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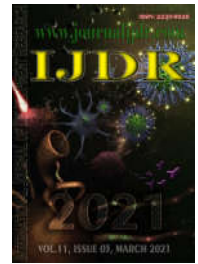
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RESEARCH ARTICLE

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VESTIBULAR FINDINGS IN BANK EMPLOYEES WITH ANXIETY DISORDERS

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ABSTRACT

Working methods restructuring induces changes in population's morbidity profile, making it common the psychiatric and psychological issues to induce functional changes in organs and other organic systems. The aim was to evaluate the behavior of the vestibular system in bank employees with complaints of dizziness, vertigo or instability during walking and diagnosed with anxiety disorders. This is a retrospective cross-sectional study carried out at the otoneurology outpatient clinic. Eighteen medical records of bank employees referred by otorhinolaryngologists or neurologists were evaluated for otoneurological evaluation with diagnosis of anxiety disorders and complaints of dizziness, vertigo or instability during walking, attended between 2015 and 2019. For the statistical analysis, the Difference of Proportions Test was applied, using the Minitab® software, test for a proportion, with 95% CI ($p < 0.05$). In 61.2% of the medical records evaluated, the results of the exams were compatible with vestibular dysfunction. It can be inferred that, in the conditions of the sample of bank employees in this study, the prevalence of vestibular alterations is higher than the prevalence observed in the global population.

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INTRODUCTION

As with all other professions in the 21st century, banking also goes through the process that the authors Ferreira (2005) and Martins and Molinaro (2013) called productive restructuring. This term is used to designate the process of changes that has occurred in companies in the last decades due to introduction of innovations, both technological and management, seeking to achieve an integrated and flexible work organization, adapting it to the new times, where part of population accesses and has paid employment, while another part is totally or partially excluded from the world of work. Despite the need to adapt work processes for the survival of the different productive sectors and the provision of services, the changes influence to maladjustments in workers' health, to a greater or lesser degree. Not long ago, among the main causes of illness among bank employees, RSI/WRMSD (Repetitive Strain Injuries/Work-Related Musculoskeletal Diseases) emerged.

Currently, due to pressure to increase productivity, ambitious goals for the sale of banking products (opening current accounts, savings accounts, diversified financial investment portfolios, attracting new customers, insurance sales, financing, etc.), mental disorders in bank employees have appeared very close to, if not greater than, RSI / WRMSD in medical offices. Due to this pattern change in the comorbidities of this category of workers, it is prudent that studies start to reconsider the multiple factors involved in this population illness. Reinforcing this perception, Portz and Amazarray (2019) study showed high psychological distress of these professionals, with emphasis on anxiety disorders, relating the illness with the poor working conditions faced. Among the symptoms of anxiety disorders, dizziness and vertigo are recurrent and, invariably, these are the symptoms that most impel people to seek diagnoses. Dizziness is the second most common complaint in doctors' offices, which is why Eckhardt-Henn *et al.*, (2003), alert to the necessity to consider the diagnosis of psychiatric disorders for patients with chronic dizziness and vertigo.

This perception is also strengthened by studies such as Chitsaz (2016), which correlated dizziness with somatization, depression and anxiety. According to Gonçalves *et al.*, (2014), otoneurology is the area of Health Sciences that comprises the study and assessment of body balance through a series of tests and procedures that, together, assess the complex human balance system. According to Kelm *et al.*, (2018), although research on chronic dizziness and psychiatric disorders has been progressing satisfactorily, more studies are required to clarify this relationship and facilitate diagnosis. Therefore, considering the noticeable tendency to increase the number of referrals of people with psychogenic disorders to undergo neurotological examinations, and also the need for further studies that may provide more information about the relationship between psychiatric disorders, dizziness and possible otoneurological disorders, the objective of this study is to evaluate the behavior of the vestibular system in bank employees with complaints of dizziness, vertigo or instability during walking and diagnosed with anxiety disorders.

