own family burdens in complying with mandatory social isolation, such as caring for elderly relatives, caring for children in school as well as just fact of trying to maintain health care in order not to contract COVID-19. These adversities, which we can group into work and personal, meant during 2020 a great negative psychological burden for Line 100 operators, reason enough for them to present work-related stress and possibly Professional Burnout Syndrome - SAP or burnout.

4. Analysis of experimental results

After having explained what the line 100 service consists of, we proceed to analyze the results obtained in the experimental analysis:

When we refer to Burnout syndrome, we are dealing with a complex phenomenon, where we can indicate that it is a process of adaptation to work stress, characterized by professional disorientation, burnout, feelings of guilt due to lack of professional success, coldness or distancing emotional and isolation. These can lead to a change in the behavior of workers where it is manifested by the loss of energy sources, showing physical fatigue, emotional fatigue and cognitive fatigue. Based on these symptoms, the burnout test presents as a result 3 levels in the dimensions of emotional exhaustion, depersonalization and personal fulfillment.

For the present study, the 186 operators working in the Line 100 program were analyzed, to whom the test was applied and the following results were obtained:

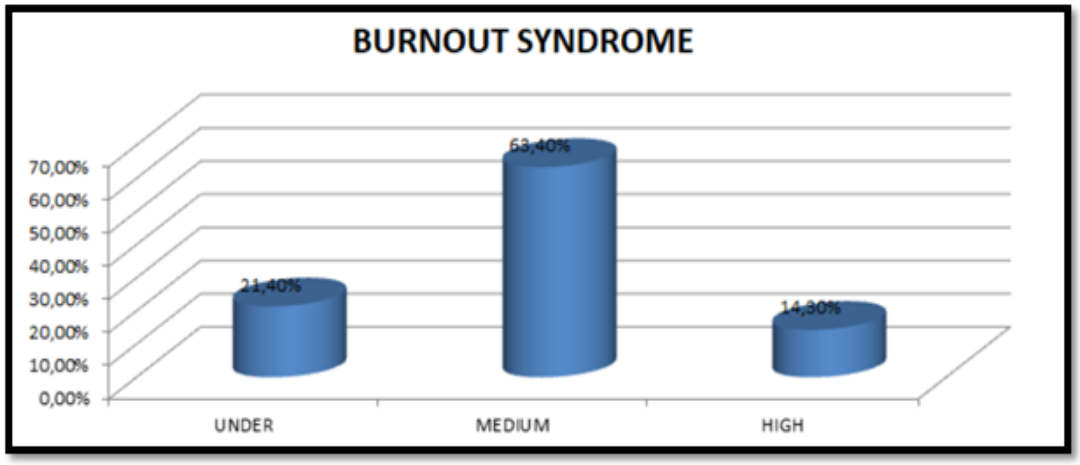

Figure 2: Results of the evaluation of burnout syndrome

In the analysis of the results of the burnout syndrome, we identified that the low level is at 21.4%, which indicates that a small group of workers have mild symptoms; 63.4% present a mean value, which indicates that more than half of the personnel who performed the test present moderate symptoms; and finally 14.3% present high symptoms, which indicates that there are workers who are subjected to strong pressure, as a result of the nature of the work and what refers to being able to help people in consideration of vulnerability, as indicated in figure 2.