METHODOLOGY

The cross-sectional and retrospective study was carried out at the otoneurology outpatient clinic. 18 medical records of patients seen between the years 2015 and 2019 were evaluated, 16 males and 2 females, aged 26 to 53 years, average age of 36.8 years and standard deviation of 7.9 years. The research included bank employees (regardless of their role at the agency), referred by otorhinolaryngologists or neurologists for otoneurological evaluation with medical and/or psychological diagnosis of anxiety disorders and with complaints of dizziness, vertigo or instability during walking, without middle ear diseases. Those who had otological variation or other variations that made it impossible to perform the exams were excluded. All patients underwent anamnesis, which contained a questionnaire with emphasis on otoneurological signs and symptoms based on clinical history and current complaint according to Bohlsen *et al.*, (2011), personal and family history, and other diseases. The otorhinolaryngological or neurological evaluations did not contain any restrictive or noteworthy observations. The findings were raised from the vestibulometry, more specifically from the following tests that comprised the vestibular exam: search for vertigo and nystagmus of position and positioning (Dix and Hallpike maneuver) by means of infrared videonystagmoscopy; computerized vectoelectronystagmography with calibration of fixed saccadic movements, search for spontaneous and directional (or semi-spontaneous) nystagmus, search for pendular tracking, optokinetic nystagmus and post-caloric nystagmus. The search for optokinetic nystagmus was performed at a speed of 60° per second, clockwise and counterclockwise, in the horizontal direction. Caloric tests were performed with the individual in the supine position with the head tilted 30° forward, eyes closed and with an air otocalorimeter at temperatures 50° C and 24° C, for 60 seconds for each stimulation, bilaterally. All these tests were applied and the results were interpreted based on the recommendations proposed by Bohlsen *et al.*, (2011). The research protocol was approved by the Institutional Ethics Committee under the Opinion number: 3.412.809 / 2019 - CAAE: 15401019.9.0000.5367. For the statistical analysis, Difference of Proportions Test was applied, using the Minitab® software, test for a proportion, with 95% CI (p <0.05).

RESULTS

Regarding the self-perception of dizziness or vertigo, there was only one patient report that stated that in some crises (at least twice, it was not a precise specification) there was the feeling that the objects were rotating around, although in most situations in which the crises occurred, the sensation was that the head was bigger. As for the other patients, all referred to the sensation of dizziness, but the sensation experienced was described in a very inaccurate way, using phrases such as: - "it seems that I am out of my body"; - "I can't explain, but my body doesn't respond and I have difficulty walking"; - "I have the

feeling that I'm floating"; - "my head gets much bigger and it seems that what I am experiencing is not real"; and - "I don't know how to explain, but I have the feeling that I'm going to fall". The frequency of the main symptoms self-reported by patients is shown in Table 1.

Table 1. Frequency Distribution of the main self-reported symptoms

Self-reported symptoms	Number of cases	Frequency
Dizziness (non-specific description of sensation)	17	94.4%
Vertigo	1	5.6%
Repeated and short-term crises (minutes to hours) in the last months	6	33.3%
Repeated and long-term crises (one or more days) in the last months	12	66.7%
Weekly crisis	6	33.3%
Fortnightly crisis	9	50%
Monthly crisis	3	16.7%
Triggering factor turn your head in any direction	7	38.9%
Triggering factor unknown	11	61.1%
Worsens indoors or in crowded places	12	66.7%
Sleep changes	10	55.5%
Memory changes	11	61.1%
Blurred vision	3	16.7%
Nonspecific symptoms	5	27.8%
Tingling of extremities	3	16.7%
Auricular fullness	1	5.5%
Feeling that something very bad is about to happen	11	61.1%
Tinnitus	2	11.1%
Pains in the cervical spine	9	50%
Nausea or vomiting	1	5.5%
Significantly negative interference with daily life	12	66.7%
Gait deviations	5	27.8%

Table 2. Frequency distribution of videonystagmography and computerized vectoelectronystagmography findings