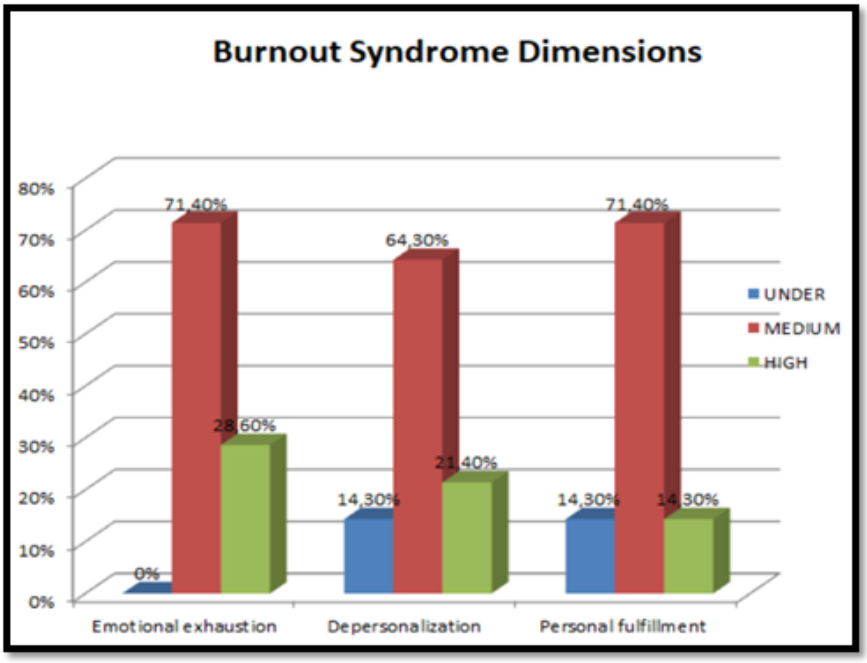

Figure 3: Results of the dimensions of burnout syndrome

In the analysis of the dimensions of the burnout syndrome, we can indicate that in the emotional exhaustion dimension there is a medium level with 71.4% and a high level with 28.6%, which indicates that emotionally the workers of Line 100, are subject to strong emotional pressures as a result of the very nature of work. A 64.3% for the medium level and with a 24.4 for the high level, which indicates that the relationship between the worker and the same person is considerable, these are the effects of the nature of the work on Line 100; Finally, for the personal fulfillment dimension, we find low values with 14.3%, medium with 71.4% and high with 14.3%, these results show that even though the staff is presenting considerable levels of work stress, they feel satisfied with the work carried out, for the same action of helping people in vulnerable conditions. According to figure 3.

5. Implementation model using artificial intelligence

Having analyzed in a standardized way the results of the test that measures the burnout syndrome, and having found that the workers of Line 100, present a considerable level of the syndrome. With the advancement of technology, where with the use of programming and artificial intelligence, we can automate and design mechanisms to be able to predict the syndrome, in the different areas of knowledge. In this sense, a computational model based on neural networks is presented for the prediction of burnout syndrome, this model allows the entry of the result of each of the 22 questions presented in the test. In the proposed computational model, it is made up of 22 inputs, 10 intermediate layers and 1 output layer, where it corresponds to the value between 1 and 0, in this way the result of the predictor is interpreted according to the result. Average values between o and 0.5 can be identified as low values of the syndrome, values between 0.5 and 0.75 can be identified with average values of the syndrome and values between 0.75 and 1 indicate high values of the syndrome. The structure of the computational model is presented in Figure 4.

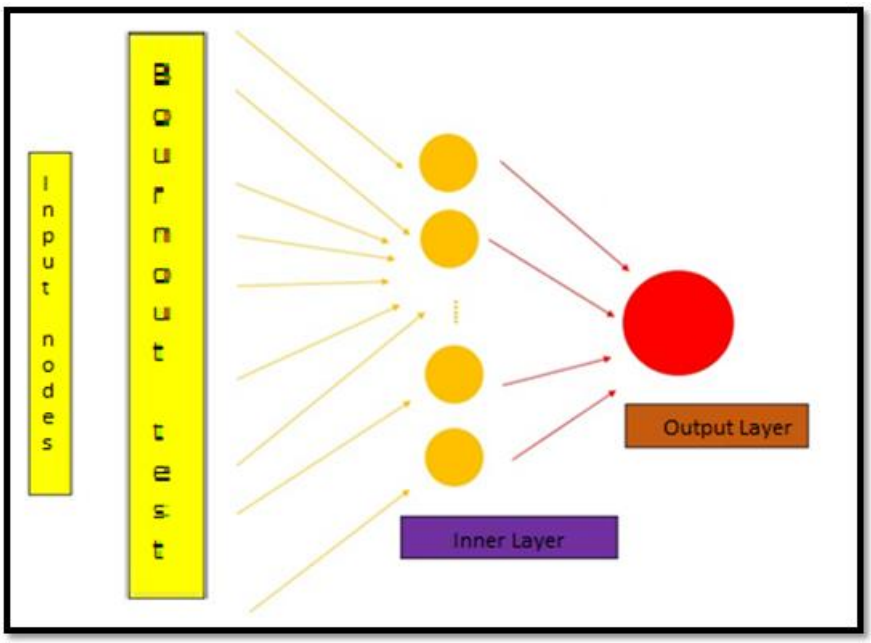

Figure 4: Computational Model Architecture

In figure 4, the computational model is presented, applied to be able to classify the levels of burnout syndrome, where it is possible to identify the input layers made up of the 22 questions, the intermediate layer made up of 10 nodes and the output layer made up of an exit.

6. Implementation of the artificial intelligence model

The implementation of the application for the classification of the levels that correspond to the burnout syndrome, the development was carried out through two steps, the first corresponding to the implementation of the test using a digital form carried out using google forms, where are the 22 questions to be sent, according to figure 5.

After completing the forms, the data is exported in "csv" format. Using the Matlab computational tool, an application was designed to be able to implement the computational model, where the "csv" file is read, prior to the training of the network to finally be able to perform the classification, the result of the classification is presented in a numerical value between 0 and 1. According to figure 6.

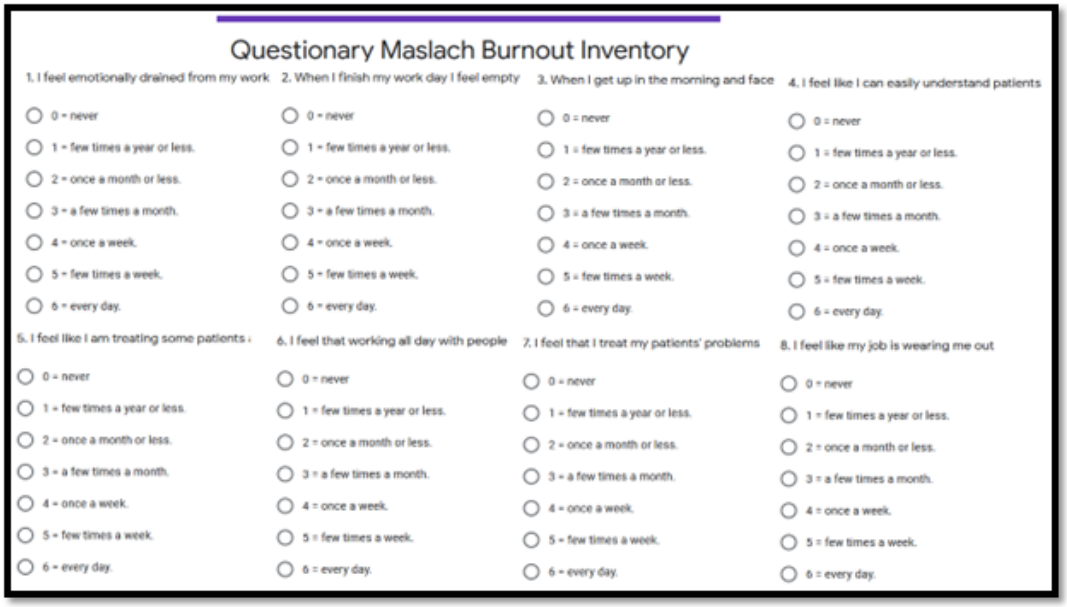

Figure 5: Example of the implemented form

7. Results

The results of this work are related to two aspects, the first related to the implementation of the computational model and the second to the results of the evaluation of the burnout syndrome.