Referred symptoms	Number of cases	Frequency
Vertigo research and position nystagmus	0	0%
Vertigo research and positioning nystagmus	0	0%
Spontaneous nystagmus with open eyes	0	0%
Spontaneous nystagmus with eyes closed and AVSC < 7°/s	5	27.8%
Presence of Ocular Fixation Inhibitory Effect - EIFO	18	100%
Presence of directional (or semi-spontaneous) nystagmus	0	0%
Pendulum tracking with type I tracing	3	16.7%
Pendulum tracking with type II tracing	7	38.9%
Pendulum tracking with type III tracing	8	44.4%
Symmetric optokinetic nystagmus	18	100%
Caloric test with bilateral hyperreflexia	11	61.1%
Caloric test with normoreflexia	6	33.3%
Caloric test with directional predominance of nystagmus - asymmetric DPN	1	5.6%

It is observed from the data presented in Table 1 that the duration and frequency of the crises are variable, most patients do not correlate a triggering factor for the crises, the majority of symptoms worse in closed environments or with a crowd of people and, most complain of changes in sleep and memory, whose combined effects tend to significantly interfere significantly in daily life. Table 2 shows the distribution of the frequency of vestibular findings through video and vectoelectronystagmography. As can be seen in Table 2, the main changes found from the vestibulometry exams were the presence of pendulum tracking type III, bilateral hyperreflexia in the post-caloric nystagmus research tests and the presence of directional predominance of asymmetric nystagmus.

Based on these results, for 12 patients (66.7%), among the 18 evaluated, the conclusion of the vestibular exam was irritating vestibular dysfunction, while for the other 6 (33.3%) the vestibular exam was concluded as presenting results within normal standards. The statistical test for a proportion was applied to assess whether the proportion of bank employees in the sample, with anxiety disorders and with vestibular disorders, differs from the worldwide proportion of people with vestibular disorders, whose prevalence, according to previous studies, is approximately 25% of the global population Ganança *et al.*, (1999). The tested hypotheses were characterized as follows: Null Hypothesis (H_0) - bank employees with anxiety disorders present vestibular changes in a proportion less than or equal to the global prevalence and; Alternative Hypothesis (H_1): bank employees with anxiety disorders present vestibular alterations in a greater proportion than the global prevalence. From the application of the Proportions Test, with a significance level of 5% ($p = 0.001$), the Null Hypothesis (H_0) was rejected and the Alternative Hypothesis (H_1) was accepted, thus, it can be inferred that in conditions of the sample of bank employees in this study, the prevalence of vestibular alterations is higher than the prevalence observed in the global population.

DISCUSSION

According to Souza and Bernardo (2019), disorders such as depression, abusive use of legal and illegal psychoactive substances, anxiety attacks, stress and professional exhaustion have become common, with an evident relationship between these expressions of human suffering and the forms of organization of the current work. According to the Ministry of Social Welfare and Social Assistance, mental illness among the working age population is the third leading cause of leaving from work in the country (BRASIL, 2012). In this same sense, it was the perception of Paparelli (2011), when reporting that the restructuring of banking work is characterized by outsourcing, insecurity and intensification of work, with direct consequences on the physical and mental health of workers. For Silva-Junior and Fisher (2015) these conditions may be due to chronic exposure to unfavorable psychosocial stressors at work, associated with psychosomatic complaints, psychiatric symptoms with implications for well-being. In this context, Silva and Barreto (2010) demonstrate the association between increased prevalence for minor psychiatric disorders and work environments harmful to psychosocial aspects in bank workers, while Fernandes (2018) highlights the high prevalence of disorders anxious to leave work that consequently affect the life quality of these workers. Anxiety is a vague and disturbing sensation of fear and apprehension, accompanied by discomfort or tension, feelings derived from anticipations of danger, from something unknown or strange, which becomes pathological when the feelings are disproportionate to the stimulus, and interfere with life quality or the individual's daily performance. (Allena, Leonard, Swedo, 1995). According to Aronson and Logue (1988) and Jacob (1988), dizziness is the most common symptom in patients with anxiety disorders, occurring in about 50 to 85% of cases, however, in the series of this study, the self-reported dizziness index patient reached 94.4%. The fact that 61.2% of the patients in this study (bank employees, diagnosed with anxiety disorders and complaining of dizziness) presented test results compatible with vestibular dysfunction, suggests that psychosomatic issues (related to anxiety) may cause changes in the functioning of physiological balance control systems. The main finding in vestibulometry that indicated the abnormality of the vestibular system was the identification of post-caloric nystagmus hyperreflexia found in 11 patients (61.1%). According to Spector (1975), hyperreflexia is characterized by the presence of caloric nystagmus whose VACL exceeds normal limits, and is present in both central and peripheral vestibular lesions. In order to understand the occurrence of hyperreflexia in these patients, it is necessary to consider that the cerebellum works in conjunction with the cerebral cortex, assisting in programming, in advance, the muscle contractions necessary for the smooth progression of rapid movement present in the direction for the next rapid movement, in another direction, in a fraction of a second (GUYTON, 2017).