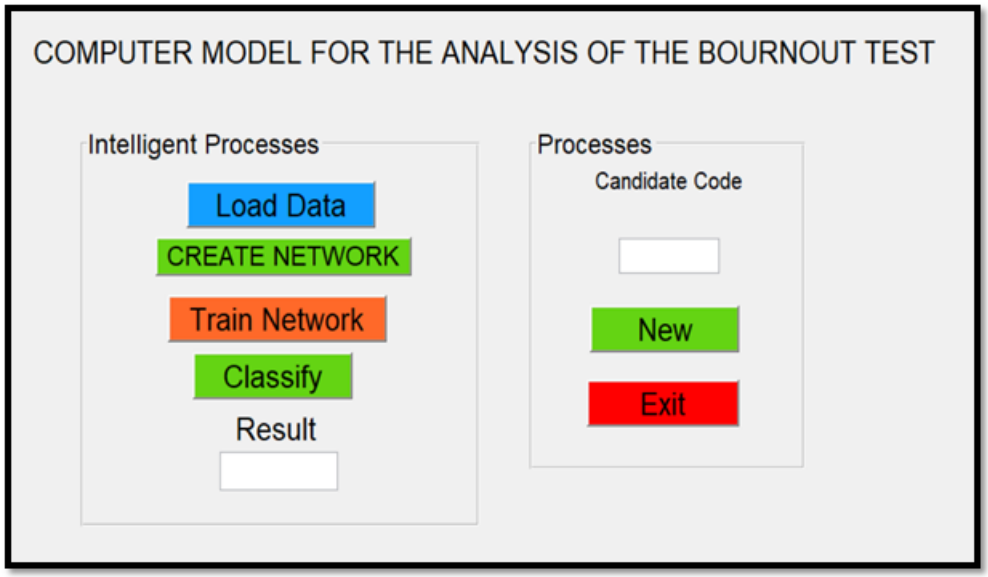

Figure 6: Implemented Application

In figure 6, the application implemented in Matlab is presented, to demonstrate the computational model, where the processes were divided into two groups, a group of intelligent processes and a candidate registration process. Below is a detail of the function of each of the application's command buttons:

- Load data: we load the data corresponding to the “csv” file of the completed form.
- Create Network: create the neural network
- Train Network: we train the neural network
- Classify: classify with the loaded data

- Result: displays the result of the classification
- Candidate code: indicates the worker or participant code
- New: clear the data for a new classification
- Exit: button to exit the application

The second result is characterized by analyzing the results of the experimentation carried out on the workers of Line 100, which is why the characteristic of the service provided by the state to people in vulnerable conditions, due to family violence. The results indicate that the majority of the workers present a moderate level of work stress, due to a characteristic of the work, the workers are subject to a serious stress, due to the concern of the people who consult the service, the results also show that One of the dimensions that is personal fulfillment, the results indicate that workers present average levels, for having collaborated with people in situations of vulnerability.

8. Conclusion

The Continental University, in Peru, where an intervention was carried out through the burnout test to the workers of Line 100, where People in a vulnerable state are helped, in times of pandemic as a result of COVID-19, cases of family violence increased considerably, consequently calls to Line 100 increased considerably until they had shifts, day and night, with the intention to be able to achieve a greater service to citizens.

A second conclusion is related to the implementation of a computational solution, based on neural networks, to be able to classify the states of burnout syndrome, the application was implemented as a demonstration using the Matlab tool, in this sense it can be implemented in other languages and for different applications. The working mode is related in two modes, the personal mode, characterized by completing the online form using google forms, and a second mode, based on the analysis of the results, which is carried out through the implemented application.

Finally, we conclude that artificial intelligence is making inroads in all areas, so our work shows that artificial intelligence can be used to benefit different processes, in our case to be able to classify stress levels, intelligently, therefore, its implementation and application would help to improve the working conditions of Line 100 workers, carrying out these tests continuously and automatically, to help the workers and be able to learn more about the situation of each one of them.

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