The functional changes caused by anxiety disorders, in these cases, would be preventing the nodular flocculus of the cerebellum from exerting its inhibitory influence on the neurons of the vestibular nucleus, failing to inhibit the vestibule ocular reflex (RVO), increasing the excitatory state of this nucleus (COATS, 1965; TOROK, 1970). Azzena *et al.*, (1993), and Balaban (2002), demonstrated through neuroanatomical mapping, correlations between areas of the brain associated with anxiety, such as hypothalamus, cerebellum and amygdala with the vestibular system. In investigating the RVO of patients with panic disorders Furman, Redfern and Jacob (2006), observed increased gains and a reduced time constant. Therefore, a second explanation for the occurrence of hyperreflexia could be due to the chronic action of stress hormones, such as vasopressin and the hypothalamic adrenal pituitary (HPA) axis, which would promote mitigating adaptation in the vestibular nuclei (SURGET and BELZUNG, 2008; DUTIA, 2010; SAMAN *et al.*, 2012). A second finding in vestibulometry, which indicated the abnormality of the vestibular system, was the search for post-caloric nystagmus that showed the directional predominance of asymmetric nystagmus (PDN).

However, considering that the clinical significance of PDN has been a source of controversy because of its numerous variability and, therefore, it does not always represent evidence of disease of the vestibular system, in addition to having no value for the location of the lesion site (EVIATAR and WASSERTHEIL, 1971; COATS, 1965), the result of the examination of this patient was not considered in the statistical calculations for testing the hypotheses. Even so, it can be inferred, from the statistical analysis, that in the conditions of the sample of bank employees in this study, the prevalence of vestibular alterations is higher than the prevalence observed in the global population. For the other 6 (33.3%) patients whose vestibular exam was concluded as showing results within normal standards, it should be noted that the absence of changes in the vestibular exam, despite the presence of labyrinthine complaint, can be explained by the occurrence of mild impairment of the vestibular apparatus whose sensitivity of the test is not sufficiently capable of identifying, or because of the very brain neuroplasticity that may have caused central compensation (TIENSOLI, COUTO and MITER, 2004).

CONCLUSION

The population of bank employees in this study, with complaints of dizziness, vertigo or instability in walking and diagnosed with anxiety disorders, has a higher prevalence of changes in the vestibular system and balance than the prevalence observed in the global population. The main finding of vestibular tests was bilateral hyperreflexia. For future studies, it is recommended to conduct a study on the health of these workers that can take into account, in addition to vestibular factors, the macro context of working conditions, given the low average age at which they had health problems (36.8 years - SD 7.9 years), and the simultaneous occurrence of 3 important factors in Brazil that contribute to the worsening that are: the ongoing epidemiological transition (with increased longevity), labor reform and social security reform, which converge and contribute to the further deterioration of environmental working conditions.

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